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The Governance
of City Food Systems:
Case Studies From
Around the World

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ABOUT THIS BOOK

This book brings together eight papers on the governance of city food systems. As case studies drawn from around the world, they serve to examine the key issues underlying the governance of city food systems in Milan, Belo Horizonte, Vancouver, Edinburgh, Bristol, Bangkok, Jakarta and Singapore and as those surfacing in the Expo's call for an Urban Policy Food Pact capable of "feeding the planet and energizing life".

The Governance of City Food Systems:

Case Studies From Around the World

Edited by

Mark Deakin, Davide Diamantini and Nunzia Borrelli

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Summary

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The Governance of City Food Systems:

Case Studies From Around the World

Introduction

This book brings together eight papers on the governance of city food systems. As case studies, they examine the governance of city food systems in Milan, Belo Horizonte, Vancouver, Edinburgh, Bristol, Bangkok, Jakarta and Singapore.

The case study from Milan focuses on the governance of the World Expo as a smart city food system. Not only in terms of the technical innovations or infrastructural service developments that make up the Expo, but in relation to the city food system, which is themed around the leitmotiv of "feeding the planet, energy for life". It suggests the value of this legacy is significant, because the city food system emerging from the Expo reaches beyond the technical innovations of infrastructural service developments and begins to reveal their true status as place-based transformations. In particular, their true status as place-based transformations, which in turn institute urban food policies, charters and pacts of equal importance in building the capacity that global events themed around the aspiration of feeding the planet and energizing life, also need to sustain their ambition. More specifically, the case study goes on to suggest the true status of the Expo as a place-based transformation is revealed in the City of Milan's Urban Food Policy and aspiration it has to feed the planet and energize life. To be exact, in that Urban Food Policy, which the City institutes in the form of the Milan Charter and Urban Food Policy Pact, the other papers in this book also explore the status of.

The case study on the city food system in Belo Horizonte is from one of the three cities in Brazil to have signed the Milan Urban Food Policy Pact. As such, this case study mirrors the institutional basis of knowledge production championed by the previous case study and reflects on how such place-based transformations develop:

"*sustainable food systems that are inclusive, resilient, safe and diverse, that provide healthy and affordable food to all people in a human rights-based framework, that minimize waste and conserve biodiversity while adapting to and mitigating impacts of climate change*".

As a city, with a population of over 2.5 million people, Belo Horizonte has received worldwide attention for its pioneering food security and the Urban Policy Food Pact does mark a critical moment in the development of the city's system. Twenty-two years since the launch of Belo Horizonte's revolutionary policy on urban food, the policy has now lost

much of its lustre; it is nevertheless, felt the Milan Urban Food Policy Pact can support those in the city fighting to elevate food policy to a new level.

Likewise, the case study on Vancouver's city food system, stresses that in the place-based transformation of North America, it is agriculture, which is emerging as a prominent fixture of the urban landscape. It suggests, the re-emergence of urban agriculture – including edible landscaping, schoolyard and community gardens, social enterprises and commercial farms, is not a passing trend, but a significant contributor to the new urbanism of the 21st century. As part of the "new food equation", it proposes, planners are now engaging with academics, professionals, community, non-government and non-profit organizations, to secure food provision and the creation of just, equitable and sustainable city food systems. As a consequence and as the case study serves to highlight, planners, academics and professionals now encourage urban policy makers to embrace city food systems as part of civic theory and practice, bringing agriculture out of isolation as a rural issue.

As this case study notes, citizens, non-profit organizations and institutions, are beginning to break ground, put shovel to earth, build raised beds, construct season-extension infrastructure, and use non-traditional spaces to grow food in urban settings. This is because, people who grow food in North American cities are motivated by reasons ranging from a desire to achieve self-sufficiency, address issues of poverty and malnutrition and engage in political activism. This case study also documents the benefits of urban agriculture for human health, by way of increased fruit and vegetable consumption and through measures to increase the social well-being of at-risk-youth. It also points out that recent studies have shown ecological benefits from the greening of urban spaces, which capture urban organic wastes, decrease urban heat-island effects, increase urban biodiversity and provide waste-water diversion. Additionally, there is an increasing body of knowledge demonstrating the economic impacts of local food economies, such as job creation and workplace readiness training.

The paper on Edinburgh's city food system shows Edinburgh to have a track record as a smart and sustainable city. In 2001, it was the first city in the UK to define itself 'smart' and since 2011 the City has sought to expand upon this development by way of its wider Sustainable Edinburgh 2020 Framework. Early consultations on this framework also serve to highlight a number of concerns about the city's food systems. In particular, concerns surrounding the:

- access to and affordability of food;

- impact of food on health, well-being and quality of life;
- waste;
- responsible consumption;
- local production.

Acting on the intelligence generated from the Sustainable Edinburgh, 2020 consultations, the City has proceeded to incorporate just such a food system into the Sustainable Edinburgh 2020 Framework and Sustainable Procurement Action Plan. Since 2012, the City Council has also been working in partnership with other key stakeholders to explore the potential it has to be smart in developing a sustainable food system.

As the case study on Bristol City's food system also establishes, the smart city approach adopted by many of their counterparts, has recently been criticized for its top-down focus on either technological innovations, or infrastructure service developments, at the expense of finding viable solutions to the institutional challenges they pose. This case study suggests such criticism results because the development of policy in the UK in not just technical or infrastructural, but also represents a social movement particularly orientated towards the provision of food.

In this case study, the digitally-connected activism of smart cities is represented by bottom-up, horizontal networks of urban groups, clubs, businesses, associations and other organisations, that create and share the knowledge which this produces about food. It also suggests such cyber food networks offer a smart city counter-point to the top-down approach of high-tech innovations in IT-driven infrastructure service developments, as some urban food networks have been successful in influencing municipal authorities as to their policy-making. It suggests that, in part, this bottom-up social movement reflects the limited power of local authorities in the UK over food provision, but also the outcome of attempts made by members of the public to participate in the democratisation of something, which has previously been marked out as technocratic.

In this case study, the authors outline the development of networks in Bristol, alongside the emergence of formal policies in city food systems. The aims of this network are reviewed in relation to the policies on city food systems. The case study also serves to reflect on what the governance of city food systems means in such a networked situation. It concludes with a consideration of the impacts, which food systems have on the city and lessons that can be drawn from such experiences.

Echoing many of these experiences, the case study on the governance of city food systems in Bangkok draws attention to:

- the participatory aspect of Bangkok's city food governance;
- the food production that emerges from the sustainable growth and inclusive nature of this governance system;
- civil society's use of this as a means to empower communities and be smart in bridging territorial divisions by way of local government strategies, secured through capacity-building exercises.

As this case study emphasizes, to facilitate the participation of civic organizations is the most concrete way to realize this ambition and this is why it has become the main target of such developments. The lessons learned from such developments is that where bottom-up initiatives from the people tend to fail, civic organizations fair better. For when they promote urban farming practices, the public sector realizes they cannot achieve civil society's expectations without engaging with the communities these represent. By doing so, civil society organizations can provide the support communities need. Consequently, the public sector decides to work with civil society organizations. This is because they realize it is only social movements of this kind that can empower a bottom-up, people-based exercise in community-building, capable of not only representing the poor, but other marginalized groups, which are otherwise excluded from such developments.

The case study on Jakarta goes on to further this exploration. As a city that struggles to provide permanent and reliable access to adequate, safe, local, diversified, fair, healthy and nutrient rich food, it offers an example of environmental degradation caused by "accelerated urbanisation"- two of the main challenges listed in the Milan Urban Food Policy Pact. Jakarta is also a city that highlights the realities of the challenges, which the Policy Pact faces and limitations of the smart city agenda adopted to meet them. In this respect, Jakarta helps to shed light on the disjuncture between the Pact and smart city food agendas of the rapidly developing cities they serve.

The case study focuses on the response to this "disconnect" and rise of community-based urban agriculture in Jakarta, particularly along the Ciliwung River. This is one of the thirteen rivers flowing through Jakarta. Its watershed cuts across the three cities of Bogor, Depok and Jakarta, and a regency. Historically, the banks of the river were plantations, with

farmlands extending into the cities of Jakarta, Depok and Bogor. Recent urban development has reduced the share of forests, plantations and farmlands. Rather than being known as a food-producing landscape, Ciliwung River is now notorious as a source of flooding. However, it is also noted that under the smart cities agenda in Jakarta there are bottom-up efforts from local communities, which do seek to revive river landscapes as productive city food systems.

The next case study notes that Singapore enjoys a relatively affordable supply of readily available food and is a place which one of the lowest incidences of food borne disease outbreaks anywhere in the world. In the 2015 edition of the Economist Intelligence Unit's Global Food Security Index, Singapore is listed as the second most food secure nation in the world, after the United States. In that sense, it excels in the categories of "affordability", "availability", and "quality and safety of food", which ranks 1st, 11th and 13th respectively. While this is not a rigorous measure of food security, it serves to approximate how Singapore stands in relation to other countries. As the case study goes on to stress, such a level of food security is achieved despite more than 90% of the produce being imported. It also suggests Singapore's high ranking in food security is the product of the smart city governance system, led by the Agri-food and Veterinary Authority (AVA). It goes on to propose this food governance system has lessons for others to learn, as no city can be completely self-sufficient in securing food.

These papers were originally prepared for a Symposium on the Milan World Expo entitled: *The Governance of the Smart City Food Agenda.* Organized by Milan-Bicocca and Edinburgh Napier Universities, this Symposium formed part of the Milan Expo Urban Laboratory's contribution to the Scientific Agreement on the UN Food Charter and Urban Policy Food Pact, launched by Milan City as part of the World Food Day.

The editors would like to thank the Feltrinelli Foundation for hosting the Symposium and agreeing to publish the proceedings.

Milan's Urban Food Policies as Smart City Governance Developments

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Introduction

In the 2015 icitylab survey, the City of Milan achieved first place in the general classification of smartness, followed by Bologna and Florence.[1] Motivated by the prospect of consolidating this status, Milan City have seen the World Expo as an opportunity to accelerate such smart city governance developments. Fieldwork conducted by Milan-Bicocca University, in 2014 illustrates how the Expo has worked to accelerate Milan's smart city governance system and serves to focus attention on the:

- site Milan assembles for the Expo;

- infrastructures the City develops to service the event;

- communication platform the Expo lays down to tell people about the event, information it offers about the exhibits on display and knowledge of food this transfers about the cluster of products on display;

- advice the Expo offers on how to move around the pavilions;

- interactive experience it offers visitors and invitation the exhibition extends them to participate in the event;

- options it provides for visitors to travel to and access the event, be it on foot, by bike, car, bus, train or waterway;

- legacy this smart city leaves behind for others working on food systems to champion elsewhere in the world.

As Deakin et al. (2015) note, as a model for governing Milan City's smart city development, such innovations draw particular attention to the ability of the master plan to coordinate the 110-hectare site for the Expo by laying down the infrastructures needed

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[1] http://www.icitylab.it/il-rapporto-icityrate/edizione-2015/dati-2015/). For Milan, also see Taylor (2012); Curi Dallari (2012); Magatti and Gherardi (2010); Mauro Magatti et al. (2005).

to service this. In particular, by laying down those infrastructures needed to service the event's mobility requirements, as well as meet the water, waste and energy demands the Expo loads onto the smart grid assembled to not only fuel the LED lighting, but also power and heat the installations. More specifically, by way of the smart grid assembled as the platform to install a remote sensing system, able to service the event through the cloud and as an internet-of-things (IoT). To be exact, as a remote sensing system, whose cloud-based IoT is able to monitor the ecological footprint of the pavilions as an environment, whose microclimates are not only energy-efficient, but also able to operate as low-carbon buildings.

As Deakin et al. (2015) go on to note, as the technical innovations of infrastructures servicing the construction of the Expo's built environment, these developments also highlight the:

- potential high-rise farming techniques have to produce food, while using natural daylight, solar power and water recycling techniques to rotate crop cycles;
- prospects the genetic modification of stable foods, such as rice, have to weather global warming and water shortage this generates;
- future of food provision as a logistical landscape, able to "feed the world and energize life".

Meeting the demands of over 100,000 visitors per day, these technical innovations, infrastructural service developments and installations, offer a leading example of a smart city built from the ground up. That is, from a former derelict brownfield site, into an installation, which builds upon the legacy of Milan's smart city governance developments, by constructing a platform able to exhibit what the world knows about food provision and understands about how improvements to the built environment can help meet the growing demand for such products.

While significant developments in their own right, what this paper wishes to focus on is not the technical innovations, which infrastructural developments in the City of Milan leaves behind, but governance legacy the Expo offers up for the future as a global event that is themed around the leitmotiv of feeding the planet and energizing life. This is because, the value of these governance legacies reach beyond the Expo as a global event for technical

innovations in infrastructure service developments and towards their true status as place-based transformations. This paper suggests the legacy of these installations and their true status as place-based transformations rests with the City of Milan's Urban Food Policy. In particular, it argues they are located in the: *Milan Charter (*promoted by Minister for Agricultural, Food and Forestry Policies, as part of the Laboratorio EXPO Programme, the *Urban Food Policy Pact* and *Food Smart City Development Project.*

The paper goes on to propose: that as the info-structures of those smart city governance developments, which surface from the Expo, these polices offer critical insights into how technically innovative infrastructure service developments reach beyond the site-specific nature of such installations. In particular, how they reach beyond the site-specific nature of such installations and reveal their true status as place-based transformations (Leydesdorff and Deakin, 2011; Deakin and Leydesdorff, 2013; Deakin, 2011, 2014, 2015). More specifically, their true status as place-based transformations, instructing civil society on how to create the institutional capacity needed to govern this as a set of policies, whose international status is expansive in the intention this global event harbours to do nothing less than feed the world and energize life. To be exact, in the intention, which this global event harbours to avoid limiting the governance of smart cities to the technical innovations underlying infrastructure service developments, by extending them up onto a platform that supports civil society's involvement in place-based transformations of this kind.

In this paper, we suggest it is not the technical innovations of the underlying infrastructure service developments that characterize the governance of smart city food systems, but the restorative justice and equity, which civil society cultivates and that Milan builds the institutional capacity for, which are key in defining the environmental qualities of the Expo. What-is-more, we also suggest that, far from being alien to the underlying logic of smart city food governance, restorative justice and equity reflect the values, which civil society cultivates and Milan City builds the institutional capacity for as policies whose charters, pacts and projects define the environmental qualities of.

We also go onto suggest, the institutional capacities, Milan City cultivates in civil society to restore justice and be equitable, go beyond the terms currently used to characterize such city food systems. That is, beyond references to bottom-up constructions and towards ground swells, whose sentiments grow into the social movement of a civitas, which cultivate

this as the tectonics of the institutional capacities they in turn build. In that sense, towards ground swells, whose sentiments grow into the social movement of a civitas, which cultivate this as the tectonics of the institutional capacities they in turn build as policies, pacts, charters and projects, able to rile against the injustices of that inequity, which the food regime has produced over the past decade. In particular, rile against the injustices of the inequities, which the regime has produced over the past decade and that smart city governance systems not only secure the innovations needed for infrastructures to overcome them, but also configure the service developments as installations required in order for social movements of this kind to break with the limitations of. More specifically, in order for social movements of this kind to break with the limitation of, as a civitas that cultivate this as the tectonics of the institutional capacities, which they in turn build as policies, whose charters, pacts and projects define their environmental qualities. That is, as charters, pacts and projects, which define their environmental qualities as place-based transformations, able to restore justice and be equitable in securing universal access to food.

As smart city governance developments, the Milan Charter is the most significant legacy of the Expo and is the product of a broad debate between the scientific community and civil society cultivated by EXPO Laboratory. Expo Laboratory is a project of Expo Milano spa 2015 and Fondazione Giangiacomo Feltrinelli, arranged by Professor Salvatore Veca and dedicated to the scientific consideration of civil society's food culture. Milan's Urban Food Policy Pact is championed by the UN and C40 Climate Leadership Group and has been developed for signature by the Covenant of Mayors. Along with Milan, over 120 other smart cities across the world are now co-signatures' to this pact. The Smart City Food Development Project aims to augment the social status of both these policy initiatives, by not only supporting the food culture surfacing from EXPO Laboratory, but by extending it into the institutions underpinning them.

As all of them have their origin in Milan's Urban Food Policy, this provides the most appropriate vantage point from which to examine the contribution that each smart city governance development makes to the Expo.

Milan's Urban Food Policy

Milan's Urban Food Policy sets out to:

- develop a vision of food for the City of Milan;
- interlink this with all the policies promoted by the City;
- define food policies in partnership with the broad range of stakeholders involved in the provision, consumption and distribution of food.

The general prospectus of the Urban Food Policy is set out as a ten-point statement, which sums up the complexity of the food regime in Milan, helping to understand its many facets and create commitments that can then evolve into general, as well as specific objectives. [2]

The ten points of the Milan Food Policy are:

- Governance: this highlights the importance of dialogue both within institutions as well as with members of the public;
- Education: shows how to learn about and gain knowledge of food and the institutions involved in this;
- Waste: refers to the unintended consequences of inefficient food provision and lifestyle choices relating to the distribution and consumption of products;
- Access: refers to the different ways in which the right-to-food is addressed, depending on the demographic structure of consumption: children, adults, the poor and vulnerable, foreign communities, refugees, etc.;
- Wellbeing: considers the relationship between food, health and lifestyle;
- Environment: draws attention to the repercussions the food-cycle has on air, water and energy;

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[2] To define the contents of the Milan Food Policy prospectus an analysis has been made of the different ways in which food interweaves with the life of the city. The analysis looked at the food-cycle and its relationship with Milanese society, economy and environment; all of this focusing on Milan but also trying, at each step, to understand the relationship between what happens in the city and its structure on a larger scale. This analysis was carried out using a wide range of sources: databases, researches, web sources, interviews and other documentary material produced both by various Milanese, regional and national institutions as well as by other social and economic parties.

- Agro-ecosystem: focuses on the interactions the agri-business has with the local territory and landscape;

- Production: addresses the theme of food provision in all aspects, from urban allotments to large-scale production, from local markets to international trade fairs (involving Milan), to innovations in quality and organisational systems via research and technical development;

- Financing: relates to all issues connected with investment and returns from the food cycle;

- Commerce: involves all aspects of food distribution and retailing, as well as the relationships these have with urban neighbourhoods, their social dynamics and cultural settings.

Milan promotes such a novel policy, because the city is home to many social and cultural activities lying at the heart of the Italian food system. The biggest financial institutions that regulate this market have offices in Milan and it is here that a significant number of the commercial catering and hospitality systems are concentrated. Improving the quality of food provision in Milan means developing the sustainability of the city. Such sustainability gains require the city to adopt a systemic approach to food provision. In particular, policies that stand firm on such commitments and which rest on the social, cultural, environmental and economic structure of food provision. Addressing food as the key element of the city's sustainability also means managing the territorial relations linked to the physical and organisational structure of food, as well as the social, cultural, environmental and economic dynamics of provision.

The city also boasts a wide range of stakeholders, initiatives and projects, whose social relations cultivate environments and determine the economics of food provision: these range from informal local groups to key organisations operating at national and international levels. Milan is also a regional, national and international hub for representatives of the agri-business, as well as civic associations and institutions related to this. In addition, it is home to a number of cooperative networks and partnerships, with varying degrees of formal constitution and who contribute significantly to the promotion of food-related innovation.[3]

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[3] Other important actors are: the DAM (Distretto Agricolo Milanese) consortium is a formed by 33 farming businesses that operate on the local territory. The DAM has signed a Territorial Development Plan Agreement with other three Districts (DAVO, Riso e Rane, DINAMO) as well as with the Milan city, province and regional governments, to promote an integrated and sustainable urban

The Milan Charter

The Milan Charter is the product of the Minister for Agricultural, Food and Forestry Policies and the main outcome of the Laboratorio EXPO project. It is the most important cultural legacy of the Expo and culmination of a broad debate on "Feeding the Planet, Energy for Life". As a policy statement, it commits everyone to take responsibility for ensuring future generations are able to access safe, secure and nutritious food as a human right. In this aim, it asks everyone (citizens, businesses and governments alike) to collaborate with one another and take actions to uphold this human right. At the same time, the document also seeks to not only guarantee the right to food, but also safeguard the productive use of agricultural land as a natural resource. In particular, as a natural resource and as part of civil society's cultural heritage. The document also represents food as a cultural patrimony and as such, defends products from counterfeiting and fraud, deceptive and improper business practices.

The Urban Food Policy Pact

The Urban Food Policy Pact represents one of the most important outcomes of the Expo. It encompasses many different aspects of food provision and represents the will of a City committed to the development of a policy regime, open to everyone, because it is inclusive, sustainable and as consequence smart. Acknowledging that cities, which host over half the world's population, have a strategic role to play in developing sustainable food systems and promoting healthy diets, the Pact commits them to re-examine the ways in which they provide food, as well as other essential goods and services. This is something, which the Pact suggests forces cities to recognize that:

- hunger and malnutrition in various forms exist within all cities, posing great burdens on health and well-being and thus generating major social, cultural,

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development of the metropolitan area of Milan. In Milan there are over 80 official ethical purchasing groups (known as G.A.S. – Gruppo Acquisto Solidale), but if we compare this number to national trends including official and non-official groups, the figure is double. These organisations, together with other high-quality farming businesses, associations and cooperatives, are also involved in the management of about ten farmers' markets that take place in Milan on a regular basis, in addition to other forms of direct retail managed by farmers who mediate their relationship with consumers outside of traditional retail channels. For many years, Milan has had an active parents' cooperative aimed specifically at overseeing and making daily quality checks on school dinner catering services provided by Milano Ristorazione, maintaining with the company an open and ongoing dialogue.

environmental and economic costs at household, community, municipality and national levels;

- family farmers and smallholder food producers, (notably women producers in many countries) play a key role in feeding cities and their territories, by helping to maintain resilient, socially just, equitable, and culturally specific food systems;

- urban and peri-urban agriculture offers opportunities to protect and integrate biodiversity into city food systems, thereby securing synergies across ecosystem services, human and social well-being;

- food policies are closely related to many other urban challenges and policies, such as poverty, health and social protection, hygiene and sanitation, land use planning, transport and commerce, energy, education, and disaster preparedness and make it essential to adopt an approach that is comprehensive, interdisciplinary and inter-institutional;

- civil society and the independent sector have major roles to play in feeding cities, bringing experience, innovation and campaigns for sustainable food systems and mainstreaming the need for a socially inclusive and rights-based approach to urban food policy;

- addressing climate change means promoting strategies and actions able to mitigate greenhouse gas emissions and adapt cities to the environmental impacts this in turn has on food systems by maintaining bio-diversity.

By signing the Milan Urban Food Policy Pact, cities commit to the following:

- working to develop sustainable food systems that are inclusive, resilient, safe and diverse, that provide healthy and affordable food to all people in a human rights-based framework, which minimise waste and conserve biodiversity, while adapting to and mitigating impacts of climate change;

- encourage interdepartmental and cross-sector coordination of food policies at municipal and community levels, working to integrate urban food policy considerations into social, cultural, environmental and economic policies, programmes and initiatives, such as, inter alia, food security, health and welfare;

- seeking coherence between municipal food-related policies and programmes and relevant subnational, national, regional and international policies;

- engaging all sectors within the food system (including neighbouring authorities, technical and academic organizations, civil society, small scale producers and the private sector) in the formulation, implementation and assessment of food-related policies, programmes and initiatives;
- review and amend existing urban policies, plans and regulations in order to be just in establishing   equitable, resilient and sustainable food systems;
- using this framework as a starting point to develop their own urban food system in association with regional,   national and international government agencies;
- encouraging other cities to join such food policy actions.

The Milan Urban Food Policy Pact now has over 120 participating cities.

The Food Smart City Development Project

The Food Policy Pact has developed from a European project called Food Smart City Development.[4] The main aims of this project are to raise public awareness about the impact of European cooperation policies, with particular emphasis on decentralized programmes on food security and sustainable development. The specific objective of the project is to create a common reference framework (network of Food Smart Cities) to guide European local authorities and civil society organisations in the drafting and development of local food related policies.

Smart city developments triggered by Milan's 2015 World Expo

From this account of Milan's Urban Food Policies, it is evident interest in such instruments is directly related to the World Expo's aim of feeding the planet and energizing life. Furthermore, it is also clear they reflect much of what Morgan and Sonnito (2010) refer to as the new food equation, vis-a-vis that period of unresolved experimentation and contestation over a regime, which this in turn lays down for those institutions charged with regulating access to such goods and services.

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[4] http://wfto-europe.org/food-smart-cities-for-development-eyd-2015/

As Deakin et al. (2015) show, what this new food regime in turn asks from smart city governance developments is nothing less than a:

- redirection of intellectual capital and wealth creation away from the ICTs, water, waste and energy of smart city infrastructures and towards the human and social capital of food;
- focus on how the human and social capital of food can co-exist with urban and regional innovations in the logistics of the mobility, water, waste and energy sectors;
- examination of how the informatic, energetic and metabolic value of these urban and regional innovations can generate the intellectual capital needed for the infrastructural developments servicing cities to be smart in building the institutional capacities required for them to sustain growth;
- exploration of how municipalities can draw upon this urban and regional innovation system as infrastructures servicing the development of food strategies capable of stabilizing provision and allowing communities to participate in the wealth creation opportunities such capacity building exercises offer in order to be inclusive.

Indeed, we suggest the need to govern the regime in such a manner is becoming so important the EC, Directorate General Joint Research Centre (DG JRC), Institute for Prospective Technological Studies (IPTS) and Smart Specialisation Platform (S3 Platform), are now championing food as a turnkey component of smart, sustainable and inclusive growth across the regions. This manifesting itself in a S3 thematic workshop entitled "Smart specialisation and food: food, gastronomy and bio-economy as elements of regional innovation strategies". That Workshop, which took place in the EU Pavilion of the Expo on 22nd September, 2015.[5]

Smart specialization is now the hallmark of this 'New Industrial Policy. That policy in which the agri-food business is prioritized as a regional innovation strategy and whose place-based transformations are justly restorative in the sense they are equitable in promoting both sustainable and inclusive growth. Considering this, it is perhaps surprising

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[5] http://s3platform.jrc.ec.europa.eu/expo-2015

the prospects, which smart specialisation offer urban food policy in Milan is something the City has overlooked in the charters, pacts and projects that it has sought to promote under the auspices of the Expo. This is surprising, in the sense that it is just this strategy, which offers the means to reach beyond the site-specific nature of such infrastructure-based service developments. That is to say, beyond the site-specific nature of such developments and out towards their place-based status as the transformations of global events. Out towards their place-based status as the transformations of global events, which instruct all of those from civil society that participate in trans-national developments of this kind. In particular, instruct all of those from civil society that participate in trans-national developments of this kind, on how to create the institutional capacity, which is needed to not only "chart" this as either a "pact", or "project", but also render the international status of the justice it restores as the equitable basis of a sustainable and inclusive growth. In that sense, render the international status of the justice it restores the equitable basis of, as sustainable and inclusive of the intention to do nothing less than feed the planet and energize life.

Conclusions

While drawing attention to the smart city governance debate surfacing from the Milan City World Expo, this paper has sought to focus, not so much on the innovative qualities, which infrastructure developments serve to leave behind, but legacy the Expo offers up for the future as a global event themed around the leitmotiv of feeding the planet and energizing life. This is because, the value of these governance legacies reach beyond the Milan Expo as a global event for the localization of technically innovative infrastructure service developments and towards the governance of their true status as place-based transformations, whose generic qualities are in turn capable of being mainstreamed. In this respect, the paper has suggested these governance legacies and the generic qualities they mainstream are found in Milan's Urban Food Policy. In particular, it has argued they appear in the Milan Charter, the Urban Food Policy Pact and the Food Smart City Development Project.

It has also gone on to argue the smart city governance these polices bequeath are particularly valuable for the reason they provide critical insights on how to reach beyond

the innovations of such infrastructural developments and towards their true status as place-based status as transformations. Towards their true place-based status as transformations, which not only instruct civil society on how to create the institutional capacity needed for policies to chart them, or pacts to project their international status, but that are also required for them to be expansive in communicating the intention they harbour to feed the planet and energize life. In particular, in the intention, which they in turn harbour to avoid limiting the governance of smart city food systems to the technical innovations of infrastructure service developments and fulfil this ambition by extending up onto a platform of social innovations, whose policies, charters, pacts and projects in turn built the institutional capacities needed to support them. In particular, the institution capacities needed to support them as environmental qualities able to restore justice as an equitable basis, upon which to feed the planet and energize life in a way that is both sustainable and inclusive.

We suggest that it is not the technical innovations of these infrastructure developments, which characterize such smart city governance systems, but the restorative justice and equity civil society cultivates and the City of Milan builds the institutional capacity for, which are the key policy commitments of the charter, pact and project, defining the environmental qualities of the Expo. What-is-more, we also suggest that, far from being alien to the underlying logic of smart city governance, restorative justice and equity reflect the values, which civil society cultivates and Milan City builds the institutional capacity for as policies whose charters, pacts and projects communicate the environmental qualities of.

We also go onto suggest, the values civil society in the City of Milan cultivates and builds the institutional capacity for, go beyond the terms previously used to communicate the status of such smart city governance systems. That is, beyond references to bottom-up constructions and in this instance, towards ground swells, which grow into a social movement, whose civitas, cultivate this as the tectonics of the institutional capacities they in turn build as policies, pacts, charters and projects, able to rile against the injustices, which the food regime has developed over the past decade. In particular, rile against the injustices of the regime, which smart city governance systems, not only serve to overcome the limitations of, but also configure the services required in order for social movements of this kind to break with. More specifically, in order for social movements of this kind to break with the limitation of as a civitas that cultivate this as the tectonics of the institutional capacities, which they in turn build as policies, whose charters, pacts and projects define

their environmental qualities. That is, as charters, pacts and projects, which define their environmental qualities as place-based urban transformations, able to restore justice and be equitable in securing universal access to food.

Drawing particular attention to the period of unresolved experimentation and contestation these developments instigate, the paper has also gone on highlight why the need to govern them as part of an emerging smart city food system, is now a matter of such importance. This in turn manifesting itself in a S3 thematic workshop entitled "smart specialisation and food: food, gastronomy and bio-economy as elements of regional innovation strategies". That regional innovation strategy, which we suggest is now the hallmark of a "New Industrial Policy" for the agri-food business and prioritized as a place-based transformation that is restorative in the sense, which it is also equitable in promoting the sustainable and inclusive growth of territories as products of the global event this represents.

Considering this, the paper has also gone on to suggest, that it is perhaps surprising the prospects, which the smart specialisation of food offer Milan have until now been overlooked by the City as a key plank of their municipality's strategy. Surprising, in that it is just this strategy, which offers the means for them to reach beyond the site-specific nature of infrastructure service developments. That is to say, overcome the limitations traditionally associated with infrastructure service developments, by reaching out towards their place-based status as the key transformative components of global events. As global events, which instruct all of those participating in such place-based transformations, on how to build the institutional capacity that is needed for regions to not only "chart" this as part of a "pact", but "project" also required to render the trans-national status of their environmental qualities. In that sense, render the trans-national status of their environmental qualities as expansive in the intention they harbour for the internationalisation of this global event to restore justice as the equitable basis of a sustainable and inclusive growth, able to do nothing less than feed the planet and energize life.

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Belo Horizonte:
the Opportunities and Challenges of Urban Food Security Policy

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Introduction

By July 2015, Belo Horizonte was one of only three Brazilian cities (the others were São Paulo and Curitiba) to have signed on the *Milan Urban Food Policy Pact* (2015). Led by the city of Milan, and to be signed on the occasion of World Food Day in October 2015, the Pact is a challenge for cities of the world to develop "*sustainable food systems that are inclusive, resilient, safe and diverse, that provide healthy and affordable food to all people in a human rights-based framework, that minimize waste and conserve biodiversity while adapting to and mitigating impacts of climate change*".

It is not surprising that Belo Horizonte would be an early signatory of this Pact. The city, with a population of over 2.5 million people, has received worldwide attention for its pioneering food security policies (Lappé & Lappé 2002; Shein 2007; Gerster-Bentaya, Rocha & Barth 2011; Haysom 2015), with programs that continue to inspire other jurisdictions. The signing of the Milan Pact comes, however, at a crucial junction in determining how important food policy will continue to be in the city. After twenty-two years since the launch of Belo Horizonte's revolutionary set of programs for food security in 1993, food policy has lost much of its luster in the agenda of municipal priorities. While it cannot guarantee the return of food as a central municipal strategy, the Milan Pact can provide some support to those forces in the city fighting to elevate its food policy to a new level.

This paper reflects on some of the factors, which led to the success of the Belo Horizonte's strategy for food security until recently, and the challenges the city faces in meeting the commitment in the Milan Pact.

Policy and Programs for Food and Nutrition Security

For those not yet familiar with Belo Horizonte's food security programs, a brief account may suffice here (see also, Rocha 2001; Rocha & Lessa 2009; Mendonça & Rocha 2015). The city's Secretariat for Food and Nutrition Security (SMASAN) has divided its programs into six "lines of work": 1) subsidized food sales, 2) food and nutrition assistant, 3) food supply and market regulation, 4) support for urban agriculture, 5) education for food consumption, and 6) job and income generation. Together, these programs have created an "alternative food system" focused on food and nutrition security and promoted by public policy. Principles guiding the programs include the right to food, social justice (favoring marginalized and low-income groups), universality (fighting stigma as they reach their target populations), and food quality and safety.

Among the programs following these principles, the Popular Restaurant is probably the most iconic. Cafeteria-style restaurants are open to all, serving over 20,000 nutritious meals per day at subsidized prices (in 2015, lunch was being served at $3.00 Brazilian *reais* or US$1.00). The principles also apply to the city's School Meals program (serving over 40 million meals/year to 155 thousand students in 218 public schools), and the *Abastecer* (or *Sacolão*) program, in which selected (private) grocery stores partner with SMASAN to sell 20 fruits and vegetables at one price (BR$0.99/kg for all items in 2015) set below market values. The city has also affected food production in its surroundings with initiatives supporting direct sales by family farmers through its "Straight from the Field" program, as well as through conventional and organic farmer's markets.

Factors in the Success and Resilience of Belo Horizonte's Food Security Agenda

Three main reasons accounted for the early success of the food security agenda in Belo Horizonte. First, political will was the most important factor in getting a coordinated, system-wide municipal policy for food security off the planning stage and into practice. The commitment of mayor Patrus Ananias (1993-1996) to food security resulted in the creation of a municipal department (SMAB, later SMASAN) to centralize all city programs in this area. Second, a technically competent, ideologically motivated, and politically dedicated civil servant team at SMASAN implemented the programs with great conviction and pride.

Its goal was to show the rest of the country that government programs geared to the poorest population could be of quality. High nutritional standards, food safety and cleanliness were to be the mark of the programs. This early concern with its image, with its branding, served to establish the legitimacy of the SMASAN's programs in the eyes of the general public. Finally, a third factor in SMASAN's early success was that, despite the large number of people reached, the secretariat's share of the municipal budget hovered between 1% and 2%, demonstrating that making a significant impact on food and nutrition security could be very cost-effective.

By the early 2000's, the city was gathering awards and growing its reputation for excellence in food security programming. It was becoming a "model" not only to other municipalities, but also to other levels of government. Still, the continuity not only of the SMASAN's programs and, more importantly, of its institutional philosophy (based on the right to food, social justice, and universality) has been frequently threatened by local political changes.

An important factor in the resilience of food security programs in Belo Horizonte for over 20 years is found beyond municipal jurisdiction. The election of President Lula da Silva in 2003 elevated food security as a new priority in the country. In his first official speech as president, Lula expressed that the main goal of his presidency would be to eliminate hunger in Brazil. In 2014, the United Nations Food and Agriculture Organization declared Brazil off the "hunger map" since, by the end of 2013, less than 5% of the country's population showed any degree of undernourishment (FAO 2014).

The national Zero Hunger strategy developed during the Lula government was the key political instrument towards greater food and nutrition security in the country. Not surprisingly, when Patrus Ananias took over the federal Ministry for Social Development and Fight against Hunger (MDS) in 2004, many of the programs he had supported in Belo Horizonte while mayor 10 years earlier became part of the Zero Hunger strategy, which allocated resources to local food security initiatives. It can be said that Belo Horizonte served as an example of what is possible through a cost-effective, integrated food policy, and its approach was then scaled-up to the national level after 2004.

This scaling-up of food security programs through the Zero Hunger strategy was, in turn, very important for the continuation and growth of the programs in Belo Horizonte itself. After 2004 and in partnership with the federal government, the city was able to increase the number of Popular Restaurants, develop its food bank (see Rocha 2014), and improve its School Meals program. Federal policies in support of small-scale family farmers now go beyond the original support provided by the city. Through the federal Food Acquisition Program (PAA), the city has an incentive to purchase food for its Popular Restaurants and food bank directly from small-scale family farmers; and legislation under the National School Meals Program (PNAE) now requires 30% of federal funding to be spent on purchases of food produced by family farms (Rocha, Burlandy & Maluf 2012).

Changes at the federal level, which now support food security programming at municipal levels, also include the passing of a National Law on Food and Nutrition Security (LOSAN) in 2006, and the constitutional amendment adding the Right to Food to the country's constitution in 2010.

Strategies and Challenges

The pioneering and innovative features of Belo Horizonte's food security strategy were mostly reflected in the creation of a separate municipal department to centralize all the city's food programs. In the beginning, SMASAN had to fight hard for its legitimacy and funding. Turf wars were common. After all, budget allocations were at stake. As one example, funding for the School Meals program (one of the largest) migrated from the municipal department of education (where it was originally, and where it still resides in the majority of Brazilian cities) to SMASAN. The resolution of such in-fights among city departments in favor of SMASAN had to have the strong and decisive support of a popular mayor. There were also sound arguments made, such as, for example, when SMASAN's staff pointed out the difficulty for the department of education to have the School Meals program as one of its many priorities. Education, not feeding children, is the main priority of the department of education. It should, the argument went, leave the feeding of children as the responsibility of SMASAN.

The creation of SMASAN allowed for an integrated thinking of the food system. It no longer was "food for hungry students" in a department of education, or "food for needy people" in a department of social assistance, or "food for consumers" in a department of commerce, or "food from family farmers" in a department of agriculture. Rather than compartmentalizing food security in the municipal policy agenda, SMASAN could integrate all the aspects of the food system and work with its importance in different areas and for different purposes. Its strategy was to partner with other city departments in implementing its programs and in accessing its target public. After 2004 and the Zero Hunger strategy, it partnered with the federal government in expanding its programs.

SMASAN's partnership strategy brought many benefits, particularly in containing the costs of its programs. Bulk food purchasing, for example, is economical. This partnership model, however, has also brought some disadvantages. First, there is the question of recognition. Since no other jurisdiction in Brazil (or around the world) has a department exclusively dedicated to food and nutrition security, SMASAN's programs tend to be identified (by the general public) with its larger and more established partners. Hence, the School Meals program is still identified with the department of education; the food bank and the Popular Restaurant with the department of social services; the *Abastecer* with the department of commerce; etc.

This leads to a second problem. For those who do not know its history and do not recognize what it does, SMASAN seems superfluous. This puts in jeopardy its very existence as a municipal department, particularly at times of a change in local government, or during times of fiscal constraint (despite its cost effectiveness). While few people would question the existence and importance of traditional departments (education, health, and social services), the existence and importance of a "department of food and nutrition security" are always questioned, no matter how successful its programs have been. SMASAN constantly has to justify its existence and relevance, even after 20 years of exemplary policies and programs in food security.

The lack of recognition of the importance and uniqueness of SMASAN is also reflected in the attitude of many of its own past directors. The directorship of a municipal department is a political appointment, and with the exception of SMASAN's first director, Maria Regina Nabuco, other people appointed to head SMASAN throughout the years have not

necessarily had any previous knowledge of food and nutrition security or any particular commitment to it. To their credit, once in the position, many learned about the importance of SMASAN and its programs, but there have also been many internal conflicts between the original technical staff and subsequent department directors. Some directors have not fully understood (or care for) the principles that guided the creation of SMASAN's famous and successful programs. As an example, the universality of the Popular Restaurant, where anyone, from homeless people to students, to office staff, and whole families can dine paying the same low price, is often challenged. Why not restrict its access to only "those in need"?

Similarly, the decision to avoid industrialized food products in the School Meals program has been questioned. All public schools in the city must have a kitchen and paid staff to cook the meals from scratch. Wouldn't it be more convenient (or even more cost effective) to buy packaged products from large food corporations? Many of those corporations are often offering deals so as to get good contracts with the city. Some of them even attempt to enter the school gates in the guise of "curriculum support" and "career development" opportunities for teachers. They also offer to supply their products for free to the children in the public school system as part of "research" contracts (to test the children's acceptance of their products). These attempts are easily recognized as pure marketing strategies by the veteran SMASAN's public servants, who have resisted them many times over the years. But these offers are also tempting for department directors and school principals, who simply see them as opportunities for extra resources for the public educational system. Many question the wisdom of refusing to accept the corporations' offers. Couldn't they be partners? What could be the harm, they ask, of accepting nutritious packaged foods (let's say, yogurt) from a corporation? Isn't SMASAN denying many poor children in the school system the opportunity to consume a product, which they could never enjoy otherwise (given the low income of their families)?

These questions do not have easy answers. But the dietary guidelines launched in 2014 by Brazil's Ministry of Health (Brasil 2014) reinforces some of the original principles followed by the School Meals program in Belo Horizonte. Brazil's Dietary Guideline offers "10 steps to health eating" to be followed by the population:

> 1) Make food (fresh or minimally processed products) the basis of your diet;

2) Use oils, fats, sugar and salt in moderation;

3) Limit consumption of ready-to-consume food and drink products;

4) Eat regular meals, paying attention, and in appropriate environments;

5) Eat in company whenever possible;

6) Buy foods in places that offer varieties of fresh foods. Avoid those that mainly sell products ready for consumption;

7) Develop, practice and share skills in food preparation and cooking;

8) Plan time to give meals and eating the space they deserve;

9) When eating out, choose restaurants that serve freshly made dishes and meals. Avoid fast food chains.

10) Be critical of the information, guidance and messages conveyed by commercial advertisement of food products.

Once again, programs at the local level in Belo Horizonte are supported by initiatives at the federal level.

Governance and the Participation of Civil Society

Organized civil society (non-governmental organizations and social movements) has played a central role in the development of food and nutrition security policy in Brazil (CONSEA 2009). At the World Food Summit in Rome in 1996, the Brazilian official delegation had members from both government and civil society. This led to the creation in 1998 of the Brazilian Forum for Food and Nutrition Security (FBSAN), a national association of social organizations, researchers, government staff, and other professionals working in the area of food and nutrition security. Once the opportunity for civil society participation in governance was amplified after 2003, FBSAN was ready to contribute.

Many of the participants in FBSAN have served on the National Council for Food and Nutrition Security (CONSEA), an advisory body to the federal government. Two-thirds of CONSEA's members are from civil society, and the other one-third are appointed by different federal ministries, such as Social Development and Fight against Hunger, Agrarian Development, Health, Education, etc. CONSEA has generated some of the most innovative and bold programs in the past 15 years. The Food Acquisition Program (PAA) and

improvements in the School Meals program (PNAE) originated there. CONSEA's main accomplishment, however, has been the institutionalization of food and nutrition security policy in the country.

CONSEA (along with FBSAN) was behind the campaign to have the Right to Food amended into Brazil's constitution in 2010. This came after its success in having the National Law on Food and Nutrition Security (LOSAN) approved by congress in 2006. Under LOSAN, the country has developed a National Policy on Food and Nutrition Security, and all levels of government (federal, state, and municipal) are to participate in the construction of a National System for Food and Nutrition Security (SISAN). The two guiding principles in SISAN are 1) the inter-sectoral nature of food and nutrition security, and 2) social participation in the development, implementation, and monitoring of policies and programs. Following these, all levels of government (federal, state, and municipal) are to install Inter-sectoral Chambers of Food and Nutrition Security (CAISAN) and food and nutrition security councils with the participation of civil society and government representatives.

In Belo Horizonte, the inter-sectoral nature of food and nutrition security has been represented within SMASAN through its many partnerships with different municipal departments. Under SISAN, however, this inter-sectoral collaboration must be much more transparent and formalized. Thus, recently (May 2015), the Inter-sectoral Chamber for Food and Nutrition Security of Belo Horizonte (CAISAN-BH) was created by government decree (Belo Horizonte 2015). CAISAN-BH has the mandate to develop the Municipal Policy and Plan for Food and Nutrition Security, and to coordinate, monitor, and evaluate their implementation. Its membership is composed of representatives from seven municipal departments: Social Policies; Health; Education; Food and Nutrition Security; Social Assistance; Rights and Citizenship; and Environment. The municipal decree also establishes that the president of CAISAN-BH is the director of SMASAN.

While CAISAN represents the inter-sectoral nature of food and nutrition security, the Municipal Council for Food and Nutrition Security (COMUSAN) is the vehicle for participation of civil society under SISAN. In Belo Horizonte, a COMUSAN has been in existence since 2003, but its relationship with SMASAN has not been very strong. In fact, earlier attempts to have civil society participating in advising the local government

(COMASA in the 1990s) actually failed. The voluntary nature of the arrangement allowed for personality and political conflicts to defeat the attempt (Rocha 2001). The construction of SISAN under legislation is changing all this. Now, COMUSAN (mostly civil society) must, by law, interact closely with CAISAN (mostly government) in the development, implementation and monitoring of policy and programs. Of its 24 members, one third (8) are representatives from the government: the departments in the CAISAN plus a representative from city council. The representatives from civil society (16 members) come from educational or research institutions; social movements; consumer groups; agricultural workers; food industry; and professional associations. Importantly, COMUSAN's staff members are civil servants working for SMASAN. Thus, while representatives from civil society are volunteers, the work of COMUSAN is supported by a secretariat paid by the government.

The same general principles are followed in the formation of the School Meals Council (CAE-BH). Under the PNAE legislation, CAEs are responsible for monitoring the implementation of the School Meals program at the municipal level. In Belo Horizonte, the CAE is composed of the following: 1 representative from the municipal government appointed by the mayor; 1 representative from education workers; 1 representative of the teachers; 2 representatives of parents; and 2 representatives of civil society organizations (Belo Horizonte 2011). CAE members have a four-year mandate, and its president and vice-president are elected among the members. The CAE's executive secretariat is coordinated and supported by SMASAN.

Conclusion

Mayors signing the *Milan Urban Food Policy Pact* commit to use the proposed "Framework for Action" as a starting point in developing a sustainable food system in their cities. Given its record on food security policy and programming in the past 20 years, Belo Horizonte is ahead in the implementation of many of the 37 actions recommended in the *Milan Pact* framework, but certainly not in all.

On the recommended actions for "ensuring an enabling environment for effective action (governance)": Belo Horizonte is doing well in this area, particularly with the recent decrees

formalizing the participation of civil society (COMUSAN and CAE) and the collaboration among different city departments (CAISAN-BH). This is supported by federal legislation determining the construction of a National System for Food and Nutrition Security (SISAN). The city is now working on developing its Plan for Food and Nutrition Security.

On the recommended actions for "sustainable diets and nutrition": Belo Horizonte can point out concrete initiatives in this area, such as the *Abastecer* (*Sacolão*) program, which sells 20 fruits and vegetables at lower-than-market prices; the Popular Restaurants, with nutritious meals at affordable (subsidized) prices; and the School Meals program, guaranteeing nutritious meals to all children in the public education system. The 2014 Dietary Guidelines support this area, but there have been many challenges and pressures coming from food corporations. Much more must be done. For example, the marketing of food and non-alcoholic beverages to children is in need of more stringent regulations to comply with WHO recommendations. Belo Horizonte and the country as a whole also need more concrete actions to achieve universal access to safe drinking water and adequate sanitation.

On the recommended actions for "social and economic equity": Following the principles of right to food, social justice, and universality, food policy in Belo Horizonte strives to achieve social and economic equity and this has been supported by programs from the federal government since 2003. Of special notice is the *Bolsa Familia* (Family Grant), one of the largest conditional cash transfer programs in the world, which has helped millions of Brazilians out of extreme poverty (Rocha forthcoming). Still, despite recent improvements, social and economic inequality is very high in the city (as in the country overall). Much more must be done to achieve significant gains in this area, particularly in regards to decent employment and adequate incomes for all.

On the recommended actions on "food production": The Straight from the Field program was designed to support small-scale farmers in regions around the city and reduce rural-urban migration. A broader (and bolder) support for family farming now comes from federal initiatives such as the Food Acquisition Program (PAA) and requirements of purchasing food from family farms under the School Meals Program (PNAE). The agroecology movement in the country is also growing and supporting family farms. In terms of promoting urban and peri-urban food production, efforts in Belo Horizonte have been

modest. A movement to consider the conservation of biodiversity and farmland in the city's land use planning and management has only recently emerged.

On the recommended actions on "food supply and distribution": Food supply in Belo Horizonte is in general safe and abundant. The city has a strong culture of farmers markets and a robust network of private food retailers and restaurants. An area for improvement is in ensuring physical access to fresh, affordable foods in low-income and underserved neighborhoods. In an earlier program, known as the Worker's Convoy, mobile units would offer fresh produce at lower-than-market prices in marginalized areas of the city. However, given growing concerns over the safety of those in the city working on this initiative, this programme has now been discontinued .

On the recommended actions on "food waste": This has not received sufficient attention by SMASAN. The city does have composting and recycling programs, but they are very timid given the extent of the food waste problem. While it has proposed its public food bank as a mechanism to combat food waste, the right-to-food principle guiding the food bank operations conflict with that purpose (see Rocha 2014). SMASAN is yet to develop a comprehensive, effective strategy to address food waste.

Overall, Belo Horizonte is in a good position to fulfill its commitment under the *Milan Urban Food Policy Pact*. The *Pact* will provide an extra incentive for the continuation and growth of the city's agenda on food and nutrition security. Through such incentives, it is hoped that Belo Horizonte continues to serve as a model of excellence in food policy and inspiration for other jurisdictions in Brazil and around the world.

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Urban Agriculture in Vancouver, BC:
Motivations, Meanings andMulti-functionality

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Introduction

In many North American cities, urban agriculture has become a prominent fixture of urban landscapes. This re-emergence of edible landscaping, schoolyard and community gardens, social enterprises and commercial farms is not a passing trend, but a significant contributor to the new urbanism of the 21st century (Mendes et al. 2008; Taylor & Lovell 2012; Mansfield & Mendes 2013). As part of the "new food equation", whereby policy makers at multiple levels are acknowledging the strategic value and multi-functionality of the agri-food system, (Morgan & Sonnino 2010), urban food planners are engaging with academics, professionals, community, non-government and non-profit organizations to imagine new mechanisms and strategies for food provision and the creation of just and sustainable food systems. As a result, urban policy makers have embraced the development and promotion of urban food systems as part of civic theory and practice, bringing food and agriculture out of a former isolation as primarily a "rural" issue (Morgan 2014).

Concurrently, individual citizens, non-profit organizations, and institutions are beginning to break ground, put shovel to earth, build raised beds, construct season-extension infrastructure, and use non-traditional spaces to grow food in urban settings. People are growing more and more food in North American cities motivated by reasons ranging from a desire to achieve food self-sufficiency, address issues of poverty and malnutrition, engage in political activism, address the concentration of corporate power in the global food system and the ecologically and socially destructive means of production, processing, distribution, retailing, and managing waste.

Studies have reported the benefits of urban agriculture to human health through increased fruit and vegetable consumption and exercise (Mendes et al. 2008; Teig et al. 2009;

Taylor & Lovell 2012; Mansfield & Mendes 2013), increased social well-being, at-risk-youth engagement, sense of community coherence, and increased political engagement (Armstrong 2000; Saldivar-Tanaka & Krasny 2004; Morgan & Sonnino 2010; Hale et al. 2011; Morgan 2014). Recent studies have also shown ecological benefits through greening urban spaces, capturing urban organic wastes, decreasing urban heat-island effects, increasing urban biodiversity and providing waste-water diversion (Duchemin et al. 2008; Grewal and Grewal 2012; Haberman et al. 2014; Johnson et al. 2015). Additionally, there is an increasing body of knowledge demonstrating the economic impacts of local food economies such as job creation and workplace readiness training (Cohen & Reynolds 2015; Surls et al. 2015).

Urban agriculture also faces significant critique. Some scholars state that urban agriculture cannot significantly contribute to urban food security or to improving affordability of food for underserved populations due to limitations imposed by high urban population densities and available area for urban production (e.g. Badami & Ramankutty 2015). Others suggest that municipal governments should not foster or support the expansion of urban agricultural initiatives based on nostalgia for an agrarian past in which growing food close to home was a primary social and ecological connector between the city and surrounding rural spaces (Hallsworth & Wong 2013). Others question the relative efficacy of using limited urban space for growing food rather than densification (Boisvert 2013; Quinn 2013). Densification can potentially reduce the impact of urban sprawl on fertile peri-urban and rural landscapes, where the majority of our food is grown. In sum, do urban agriculture outcomes meet the expectations of most participants and supporters?

Few studies seek to assess how urban farming participants themselves characterize the multifunctional contributions of urban agriculture, including perceptions of cultural, health, ecological and social benefits. Through analysis of four urban farming organizations in Vancouver, Canada, this paper identifies a range of policy challenges, opportunities, and contradictions that emerge with the growth of urban farming initiatives in a major world city. By doing so, this study contributes to emerging value frameworks that move beyond economic replacement models of urban agriculture, greenhouse gas emissions analysis, or other sustainability arguments frequently used to support the increased development of urban agriculture.

Vancouver: Greening the City through Urban Agriculture

In 2009, on the eve of hosting the 2010 Winter Olympics, Mayor Gregor Robertson declared Vancouver's goal to be the Greenest City in the World by 2020. Building on a comprehensive city sustainability plan that includes targets for zero carbon, zero waste, and healthy ecosystems, urban agriculture and sustainable food systems emerged as a foundational plank in the city's greening strategy. Local food is one of 10 key action areas identified in Vancouver's Greenest City 2020 Action Plan, with a goal to increase city-wide neighborhood food assets by a minimum of 50% over 2010 levels (City of Vancouver 2010). In the 2013 Vancouver Food Strategy, the City of Vancouver made advancing urban agriculture (including community gardens and urban farming) one of its top five priority action items for advancing a just and sustainable food system in the city (City of Vancouver 2013). From the City's point of view, urban agriculture can contribute to the availability of local food through farmers markets, Community Supported Agriculture programs, community gardens, school cafeterias, and community centres. Urban agriculture initiatives may also contribute to the green economy and the advancement of public education and food literacy related to food production, processing and consumption in Vancouver.

In 2015, Vancouver hosted 4,166 community garden plots across almost one hundred sites, in addition to 16 commercial urban farms and many community food initiatives and organizations involving food systems and gardening education (City of Vancouver 2014). In this paper, we examine the role of urban food production as part of Vancouver's broader sustainability goals. After characterizing the evolution of food systems planning and the expansion of food production in the city, we focus on the scaling up of urban farming activities in Vancouver through analysis of four revenue-generating enterprises, assessing the motivations, meanings, and multi-functionality of food production in a global city from the perspective of those with their hands in the dirt.

Vancouver's sustainable food system agenda

Vancouver is a global coastal city situated on the edge of one of Canada's most productive agricultural landscapes. With more than 600,000 inhabitants in a metropolitan area of over 2 million, Vancouver serves as a key nexus of global food imports from the US, Mexico and

Asia and as a global food exporter for products as diverse as blueberries, farmed salmon, and grains shipped from Canada's central prairie provinces. Within the Metro Vancouver area, about 41,000 hectares are in agricultural production on over 2600 farmers, supplying a vibrant food retail landscape in the city. Vancouver is home to nine farmers markets, which contribute an estimated $13 million to the local economy each year (City of Vancouver 2013) and a local food hub distribution network. Greengrocers, and large-format supermarkets feature local produce through the provincial government's BuyBC program (Gibb & Wittman 2013; Newman et al. 2015).

The City of Vancouver was an early adopter of a systems approach to food policy and planning, with an active consideration of all aspects of the food system, including food production, processing, distribution, access, and food waste management (City of Vancouver 2013, p. 11, see Figure 1). In 2003, in a city council motion, the City called for the development of a "just and sustainable food system…in which food production, processing, distribution, consumption and waste management are integrated to enhance the environmental, economic and nutritional well-being of our city and its residents" (City of Vancouver 2013, p. 10).

Vancouver's long history of local food activism led to the development of Canada's second municipal Food Policy Council in 2004. This citizen-led advisory group is comprised of 21 voting members with food system representatives from production, retail, waste management, processing and distribution, and access and consumption sectors, in addition to liaisons from city staff and council members. The food policy council advises city government on positions and policy initiatives pertaining to the *Vancouver Food Strategy*. In addition, Vancouver has several neighborhood food networks (NFNs) that have initiated food system programming involving urban food production as part of promoting community food security. NFNs in Vancouver are typically coalitions of local residents, community agencies, and municipal staff that share similar objectives and priorities around addressing food system issues specific to the neighbourhood in which they operate. For example, Renfrew Collingwood Food Security Institute operates community gardens and orchards, low-cost community meal programs, and culturally-relevant food celebrations (Mendes 2012). Across Vancouver, the NFNs provide a platform for the coordination and development of grassroots initiatives in collaboration with municipal and regional agencies, such as the Food Policy Council and Health Authorities. NFNs empower citizens to

participate in creative, flexible, and responsive strategies for addressing the diverse needs of their neighbourhoods.
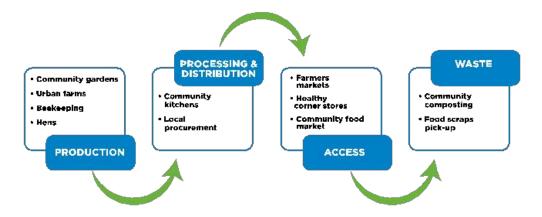

Figure 1: Components of the municipal food system. Note. From the 'Vancouver Food Strategy' (City of Vancouver 2013, p. 11).

In 2007, the Vancouver Food Charter further defined its vision for a just and sustainable food system as that which:

- contributes to the economic, ecological, and social well-being of the city and region;

- encourages personal, business and government food practices that foster local production and protect our natural and human resources;

- recognizes access to safe, sufficient, culturally appropriate and nutritious food as a basic human right for all Vancouver residents;

- reflects the dialogue between the community, government, and all sectors of the food system, and

- celebrates Vancouver's multicultural food traditions (City of Vancouver 2007; City of Vancouver 2010).

The Vancouver Food Charter fostered several initiatives resulting in policy and bylaw development, including guidelines for urban beekeeping (2005) and backyard hens (2010), a municipal food composting program (2010), a food cart street vendor program (2012), and a granting program that supported the development of urban agriculture and neighborhood food networks (2011) (City of Vancouver 2013, p. 12).

In 2010, the Vancouver Urban Farming Society formed a network of urban farmers that aims to advance urban farming in Vancouver through public outreach and policy development. The society has a close relationship with the Vancouver Food Policy Council and often collaborates with City staff for educational urban farm tours, policy consultation, and outreach to demonstrate and promote policy related initiatives. The society hosts annual conferences and events to bring key regional stakeholders together, identify and discuss issues of relevance for best practices and policy development in urban food production, storage, and distribution.

The 2011 Greenest City Action Plan created goals and targets that, if achieved, would make Vancouver the world's greenest city by 2020 and included positioning Vancouver as a global leader in urban food systems. This goal included a target to increase city and neighborhood food assets by 50% by 2020, including community gardens and urban food forests, urban farms, farmers markets, food processing facilities, composting and waste management facilities, and neighborhood food networks (City of Vancouver 2013, p. 4).

In 2013, Vancouver City Council approved the Vancouver Food Strategy (VFS), a visioning document prepared by the Vancouver Food Policy Council in consultation with civil society stakeholders, involving roundtable discussions, public events, and targeted outreach. The public consultation involved four key principles: 1) engagement with ethno-culturally diverse communities, including outreach materials translated into seven languages; 2) engagement with socio-economically and age diverse communities through storytelling; 3) an emphasis on collaboration and partnerships with government and civil society partners both within and beyond the city; and 4) the development of tools and resources to be used in policy implementation. The resulting Food Strategy (City of Vancouver 2013) is a road map and official policy framework to address food system issues within a single policy framework. The VFS identified five key priorities:

Vancouver Food Strategy – Priority action Areas 2014-2017

1. *Food Production*: support and enable all forms of urban agriculture (specifically community gardens and urban farms) and make stronger connections with all parts of the food system.

2. *Empowering Residents*: Enhance access for individuals to participate in the activities of neighborhood food networks and other community-based food programs, particularly for vulnerable and isolated groups.

3. *Food Access*: Improve access to healthy, local affordable food for all by increasing the number of healthy food retail including farmers markets, community food markets, and piloting healthy food retail programs.

4. *Food Processing and Distribution*: Address gaps in local food processing, storage and distribution infrastructure by exploring possibilities that might include a food business incubator or food hub. Increase the percentage of local and sustainable food purchased by City facilities

5. *Food Waste*: Reduce food waste going to landfill or incinerator. Expand and support food waste disposal programs. Expand local collection and composting options (City of Vancouver 2013).

Date	Milestone	Objective
2003	Motion for municipal food strategy by city council	Develop food strategy for creating just and sustainable food system in the City of Vancouver
2004	Food Policy Council established	Citizen-led council to advise on food-related policy initiatives
2007	Vancouver Food Charter	Defined vision for achieving a just and sustainable food system in Vancouver
2010	Vancouver Urban Farming Society	Public outreach and policy development related to urban food production
2011	Greenest City Action Plan	Create goals and targets to make Vancouver the world's greenest city by 2020
2013	Vancouver Food Strategy	Create a single policy framework to address food system issues in Vancouver

Table 1. Recent milestones in the development of Vancouver's urban agriculture policy and governance frameworks

The City of Vancouver advocates a "collective responsibility" model and multi-functional approach for sustainable food system development (City of Vancouver 2013, p. 7), involving not just the city government, but also citizens, community groups, businesses, and other levels of government. The interactions between these stakeholders can be complex, particularly in relation to other levels of government with competing policy mandates for food safety, public health, agricultural land management, and municipal tax revenue. For example, the provincial *Public Health Act* sets food safety guidelines for the sale of foods at temporary markets (BCCDC 2014). Urban farmers that sell produce need to follow provincial regulations to ensure they are following *Good Agricultural Practices* to minimize risks for the general public (BC Ministry of Agriculture 2015).

The City has not created a business license category for enterprises growing and selling food in the city on residential land, because financial and taxation implications for the City have not been resolved. Residential landowners can claim provincial Farm Tax Status and avoid paying municipal taxes if they demonstrate that they are producing $10,000 of agricultural sales on a cultivated area of less than .8 hectares (1.98 acres) (BC Assessment 2015). Property taxes account for roughly 40% of municipal revenues in the province (Stobbe et al. 2009) and the City of Vancouver is reluctant to create a policy that allows residents to take advantage of urban farming for tax reasons only. Some urban farming enterprises in Vancouver have not been affected by the farm status tax issue because they have either established their farms on public lands (e.g. school land is exempt from provincial property tax), categorized their operations as an "art installation", or have entered into agreements with the City over the temporary use of development sites for urban farming.

Vancouver's Urban Agriculture Strategy

Urban agriculture is considered an integral component of Vancouver's "food assets". Community gardens are the most visible form of urban agriculture, including 97 community gardens and more than 4000 plots on municipal, public park, school and privately-owned land, including land held in preparation for urban development. Community gardens allot lands to citizens for gardening and are managed by individual non-profit societies comprised of garden members and a local coordinator. A network of 18 community orchards, stewarded by community garden societies, neighbourhood houses and other non-

profit groups, partner with the City to achieve two of the Greenest City Action Plan goals (planting 150,000 trees and increasing the number of food assets in Vancouver).

Many community gardens and orchards serve as gathering places, organize workshops and gardening education, distribute food to community kitchen and hunger alleviation organizations, and all of them are considered to be a key component of neighborhood greenspace and community building. In the Vancouver Food Strategy (City of Vancouver 2013), nine actions support community gardens (e.g. increasing the number of garden plots to 5000 by 2020, improving the security of tenure for gardens and orchards on City property, creating healthy soil guidelines, and increasing access for diverse community members).

Urban Farming in Vancouver

Market-oriented urban farming is on the rise across North America (Cohen & Reynolds, 2015; Johnson et al. 2015; Tornaghi 2014). In 2013, McClintock and Simpson (2014) identified 619 urban agriculture businesses and organizations from over 70 cities in Canada and the United States. These enterprises face challenges of profitability related to the costs of land access and tenure (Surls et al. 2015), labour costs (Cohen & Reynolds, 2015), and returns on capital-intensive production methods (Mok et al. 2013). But beyond a profit motive, Vancouver's urban farming initiatives express a range of additional motivations to create viable and meaningful urban farming enterprises, including a focus on engagement municipal governance and community development.

Urban farming is a relatively new land use category in Vancouver, which is defined here and by the City of Vancouver as production at a larger scale than individual community garden plots, and primarily for the purpose of producing food for sale. Urban farms in Vancouver include both for-profit and social enterprise models, including those operating as part of a network of residential gardens, farms operated in collaboration with a community or city institution such as a school or hospital, indoor production systems, vertical farms, and farms on private agricultural land.

According to a 2013 census commissioned by the City of Vancouver, 16 urban farms were distributed across 50 plots, with a median size of 1000 sq feet. Some farms managed a large number of plots, while others were contained with one location, with an average total farm

size of about one-half acre (Shutzbank 2014). Between 2010 and 2013, land in agricultural production classified in the urban farm category grew from 1.53 to 7.18 acres (Shutzbank 2014).
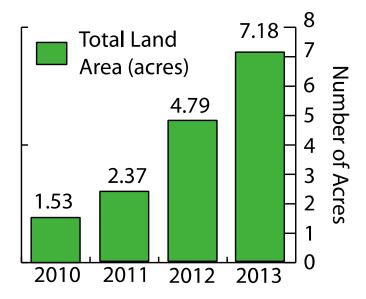

Figure 2. Growth in land cultivated for food production in Vancouver from 2010 to 2013. Note. From 'Urban Farm Census 2010-2013' (Shutzbank 2014, p. 5)

In the next section, we describe four urban farm enterprises in Vancouver that exemplify the diverse range of land access, governance and operational strategies, and forms of community engagement with the broader food system in Vancouver. We interviewed stakeholders in each of these small commercial farms to explore motivations, meanings, and outcomes related to their distinct enterprises and to also inform ongoing debates about and policy discussions around the advancement of urban farming a in Vancouver. To examine the multi-functionality of urban farming in Vancouver, our criteria move beyond metrics of yield to include participant perceptions of the role of urban agriculture in promoting health, social, ecological and economic outcomes.

Urban Farming in Vancouver

Fresh Roots Urban Farm

The goal of the Fresh Roots Urban Farm Society (Fresh Roots) is to grow resilient, engaging, education-based food systems, accessible to Vancouver's diverse communities.

Founded by University of British Columbia students in 2009, Fresh Roots began growing and selling food on borrowed residential spaces. Incorporated as a non-profit society in 2011, Fresh Roots currently creates neighbourhood market gardens on three schoolyards in Vancouver in partnership with the Vancouver School Board, with just under three-quarters of an acre in cultivation. These market gardens are designed as commercially productive agriculture fields that provide educational opportunities for elementary and high school students, and grow food for sale. Produce from the neighbourhood market gardens is distributed through a Schoolyard Harvest Box program, sold to local school cafeterias, and neighbourhood market stands. Their fields are used as outdoor, hands-on learning classrooms - engaging school communities and residents of Vancouver in addressing food sovereignty, community health, and vocational skills development. Fresh Roots aims to introduce urban school children to the concept of farming and foster farming skills for a new generation of farmers. They do this primarily through a young-farmer training program that offers people interested in agriculture an opportunity to learn and work on urban farmland. The program also provides participants the opportunity to learn about farm business planning and community-engaged neighbourhood farming. Fresh Roots aims to transform how Canadian (and North American) communities address food literacy by building sustainable urban food systems that provide affordable and healthy food back into the neighbourhood that grows it.

Inner City Farms, Inc

In 2008, a group of friends that lacked access to personal growing spaces in the city of Vancouver formed a for-profit corporation called Inner City Farms, Inc (ICF). Members of the group shared a common interest in growing, preparing and sharing food and had varying levels of agricultural expertise. ICF's mission is to help cultivate a healthy community through growing food in residential and institutional spaces in the City of Vancouver, using socially and ecologically respectful methods of production and distribution.

The winter and spring of 2009 were devoted to seeking out residential spaces in the city to convert into productive growing spaces and form an aggregate network of urban farms. Thirteen spaces, covering, roughly 6000sqft, were converted in the first year, which

provided produce for 15 weekly Community Supported Agriculture (CSA) boxes from mid-June to mid-October. CSA is a distribution model whereby the consumer pays for produce at the beginning of the season and receives a weekly share of the overall harvest. This model distributes the risk and reward of food production between the consumer and farmer; if yields are high, the consumer receives better value for her investment. If the yield is lower, the consumer receives less. In 2010, the group became legally incorporated. From 2009 to present, each season has seen an increase in production area and number of shares in the CSA. In both 2013 and 2014 growing seasons, roughly 70 CSA shares were distributed each week, with an estimated value of $30 per box (in Canadian currency). 55 of the shares were for households and five local restaurants held 15 shares, a restaurant share being the equivalent of three household shares. Roughly 15% of the CSA shares are provided free to land-providers as non-monetary compensation for access to their land (a space of 1000sqft or greater qualifies for a free annual CSA share). The remaining 85% of the shares are sold to consumers to cover equipment, seed, and labour expenses. The estimated growing space in 2015 is roughly 1/2 acre (22 000 sq ft) across 18 separate locations within the City of Vancouver. Primarily, vegetables are grown directly in soil amended with a compost, organic fertilizer or composted horse manure from a local stable. As of September 2015, ICF grows over 120 different varieties of vegetables, herbs and fruit and distributes produce to 50 households and 13 restaurants.

Sole Food

Sole Food Street Farm was established in 2009 in collaboration with United We Can, a non-profit, charitable agency active in Vancouver's Downtown Eastside neighbourhood. The primary mandate of the farm is to provide meaningful employment for people in Vancouver who are faced with addiction, mental health concerns and economic hardship and thus have significant barriers to traditional employment. Sole Food guides its mission with the belief that growing high quality, non-certified organic produce is a viable way to provide green jobs, the work itself being of healing and healthy nature for the population they aim to involve and employ.

Sole Food's farms are built in movable, raised container beds filled with commercial soil mixes. All sites are in highly urbanized neighbourhoods and their land base is leased from

the municipal government or private landholders. Their model enables food production on temporarily available spaces that do not have viable soil on site. In 2014, Sole Food managed approximately 4.5 acres in high intensity production. Sole Food provides the equivalent of 12-14 full-time paid positions in their operations and one unpaid, internship/volunteer position. Occasional volunteer "work parties" are also held. Sole Food's vegetables are sold to restaurants, at farmer's markets and through a CSA model.

Sole Food is owned by a registered charity, which allows the operation to apply for capital available through regional funding opportunities for non-profit organizations. Funding accessed through these sources (e.g. foundation, philanthropic, or community development funding) enables Sole Food to cover the relatively higher costs of their operations model in comparison to most other urban farming operations in Vancouver. These costs include transportable growing infrastructure such as raised beds in movable containers, livable wages for full-time staff, and leased urban retail space in the Granville Island Public Market. According to Sole Food, it would not be possible to offset these expenses through revenue generated by produce sales alone under current market conditions.

Alterrus Local Garden[7]

In the spring of 2012, Vancouver's first 'vertical farm' was established on the roof of a city-owned parkade in the downtown core under a ten-year commercial lease agreement. Developed using proprietary Verticrop technology owned by the Alterrus group, the first crop of Local Garden hydroponic greens was harvested in January 2013, and was marketed to restaurants and 15 grocery store outlets in the city. Alterrus aimed to "grow food, not people, in BC's Agriculture Land Reserve" using a triple-bottom line perspective ("people, planet, profits"). Alterrus was a certified B Corporation, a designation in Canada that requires meeting standards of social and environmental performance, accountability and transparency.

Alterrus technology aims to "provide up to 20 times the yield of field crops, while using a mere 8% of the water required for land farming" using a moving conveyer system in a

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[7] After two years of operation, Alterrus Local Garden filed for bankruptcy in January 2014 due to issues of crop failure and mechanical failure.

closed loop/controlled environment (Alterrus n.d.). The Local Garden enterprise aimed to fulfill a niche market for boxed salad greens that current are primarily imported to Vancouver from California-based suppliers. About 25% of greenhouse staff are hired through a partnership with Mission Possible social enterprise work readiness program.

Multifunctionality in Urban Farming in Vancouver

In Vancouver's city planning documents, urban farming is intended to increase the availability of fresh, local and healthy food. In 2013, food production from urban farms yielded sales of approximately $450,000 (Shutzbank 2014). However, for three of the urban farms highlighted here (Fresh Roots, ICF, Sole Food), the total volume of food produced and sold is of secondary importance to the systems shift intended by each of these projects. Fresh Roots aims to "catalyze a re-think among urbanites and their sources of food...[to] help re-prioritize purchasing food from local BC farmers". For Inner City Farms, shareholders were provided with "a large amount of diverse, seasonal and nutritious vegetables...[and] are often told by customers that participating in the CSA shifts cooking habits, requiring greater attention to vegetables being incorporated into weekly meals and an increase frequency in cooking with whole ingredients." Sole Food has the most visible impact among the four enterprises in relation to urban food security, with a 'pay what you can' market stall, food donations to food banks and shelters, and reduced cost or free food to farm employees. Alterrus aimed to replace food imported from California – with no net change in the amount of food available to urban residents, but aiming to reduce the environmental footprint of that food.

Environmental values are also high on the agenda for all four urban farms. Food system localization in the City of Vancouver aims to reduce the environmental impact of food in the city by bearing down of the in-transit costs of food distribution and by promoting organic and sustainable farming practices. Alterrus highlights the possibility of reducing food miles by producing food in a closed loop system, using very little water and low levels of nutrient inputs and marketing the food 'close to home'. Fresh Roots emphasizes the ability of urban farms to create agro-biodiversity within urban setting, including support for pollinators, and to provide opportunities for urban residents "to reconnect with the natural world." Inner City Farms, with their distributed model of farming parcels across the

city, emphasizes the potential for multi-functional landscapes to "bring food and food production back into the lives of as many people as we can" and also highlights their role in improving urban biodiversity by creating "even on a small scale, diverse urban habitats that weren't there before." However, some urban farmers resist an over-romanticization of urban agriculture as a pillar of the City's Greening strategy, sharing "a distinct frustration with the pressure there is for urban farms to be ecological saviours, especially as oil tankers roll in and out of the harbour and boats dump raw sewage … in plain view of the farm site."

Three of the four enterprises reported also aim to develop food literacy amongst the citizens of Vancouver. Food literacy is defined as the knowledge, skills, and practices that allow an individual to effectively engage with food across the food cycle, from production and preparation to consumption and composting (Cullen et al., 2015; Vidgen and Gallegos, 2014). By growing food in public spaces, citizens in Vancouver that engage with urban farm enterprises have a direct and tangible means to learn about and participate in farming production, distribution and consumption practices. All four enterprises report on their engagement with diverse participant groups including youth, community groups, and municipal staff through workshops, operational tours, volunteer events and employment opportunities. For example, the director of Fresh Roots states, "we are role modeling…in food production practices." Similarly, ICF perceive their role in the community as providing "a reminder that vegetables are plants, not commodities, and that people work in gardens and farms. Good food comes from people, not multi-national corporations, and the best vegetables come from human hands, not machines."

Citizen engagement and developing opportunities for social cohesion in the community also emerge as a motivation and perceived outcome of urban food production for urban farmers in Vancouver. Fresh Roots considers the on-going and growing presence of neighbours visiting, talking, and spending time in their farms as evidence that their urban farming enterprise is "contributing to the social and emotional well-being of the neighbourhoods in which we grow our food." Sole Food views their primary form of community engagement as the opportunity for meaningful and positive interactions between the farm staff and the general public: "the population that makes up the [Sole Food] staff is one that is often somewhat invisible or ignored my mainstream society, considered "less-than". The disarming power of the farm encourages direct and open dialogue that crosses socio-economic barriers and is often devoid of typical negative judgments."

Similarly, land-donors for ICF report having more conversations with their neighbours after their yards are converted into food production spaces. "Our land-providers become focal points on their streets... [which] creates a sense of pride for the landowner and gives them a greater sense of community."

Conclusions

Motivations for participating in urban food production go beyond feeding the city for the four urban farm enterprises we characterize here. These urban farms seek to demonstrate that environmentally and socially responsible food production is possible. They also suggest that their operations increase food literacy and link that to a positive contribution to community development. However, a significant question remains with respect to the goals of the Milan Food Expo: what is the role of urban food production in feeding the city and bringing energy to life? Urban farming enterprises tend to have higher labour costs relative to larger-scale production systems in rural areas, which can lead to pricing produce at a level attainable only for wealthy individuals and high-end restaurants (Allen 2008; Cohen & Reynolds 2015; Surls et al. 2015). In Vancouver, Sole Food, Fresh Roots and Inner City Farms, all have strategies for increasing access to their produce for individuals in a broader socio-economic demographic, such as a pay-what-you-can format at market stands and weekly donations to community kitchens in under-served neighbourhoods. But if yield is not of primary concern and the food that is harvested goes primarily to the wealthy, how does urban food production contribute to the City of Vancouver's goal of supporting a just and sustainable food system?

Why should municipal governments create a policy to promote urban agriculture if those involved in food production report minimal environmental impact, produce low yields relative to the volume of food necessary for maintaining an urban population, and find that their primary consumer base are "urban foodies" who are relatively food secure? Furthermore, without considering the land requirements for protein production, the amount of land required for global cereal production is ten times the area occupied by cities worldwide, which is a stark reminder that globally, cities depend on the protection of farmland in peri-urban and rural spaces (Mok et al. 2013). Is developing, promoting and supporting food policies the best use of limited municipal resources?

The answer to this question lies in the multi-functionality of urban food production. Developing municipal policy and promoting urban agriculture brings food issues back to the urban consciousness. The question should not be, *can urban agriculture feed the city?"* Rather, the question should be *how is the city fed?* By transforming urban landscapes to produce food, increase food literacy, and dialogue about the role of food in urban communities, urban agriculture demonstrates how food matters to urban residents and provides a pathway for discussions about food production and food security to be brought back to the urban political arena. The challenge lies in not letting the conversation stay within city limits. We need to leverage current municipal and civic interest in urban food systems to re-think peri-urban, rural and global food policies, where the scale of unsustainable practices is much more significant and distant enough from urban populations that it can be out-of-sight, out-of–mind. Urban food production will likely continue to have limited capacity to feed the city, but may have greater potential to energize life by focusing the minds of civic leaders, community activists and ordinary citizens on important political decisions that affect peri-urban and rural landscapes – those spaces which actually feed the city and are in dire need of progressive food-related policies, similar to what we see in global cities like Vancouver. To achieve this, we need to expand the momentum already gained in cities like Vancouver and Milan. Using urban agriculture to reconnect urban citizens with the broader food system can breath energy back into civic life and dialogue, so that we can collectively demand, create, and support healthy, sustainable and just food systems, at regional, national, and global scales.

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Edible Edinburgh: a Case Study in Smart and Sustainable Development

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Introduction

Edinburgh has a track record as a smart and sustainable city. In 2001, it was the first city in the UK to define itself 'smart' and since 2011, the City has sought to sustain and expand upon this development through its wider Sustainable Edinburgh 2020 Framework. Early consultations on this framework also served to highlight a number of concerns about the city's food systems. In particular, concerns surrounding the:

- access to and affordability of food;
- impact of food on health, well-being and quality of life;;
- waste;
- responsible consumption;
- local production.

Acting on the feedback from the Sustainable Edinburgh 2020 consultations, the City has proceeded to incorporate a sustainable food policy into the Sustainable Edinburgh 2020 Framework and Sustainable Procurement Action Plan (City of Edinburgh Council Policy and Strategy Committee, March 2012)[8]. Since 2012, the City Council has also been working in partnership with other key stakeholders, to explore the potential there is for the City to be smart in developing a sustainable food system.

Sustainable Food City

Some might ask why Edinburgh needs a sustainable food city strategy. As the capital city of Scotland, Edinburgh is a European centre of commerce, culture and knowledge. Its

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[8] City of Edinburgh Council Policy and Strategy Committee, Items 7 and 8, 27 March 2012

population stands at 487,500 (Edinburgh by Numbers 2015)[9] and is growing by 1% each year. It has a powerful economy, predicted to grow by an average of 2.6% a year to 2030 (Edinburgh 2013 Macro Scenarios)[10] making it the most prosperous and productive city in the UK outside of London. Edinburgh also benefits from one of the UK's most highly educated and productive workforces and boasts the highest percentage of professionals in the UK (Edinburgh Inspiring Capital)[11]. Almost 50% of the working-age population also hold a degree level or professional qualification. Employment levels are high and there is a strong social economy, based on a volunteering rate of 29% and reported annual income to city charities of £86.2m (Edinburgh by Numbers 2015)[12]. Overall, this makes the city a magnet for international talent and tourists alike. Nevertheless, despite scoring consistently high in studies of wellbeing and quality of life, Edinburgh, like many other modern cities, is also home to a paradox.

Edinburgh shows little deviation from wider Scottish national trends in having one of the worst health records in Europe. Over half the city's residents are either overweight or obese, with less than a third of all residents eating the recommended 5 fruits and vegetables per day (Lothian Health and Lifestyle Survey)[13]. Food poverty is rapidly increasing, evidenced by rising levels of food aid provision and the number of food banks being established (Lyall 2014)[14]. Yet, at the same time, food waste accounts for one third of all household waste in our city (Messenger 2013)[15]. The Scottish Government designated 2015 as 'The Year of Food and Drink' to celebrate the continued success of Scotland's food and drink sector (the largest economic growth sector in Scotland), but this economic success is not reflected in the city economy. Less than 5% of our workforce is employed in manufacturing and primary industries such as farming and less than 10% work in accommodation and food services, traditionally a low pay sector (Edinburgh by Numbers, 2015)[16].

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[9]City of Edinburgh Council, Edinburgh by Numbers 2015. Available from:
http://www.edinburgh.gov.uk/info/20247/edinburgh_by_numbers/1012/edinburgh_by_numbers
[10] Edinburgh 2013 Macro Scenarios: Oxford Economics baseline forecast (2013)
[11] Edinburgh Inspiring Capital, 2013, "Working in Edinburgh"
[12] City of Edinburgh Council, Edinburgh by Numbers 2015. Available from:
http://www.edinburgh.gov.uk/info/20247/edinburgh_by_numbers/1012/edinburgh_by_numbers
[13] Lothian Health & Lifestyle Survey, Community Health Partnership Findings: Report. 2012
[14] Lyall, H, 2014 'The increasing demand for emergency food aid in the UK', Scottish Parliament SPICE Briefing
[15] Messenger, B 2013 'Recycling Up & Food Waste Tackled As Edinburgh Plans Energy Recovery Plant' Waste Management World. Available from: http://www.waste-management-world.com/articles/2013/06/recycling-up-food-waste-tackled-as-edinburgh-plans-energy-recovery-plant.html
[16] City of Edinburgh Council, Edinburgh by Numbers 2015. Available from:
http://www.edinburgh.gov.uk/info/20247/edinburgh_by_numbers/1012/edinburgh_by_numbers

The Scottish Government has set ambitious climate change emissions reductions targets of 80% by 2050 with an interim target of 42% by 2020 (Climate Change (Scotland) Act 2009)[17] The City of Edinburgh Council has also mirrored this target through the Sustainable Edinburgh 2020 framework, pledging to reduce carbon emissions in the city over 40% by 2020 (Sustainable Edinburgh 2020 2012)[18]. Studies estimate that our food system accounts for 30% of the UK's carbon footprint (Audsley et al 2010)[19] so it would seem straightforward that if we address our food systems, we address a major source of carbon emission and a wider range of socio-economic challenges.

At national level, we have seen the Scottish food and drink policy, Recipe for Success (2009)[20]. The Scottish Government has made considerable investment in children's food education, in communities, on resource use, climate change and a wide range of health and cultural initiatives. At community level, the responses have been varied and often creative, drawing on the skills, talents and enthusiasm of committed staff and volunteers. The community food sector in Edinburgh includes community shops and cafes, healthy eating projects, initiatives to reduce food waste and carbon emissions, community gardens and allotments and the provision of emergency food aid and community meals. Both individually and collectively these initiatives have made a real difference to people's lives, particularly amongst vulnerable groups, including the elderly, minority ethnic communities, and those experiencing homelessness, addictions or mental health issues.

Nevertheless, few of these initiatives address the sustainability of our food systems in a comprehensive manner. Our food systems and ways of 'fixing' them are disjointed and this is reflected at the highest level in our national governance structures, with food policy responsibility fragmented across a range of government portfolios including Communities, Food and Drink, Health and Third Sector work. With such inherent contradictions in our social, environmental and economic systems and absence of a systemic approach to managing what is evidentially an issue of growing importance, it has become clear that if Edinburgh wants to be a *sustainable* city, it needs to develop as a sustainable *food system.*

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[17] Climate Change (Scotland) Act 2009
[18] City of Edinburgh Council 2012, Sustainable Edinburgh 2020
[19] Audsley, E; Brander, M; Chatterton, J C; Murphy-Bokern, D; Webster, C; Williams, A G; 2010, Report by Cranfield University for WWF and Food Climate Research Network, http://dspace.lib.cranfield.ac.uk/handle/1826/6503
[20] Scottish Government, 2009, 'Recipe for Success – Scotland's National Food and Drink Policy'

In September 2011, the City of Edinburgh Council and the Soil Association Scotland held a city seminar to examine food-system models and explore how to make change for the better. Gathering together agencies and organisations with interests in food – growing, distribution, buying, manufacturing, catering - the seminar concluded that the public sector needed to lead the way and lead by example. The City's three largest public sector organisations – National Health Service (NHS) Lothian, the City of Edinburgh Council and the University of Edinburgh, agreed to explore how they might pursue this agenda within their respective organisations and also work together in partnership to lead the development of a sustainable food system.

NHS Lothian, the City of Edinburgh Council and the University of Edinburgh, are the three largest employers in the City, with a combined staff in excess of 50,000 (Edinburgh by Numbers, 2014)[21] and a significantly wider client base. Each has a substantial food budget and is responsible for providing nourishment for people at key points in their lives - nursery and school-aged children in their formative years, young people living away from home for the first time and people in hospitals and residential care who are sick, elderly or otherwise vulnerable. With the support of the Soil Association Scotland, the three organisations formed the Edinburgh Food for Life Partnership (EFFLP), and along with the Scottish Government, funded a 3 year pilot project to:

- identify and tackle barriers in providing increased levels of seasonal, fresh, local, higher welfare and organic food within public sector catering.
- achieve the Soil Association's Food for Life Catering Mark in selected sites.
- engage children and young people, parents, patients, students and staff to increase knowledge of where their food comes from.
- evaluate the measurable impacts of the changes made.

This Food for Life (FFL) model:

"*works in partnership to transform food culture and food systems across the country; so we can eat food that is good for us, our communities and our planet. We work with*

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[21] City of Edinburgh Council, Edinburgh by Numbers 2015. Available from:
http://www.edinburgh.gov.uk/info/20247/edinburgh_by_numbers/1012/edinburgh_by_numbers

food producers, suppliers, catering services, policy makers and Scotland's local authorities to link food culture, catering, curriculum and communities."
(Soil Association Scotland)[22]

The FFL Catering Mark (Soil Association Certification)[23] is at the heart of the Food for Life Scotland programme. The Catering Mark is an independent certification scheme, which rewards caterers for producing menus using fresh, healthy, seasonal, local and organic ingredients, including high welfare animal products and fish from sustainable sources. The Catering Mark has three tiers – bronze, silver and gold – in recognition that change takes time, and enables caterers to make stepwise progress towards producing healthy and sustainable menus.

The Food for Life Bronze Catering Mark Standard is fixed for all certified meals. It proposes food products have:

- no undesirable additives and hydrogenated fats
- at least 75% of meals are freshly prepared
- all meat is sourced from farms which satisfy UK welfare standards
- eggs are from cage-free hens (free range from 2015)
- menus are seasonal and in-season produce is highlighted
- catering staff are supported with skills training and are engaged in food education
- no genetically modified (GM) ingredients
- no fish on the Marine Conservation Society 'fish to avoid' list is served
- information is on display about food provenance
- all suppliers meet appropriate food safety standards
- caterers in schools, early years and residential settings meet nutrition standards/guidelines

In addition to this, the Food for Life Silver and Gold Catering Mark Standards ask caterers to:

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[22] Soil Association Scotland. Available from: http://www.soilassociation.org/foodforlifescotland
[23] Soil Association Certification. Available from: www.sacert.org/catering/whatisthecateringmark

- source ethical and environment-friendly food
- champion local producers
- make healthy eating easy

With public sector commitment in place, via the EFFLP, a number of key organisations from the public, private and third sectors have agreed to progress a wider, city-based action able to develop Edinburgh as a sustainable food system. Over the course of 2012, three key events were held with a range of organisations to establish whether there was sufficient interest in developing Edinburgh as a sustainable food system and if there were models of good practice able to take this agenda forward.

In March 2012 and in partnership with the City of Edinburgh Council, the Soil Association Scotland hosted a national (Scotland) seminar to network interest in the newly emerging sustainable food cities agenda. With over 80 attendees, the event allowed individuals and organisations within Edinburgh and from other cities, to engage, share information, and start to build a network of support for such actions.

In September 2012 and in partnership with Nourish Scotland, a delegate from Copenhagen's 'House of Food' met with Council staff, elected members and newly emerging sustainable food partners, to share details of work going on in Copenhagen to convert public sector meals to organic food. The event presented a model of good practice ('menu conversion') and highlighted how public sector leadership of this initiative has cemented the city's wider reputation as home to the 'New Nordic Cuisine' and a raft of award winning, internationally acclaimed restaurants. The event also served to engage Council staff and elected members with the aims of the EFFLP project and to see the potential of this as leading the way in a wider city agenda.

In December 2012, a stakeholder consultation event was hosted by the City of Edinburgh Council to agree a way forward. Key agencies and businesses involved in setting the city's food agenda attended the event. These included representatives from the public, private and third sector, who in turn sat on the steering group responsible for promoting this agenda under the auspices of Edible Edinburgh. Under the auspices of Edible Edinburgh, the steering group aspired to transform the City into a place: –

"... where good food is available and accessible for all, making for healthy people, thriving communities and a sustainable environment."

(Edible Edinburgh, 2014)[24]

Group members came from a range of backgrounds and had different interests in food. In order to work collaboratively and ensure that members were informed across the broad spectrum of food issues, the group agreed to take up to one year to build capacity, explore issues, fill knowledge gaps, examine models of good practice and identify what action might best be designed and delivered to transform the City's food system..

Between January 2013 and September 2013, the group held monthly, half-day seminars on themes of land use, environment, skills and employment, procurement, health and culture. Each seminar was led by one or more of the group members with contributions invited from 'experts' in universities, agriculture, employment organisations, etc. Investing time to this learning process was invaluable. Not only did it serve to make the group more cohesive and to affirm the imperative of transforming the City's food systems, it also highlighted how food could be used to engage with and take action on a raft of wider, social, economic and environmental issues. These investigations also made clear the need to incorporate good food policies and strategies into the City's governance systems. To do this, legitimacy and support for the agenda had to be demonstrated.

The steering group drafted an outline Sustainable Food City Strategy and planned a public consultation with a difference. Following popular events in the UK and Europe, Edinburgh hosted a Feeding the 5,000 event in October 2013. Held in the heart of the city, 5,000 people enjoyed a delicious free meal created by local celebrity chefs and community groups from ingredients that might otherwise have been thrown away. The event mobilised a small army of volunteers to help distribute information, set up the site, displays, cooking stations and marquees. Extra volunteers were recruited to help the community cooking groups with food preparation, peeling and chopping vegetables. Volunteer stewards helped coordinate participants and the public provided directions and ensured the site was kept clean and orderly. Others took on the role of pledge-takers, encouraging participants to make a personal commitment beyond the event and another team promoted and encouraged responses to the Edible Edinburgh consultation. The day-long event involved participatory

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[24] Edible Edinburgh, 2014. Available from: http://www.edible-edinburgh.org/

cooking sessions, educational and campaign stalls, discussion groups and family-fun events. It highlighted the benefits of local food and issues of food waste and social responsibility. It also served as a high profile launch for Edible Edinburgh and the public consultation for a Sustainable Food City plan.

Attended by Members of the Scottish Parliament and local elected members, the event was a huge success and received wide press coverage. The draft sustainable food strategy consultation received over 400 responses and a number of qualitative interviews were completed. Feedback received both on the day and in follow up was analysed and used to develop the first ever Sustainable Food City plan for the City of Edinburgh.

Policy Aims and Objectives

A core group of Edible Edinburgh members has remained stable throughout the life of the initiative. Some of the original members have left; a few more have joined, largely reflecting the changing stages of initiative's early development. This evolution of the membership has posed some challenges; for example; ensuring that all members are engaged, have a role to play and feel valued within the initiative. However, it also allows a good degree of freedom from formalities and bureaucracy. The initiative has no formal organisational policies, however, the broad aims and objectives can be summarised as follows;

- validate the sustainable food agenda, raise awareness and engage across sectors.
- influence and inform policy, engage and educate decision makers and activists.
- connect, integrate and improve coordination between policies, programmes and practice, via the planning system, by way of procurement, and through climate change adaptation.
- communicate across and between sectors to raise awareness, and encourage new ways of thinking about food.
- create visibility in all aspects of the sustainable food agenda, supporting existing activity and encouraging new.

- establish Edible Edinburgh as the City's sustainable food strategy, fostering aspiration and stimulating growth.

- identify and fill gaps in the plan by, initiating new programmes where resources are available.to support the policy.

Strategy

The Edible Edinburgh Sustainable Food City Plan (Edible Edinburgh, 2014)[25] was published in July 2014. It recognises that Edinburgh is already home to a vast range of good food related activity and is inspired by the many people whose organisations in turn lead the way in delivering positive change, be it by either tackling health inequalities, food waste, food poverty, or any other food related issues. The plan helps to strengthen and expand this activity, by first identifying and then addressing gaps in the food system and engaging with as many people as possible to develop Edinburgh as a sustainable food city.

The plan is set out as follows –

Vision:

Edinburgh is a city where good food is available and accessible for all, making for healthy people, thriving communities and a sustainable environment
Outcomes:

- More fresh, healthy and sustainable food eaten

- Fewer people living in food poverty

- Our natural environment and resources are protected and conserved with fewer emissions

- A thriving food economy with greater diversity in local food production and distribution

- A transformed food culture with greater awareness and skills

Aims:

- Health and Well being - To offer fair and affordable access to food and ensure people have a fresh, healthy and nutritious diet

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25 Edible Edinburgh, 2014, Available from: http://www.edible-edinburgh.org/

- Land Use - To grow, produce and distribute food more locally, while conserving and protecting our natural resources and environment

- Environment - To use our natural resources more efficiently in order to minimise the ecological footprint and reduce levels of avoidable food waste

- Buying Food - To develop a thriving local food economy based on public and private sector businesses procuring more sustainable food

- Economy - To develop a diverse independent food sector which offers a variety of high quality skills, training, and employment opportunities

- Cultural Change - To inspire, enable and support people to connect with food, along with the everyday pleasures and traditions of eating, sharing and celebrating meals together.

Objectives and actions for achieving the above are outlined in the Action Plan, with food poverty currently identified as a priority action area. Edible Edinburgh has identified food poverty as a major barrier to advancing the sustainable food agenda. The Council's poverty profile shows that more than 1 in 5 households in the city (22% or 48,400 households) live on low incomes, and that slightly higher numbers (24% or 53,600 households) experience particular aspects of poverty, such as fuel poverty. Many children are affected by these hardships: 18% of all children in Edinburgh live in low-income households, a total of 17,600 children. Although it is harder to measure or estimate how many individuals or families experience food poverty, This is one of the common effects of unemployment and low pay, especially where employment is part time or on zero hours contracts and at minimum wage. Over half the households on low-incomes are working households (**City of Edinburgh Council Communities and Neighbourhoods Committee, May 2015)**[26] . This rise in food poverty is also evidenced by a rapid increase in the number of food banks. Between 2011 and 2013, Scotland experienced the highest rate of growth in food banks administered by the Trussel Trust (largest single provider of food banks in the UK) and greater than any other region in the UK (Ellison 2015).[27] There are now approximately 24 food banks in Edinburgh.

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[26] City of Edinburgh Council Communities and Neighbourhoods Committee, 5 May 2015, 'Responding to Crisis Needs – Food Banks in Edinburgh'

[27] Ellison, M 2015, 'Record Numbers Use Scottish Food Banks', BBC News 16 January. Available from: http://www.bbc.co.uk/news/uk-scotland-30832524

Governance Systems

Like all of the City's policies, Edible Edinburgh faced an early challenge – how to incorporate sustainable food into an already busy Council agenda, and how to keep it there. This meant the initiative had to find ways to embed new values and principles within the existing culture, policies and strategies of the City Council and with wider stakeholders in the independent and third sectors.

Edible Edinburgh built credibility through work on the related Edinburgh Food for Life Partnership and delivery of Feed the 5,000 as a major city event. It also had an inbuilt credibility via the individuals and organisations represented on it. The chair of Edible Edinburgh is the convenor of the City of Edinburgh Council's Transport and Environment Committee, and while Edible Edinburgh remains an independent, cross-sector partnership, this connection with the City's administration helps integrate it into the existing governance systems, both directly via the Council and the City's Community Planning Partnership – the Edinburgh Partnership.

Community Planning is a process whereby public services in a local authority area are planned and provided in consultation among all public bodies in that area. It gained a statutory basis in the Local Government in Scotland Act 2003 to deliver better services. The Edinburgh Partnership oversees Community Planning in Edinburgh, with policies and programmes designed and delivered by a number of further partnerships. Edible Edinburgh is formally recognised within these structures and in this way is linked into the City's Community Planning arrangements. Additionally, the City of Edinburgh Council has formally agreed to 'endorse and support' the Edible Edinburgh Sustainable Food City plan, further embedding the legitimacy of the strategy's governance structures.

Edible Edinburgh's strategic partnership group meets four times a year to assess progress and determine priorities. Members of the group connect widely across the food sector in the city to deliver action. A part-time project officer and group members share leads on different areas of the action plan, which involves wide ranging activity from policy work to networking, education and communication, project development and delivery.

Initiatives

The numerous seminars, events, consultations and Feeding the 5,000 festival, were all important initiatives in their own right, particularly in terms of raising awareness, interest and participation with the sustainable food agenda. Initiation of the EFFLP was crucial to establishing a public sector lead and the development of the first ever Sustainable Food City Plan, rooted in legitimate governance structures, was a major milestone on the road to transforming the city's food systems.

Since the launch of the Edible Edinburgh Sustainable Food City Plan in July 2014, Edible Edinburgh has worked to deliver the actions and objectives outlined in the Plan. In December 2014, Edible Edinburgh met with the Glasgow Food Policy Partnership and a number of national agencies, leading to the elected leaders of both Edinburgh and Glasgow Councils issuing a joint statement on food poverty in February 2015 (City of Edinburgh Council, 2015)[28]. The statement commits the cities to eradicate poverty in all its forms.

Acknowledging the generous commitment of time, effort and resources communities make to the development of food banks, the statement noted their status as crisis-driven responses to an immediate problem and not a sustainable solution. The Leaders pledged to avoid the establishment of these emergency measures as part of the support systems for poorer families, seeing this as charity welfare, rather than a solution able to uphold the social security for citizens. They pledged to work with all relevant stakeholders, including people with first-hand experience of poverty, to ensure that all citizens have access to sustainable, nutritious food as a matter of course, not as an act of charity.

The statement was the first of its kind and received wide media attention. The Directors of Public Health in the two cities issued a follow-up statement emphasising the effects of food poverty on health. These moves inspired and provided the model for the UK Sustainable Food Cities network to follow. Under the banner 'Beyond Food Banks', the leaders of over 30 UK cities have now signed a Food Poverty Declaration calling on the UK government to reduce benefit delay, review how benefit sanctions and welfare reforms are

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[28] City of Edinburgh Council News Blog, 2015. 'Edinburgh and Glasgow commit to eradicating poverty in our cities'. Available from: http://www.edinburgh.gov.uk/blog/newsblog/post/739/edinburgh-and-glasgow-commit-to-eradicating-poverty-in-our-cities

being implemented and make sure that all jobs pay enough to meet basic needs (Sustainable Food Cities Network 2015)[29].

Edible Edinburgh has also participated, supported and contributed to a range of community events in the City, such as workshops in peripheral estates, educational events with a range of organisations, and the inaugural community-led Power of Food Festival. It also launched a website in June 2015. This hosts an online Sustainable Food City Food Charter, which invites individuals and business to make a commitment towards achieving the sustainable food city vision. Other actions include on-going work with the EFFLP, maintain an overview and influence key policy developments by responding to consultations such as the Scottish Government's 'Becoming a Good Food Nation' discussion document (Becoming a Good Food Nation, 2014)[30] . In particular, the document's proposal for a national food and drink policy, which makes the case for a number of priority actions and that in turn, lays the foundations for the newly established Scottish Food Commission.

Implementation/Impact

The Sustainable Food City Plan was published in July 2014. Much of the work of the Edible Edinburgh initiative remains focused on raising awareness of food issues and encouraging integration with related agendas. Like many others who aspire to become Sustainable Food Cities, the complex nature of our food systems mean that we remain unclear on how best to measure the impact of such initiatives and transform the Ciity's food systems. This is something Edible Edinburgh is working on as a priority with several key partners and other cities within the UK Sustainable Food Cities Network.

In addition to Edible Edinburgh's high profile work on food poverty, perhaps the most notable area of progress to date is with influencing public sector food procurement and catering systems via the Food for Life project. Over the last three years, the EFFLP has achieved the following (Edinburgh Food for Life Partnership Evaluation Report, 2015)[31].

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[29]Sustainable Food Cities Network, Beyond the Food Bank Campaign. Available from
http://sustainablefoodcities.org/campaigns/2015beyondthefoodbank
[30]Scottish Government, 2014, 'Becoming A Good Food Nation'. Available from http://www.gov.scot/resource/0045/00453219.pdf
[31]The Edinburgh Food for Life Partnership Evaluation Report, 2015. Available from:
http://www.ed.ac.uk/files/atoms/files//soil_associaion_scotland_efflp_evaluation_report.pdf

- The University of Edinburgh was the first Scottish Institute of Higher Education to achieve the bronze FFL Catering Mark award, including all its catering outlets across the City.

- All City of Edinburgh Council schools have achieved the bronze FFL Catering Mark award – the first Scottish local authority to achieve this.

- The City of Edinburgh Council was the first to achieve Catering Mark bronze standard for a care home in Scotland. It has since built on this achievement to include four more social care locations.

- Several innovative pilot projects have emerged from the FFL project, including a FFL Action Group at one High School and organic fruit and vegetable trials with established suppliers.

- Several major food suppliers to EFFLP partners have joined the Catering Mark Suppliers scheme and one has obtained certification as an organic licensee.

- Edinburgh partners now serve 3.5million award standard meals each year.

Feedback from those involved with FFL at the point of service delivery has been positive:

"The menu has changed for the better. We are still doing some of the same meals but with farm assured Scottish meat. We have had positive feedback from staff and pupils. The budget is the same but staff morale is a lot better!"
(Julie Young - Senior Cook, Currie Community High School, Edinburgh)

"It feels so much better to be putting TLC into the food rather than just opening packets. Preparing food together has bought our whole team closer"
(Catering Team Leader, Edinburgh)

"Food for Life has improved what we can offer our students with regards to healthy and ethical food choices in a positive and interesting way."
(Ben Stewart - Depute Head Teacher, Currie Community High School, Edinburgh)

Conclusions

Work on the Edible Edinburgh Sustainable Food City Plan is, at the time of writing, only just entering its second year. Despite this, several lessons are worth sharing:

- Sustainable Food is an emerging area of public policy and action. There is no one-size-fits all model or framework and as a result, a holistic, flexible approach is required because sustainable food is about so much more than just food, spanning the breadth of social, environmental and economic agendas.
- It is important to ground sustainable food in established city governance systems – and keep it there. This must integrate sustainable food with other key city agendas – planning and land use, procurement, climate change, adaptation, waste, anti-poverty, health, economy, culture, etc.
- It is hugely helpful to have champions – those who make and influence decisions in cities and network with others across various sectors.
- A clear plan is essential. It enables good management and aids communication. Having the plan adopted by the local authority and other public bodies is critical in embedding sustainable food in organisational and city agendas.

Looking forward, Edible Edinburgh shall continue to work closely with the well-established community food sector in the city and their concerns will continue to shape priorities. In this respect, Edible Edinburgh shall endeavour to play an active role in supporting communities in making the most of the opportunities presented by the new Community Empowerment Act with respect to community land access and management.

Scotland's cities have the potential to play a valuable role in connecting national policy and local initiatives. Building on the success of the Joint Council leaders' statement on food poverty, Edible Edinburgh will continue to work with Glasgow and key national and local organisations to press for change at local, Scottish and UK level. These cities are currently examining the potential of community food hub models in Scotland have to replace food banks.

Food is a complex issue, but a great for showing how cities can be smart in engaging people in sustainable development issues, environmental impact assessments, the

calculation of carbon footprints and relationship this in turn has to climate change. In this respect, sustainable city food systems could be key in accelerating actions able to reduce carbon footprints and meet the challenge global warming raises for such adaptations to climate change.

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Making the City Smart from the Grassroots up:
the Sustainable Food Networks of Bristol

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Introduction

The Smart City approach has been critiqued for its top-down focus on technology at the expense of finding viable solutions to the challenges of city life (Saunders and Baeck 2015; Wiig 2015). The development of food policy and food activism in the UK also reflects the development of a civic social movement particularly orientated towards food in the city. In particular, digitally-connected food activism is represented by bottom-up, horizontal networks of urban groups, clubs, businesses, associations and other organisations that create and share knowledge about food. In effect, such cyber food networks offer a Smart City counter-example to the top-down approach to high-tech IT infrastructure development. Some urban food networks have succeeded in influencing municipal authorities in their policy-making but this has not been as smooth or direct as might have been anticipated for such a democratic impulse. In part, this reflects the limited power of local authorities in the UK over food provision, but also the extension of democratic participation into an area that has been marked by private governance and technocratic procedures.

In this paper we outline the development of food networks in Bristol, alongside the emergence of a formal food strategy and associated organisations. The aims of the strategy are reviewed in relation to the food networks in the city, and other city policies. We then reflect on what governance means in a networked situation. The chapter concludes with a consideration of the impacts on the city and lessons that can be drawn from its experiences.

There has been some debate as to whether the network of civic groups in Bristol constitute a social movement, with Kevin Morgan in particular arguing that urban food movements in the UK:

> *"...do not (as yet) possess the trans-local reach and organisational coherence to constitute a new social movement"* (Morgan 2015, p.1391).

Morgan's position implies that urban food movements have too localised an influence and narrow range of forms to be able to affect change, a view informed not least by his former position as the first Chairman of the Bristol Food Policy Council. Morgan's framing of social movements contrasts, however, with sociological understandings, such as Goodwin and Jaspers' definition:

> *"Social movements are conscious, concerted, and sustained efforts by ordinary people to change some aspects of their society by using extra-institutional means."*
> (Goodwin and Jasper 2009, p.3)

Under this framing, the movement is defined not by the scale of its institutional influence, but by its social activity. Morgan looks to a time when urban food movements might gain the capacity to create change, and we concur with his observation that elements of the network have been involved in the 'co-governance' of urban food, while continuing to organize separately. Our work in Bristol shows that while some food networks are connected to the state, others oppose it (sometimes directly) or have little need of it to constitute their social movement.

To view the City as the host of social movements poses questions as to how they can be analysed, and how the forms of knowledge that they are generating can lead to the changes to which they aspire. Several authors have pointed to the symbolic, but also technological work, that social movements are capable of achieving. Social movements not only signal new ways of living but they can also create the means of achieving this through social experimentation (Melucci 1996; Crossley 1999). Hess and Rao provide examples of how social movements have played a role in creating new technologies as diverse as wind turbines, organic farming and the petrol powered car (Hess 2004, 2005; Rao 2009). Bristol is known as a centre for such experimentation, through festivals, alternative agriculture and the arts (Purdue et al. 1997, Jowers et al. 1999). In our analysis, we foreground the way in which new forms of knowing the city are created and how that helps urban food networks to strive for change. This is a way of conceptualising how a city can be smart from the bottom up.

Evidence for this paper was collected as part of the FP7 SUPURBFOOD project funded by the European Commission (agreement 312126), which allowed the research team to work

in the Bristol City Region from 2012 to 2015 (Reed and Keech 2016; Curry et al. 2014). Within the project, Bristol was one of seven European city-regions alongside Ghent, Riga, Rome, Rotterdam, Vigo and Zurich. The emphasis of the project was to explore, in close collaboration with small and medium-sized food enterprises, short food chains, waste cycles and multi-functional land use through a city-regional lens. Data collection methods included interviews, surveys, and participatory workshops. SUPURBfood's qualitative research involved a high level of face-to-face and participatory engagement between the University of Gloucestershire's research team and people involved in urban food networks, over three years. This contact has revealed views on the sustainability of Bristol's food system, and factors that could accelerate change.

The paper proceeds by first considering the context of Bristol and the development of the food network in the City, then its leadership and governance, concluding with an analysis of the changes it food networks have secured in the City.

Bristol's sustainability agenda

(i) Bristol – complexity and vibrancy

The City of Bristol sits within a governance structure that is complex, often even to those who live within it. Between 1974 and 1996 the cities of Bristol and Bath, as well as their associated rural districts, were administratively united within the County of Avon. Local government reorganization then offered district authorities the possibility to continue the two-tier county/district system, or to choose so-called unitary status, meaning that district authorities assume full responsibility for the provision and organization of public services. In the case of Avon the latter option prevailed, leading to the establishment of four new single-tier authorities: Bristol City, Bath and North East Somerset, North Somerset, and South Gloucestershire. The resulting complexity means that the territory of Bristol is split: the north of the city is administered by South Gloucestershire, most of the rest is run by Bristol City Council while the suburban areas immediately south-east of the city are under the authority of Bath. Other functions and the allocation of resources delegated from central government (such as the Local Enterprise Partnership - LEP) are still collectively co-ordinated through meetings of the four councils, and Avon remains relevant through the

term CUBA, or the County that Used to Be Avon.

This cumbersome arrangement means that there is a tendency to think about what can be done without the involvement of the relevant council.

> *"I think maybe there hasn't been the political leadership [historically]. Certainly it hasn't been very radical and interesting so people go and get on with it themselves" (Interviewee UX).*

But one of our interviewees describes it as an effective economic unit.

> *"I [...] define it as the LEP region which is otherwise known as CUBA ...And that forms effectively quite a cohesive economic unit" (Interviewee ZS).*

Even so, there is irritation if the boundaries associated with state funding conflict with local interests:

> *"Businesses don't recognize those boundaries. They are not economic boundaries. And it is incredibly frustrating when you are promoting something and somebody says "that sounds great and I'd really like to do it, but I'm really sorry you've got the wrong postcode" (Interviewee ZS).*

Such complex institutional arrangements demonstrate how the City needs to be understood as a networked field of action rather than as an administratively bounded construction.

Bristol has a population of about 435,000 people, with an economy historically founded on colonial trade. Today its commercial importance lies in aerospace technology, finance and creative industries. It is well known for its vibrant, bohemian culture and diverse population (Florida 2002). Bristol is home to several works by the street artist Banksy, and supports a thriving music and arts scene. Bristol sits at the gateway to the rural southwest, the English region most economically reliant on agriculture. Food and agriculture are, however, largely outside of the control of locally elected politicians in the UK. The multiple food retailers, who supply about 80% of all UK groceries, are the *de facto* regulators of the

food system. Supermarkets dominate production standards and food supply chain arrangements (Marsden et al. 1999). In terms of spatial planning the food system has a profound impact on the cityscape, defining the built edges of the city but also the streetscape and the flows of people through the streets. In the UK, local authorities have limited powers to control the pattern of development, or, in some cases, even the location of individual stores. This has led to site-specific tensions but also a wider contest for the way in which people experience cities, including a citizens' backlash across a number of issues, as the problems of such a centralised control of food have become apparent (CPRE and Natural England 2010).

Bristol is the headquarters of several national NGOs, in particular The Soil Association (organic food and farming), SusTrans (promotion of cycling) and the Federation of City Farms and Community Gardens. In addition, there are a range of smaller consultancies and food professionals based in the city. Several interviewees argue that the city's culture is quite distinctive with regard to environmental concerns:

> *"Bristol is statistically supposedly much greener, in terms of its people… the number of people in Bristol who believe that climate change is man-made is significantly higher than the national average, for example" (Interviewee ZS).*

A counter-balance to Bristol's cultural vibrancy is that interviewees expressed concerns that it overpowers its smaller and more rural neighbouring districts, which at times works against local co-operation.

(ii) Contesting conventional food governance

Much of the criticism levelled against the dominant food system emerged from the realisation of its reliance on fossil fuels, leaving it prone to disruption. This risk became especially evident during fuel distribution boycotts in 2001, resulting in tangible threats of food shortages (Doherty et al. 2002). Public, scientific and policy concern about the food system is also associated with the significant contributions to CO_2 emissions made by agriculture, food transport, refrigeration and post-retail consumer practices, all of which exacerbate global warming and so, in turn, the food system's own vulnerability (Foresight

2011). Despite recent food price falls, in recent years many vulnerable households in the UK have found that their family budgets are inadequate to meet recommended nutritional standards and, consequently, they are in need of food support (Dowler et al. 2011; Morgan 2015; Plunkett et al. 2014). This aspect of food security as a widespread phenomenon, affecting people in work as much as those who are workless, is new in the UK and underlines another type of vulnerability associated with the prevailing food system. The intersection of the environmental, social and communal has provided the driving force for a network of civic food initiatives all over the country, and particularly in the city-region of Bristol, where violent riots marked fierce opposition at the opening of a supermarket branch in 2011 (graphically depicted in Rice et al. 2011).

To describe, or even map, the diversity of food initiatives in Bristol (and Bath, its neighbouring city) is challenging both in terms of number, scale and scope, but we estimate there to be over 200 groups. In scale they range from those that involve hundreds of people such as community funded farms through to those that are focused on neighbourhoods, examples of which include shared gardens. In scope they range from initiatives to help people fighting obesity, addiction or mental health problems through to food waste cafes, food banks, and those attempting to resurrect artisan food skills through to foraging skills, and even urban trout fishing. Without central co-ordination there are areas of overlap and redundancy, some are very well organised and networked, while others fizzle out quickly. As a key activist notes, this dynamism has downsides:

> *"So there is an awful lot that goes on which, on one hand, is brilliant, but if you are trying to create a joint step change it's an absolute nightmare" (Interviewee ID).*

Most food organisations are no-, or low-budget, with a strong emphasis on voluntary effort. Often the vehicle of a Community Interest Company (CIC) or co-operatively owned venture is created for the project. In this way the organisations echo the dynamism of the private sector, but build in forms of stakeholder accountability to their operations.

An important initial civil society intervention was the formation of the Bristol Food Network (BFN) in 2009, which registered as a CIC in January 2014, to promote a set of key goals, including to:

- Encourage people to cook from scratch, grow their own and eat more fresh, seasonal, local, organically grown food.
- Champion the use of local, independent food shops.
- Encourage the use of good quality land in and near the city for food production.
- Promote and encourage the redistribution, recycling and composting of food waste.
- To advance nutritional education and social cohesion.
- To promote community-led food trade[32].

BFN has become a platform around which a wide range of groups gather, including those concerned with radical social transformation of the food system, those advocating changes to people's diets, or residents who wish to cultivate a patch of ground in their neighbourhood. In 2009, BFN drafted a 'Sustainable Food Strategy' for Bristol. This stimulated Bristol City Council to develop its own 10 point 'food charter', which effectively became an unofficial food strategy, principally geared towards public sector food procurement. The charter was a significant step forward and staff from different sections of the City Council met periodically in a 'Food Initiative Group' to facilitate better internal communication.

Another key resource in furthering the development of the food network was the publication of the report *Who Feeds Bristol?*[33] (Carey 2011). Written by Joy Carey, an influential food system consultant and Bristol resident, and commissioned by the city branch of the National Health Service (NHS), the report has become an exemplar for other cities. The report was "primarily a descriptive analysis of the food system serving Bristol" (Carey 2011, p.3) but, for the first time, provided a wide range of information about the operation of the food system in the south-west region. This ranged from the number of independent food shops (140), through an exploration of the relative concentration of supermarkets in Bristol compared to other English cities of similar size, to a description of the infrastructure (wholesale markets, abattoirs) in the south-west of England. Given its modest budget, the report was limited to compiling secondary data sources, although it

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[32] http://www.bristolfoodnetwork.org
[33] Downloadable via http://www.bristol.gov.uk/sites/default/files/documents/environment/environmental_health/Who-feeds-Bristol-report.pdf

included some interviews and 'snapshot surveys' with selected food businesses. Despite these constraints, the report provided a key resource for discussing how the consumer markets of Bristol might be more closely integrated with productive rural areas in the region. It also demonstrated the epistemic resources of the network, and the role of knowledge in re-shaping the city.

(iii) Bristol Food Policy Council

The Bristol Food Policy Council (BFPC), established in March 2011, was modelled on precedents in North America, notably Toronto (Carey 2013; Morgan 2014; Morgan 2015), and followed some earlier experiments in the UK to co-ordinate food policy within municipal government (for example, the Greater London Food Policy Council in 1986, London Food in 2004, Sandwell Healthy Urban Development Unit in 2008). With members drawn from a wide range of stakeholders including representation from the local food industry, Bristol City Council, Bristol Food Network, universities and grassroots bodies, it set itself the goal of promoting 'Good Food' which it defined as being:

> *"Vital to the quality of people's lives in Bristol. As well as being tasty, healthy and affordable the food we eat should be good for nature, good for workers, good for local businesses and good for animal welfare" (BFPC website).*

BFPC adopted many recommendations from *Who Feeds Bristol* within its subsequent Bristol Good Food Plan, launched in November 2013 (Bristol City Council 2013). In 2015 a more detailed action plan with clear commitments, outcomes and measures of success was produced. The Good Food Plan framework aims to help different actors to participate in an integrated, sustainable food vision for the city, and represents a mechanism through which people can coordinate discussion and work. Although not formally part of Bristol City Council, the BFPC and its new Good Food Plan has gained the official support of the City's elected executive Mayor. Other achievements of the BFPC include a City Council review of food in relation to strategic development. This illustrates what Morgan describes at the 'co-governance' of these aspects of city life, in effect an informal extension of the local state.

(iv) European Green Capital 2015

European Green Capital status is awarded annually by the European Commission to help cities in EU member states to try and tackle the urban sources of contemporary environmental challenges. Bristol was awarded European Green Capital (EGC) status for 2015 (its third attempt), linked in particular to the City's commitments to sustainable transport and energy[34]. As part of Bristol's EGC activities, the City Council allocated £450,000 to food projects, most notably in the work of the Bristol Food Network and the Bristol Green Capital partnership (itself a CIC) to help co-ordinate a food plan for period 2017-2020 on behalf of the Food Policy Council. BFN started this process with a workshop of stakeholders in May 2015. Other activities reflected Bristol's cultural energy and cosmopolitanism through cooking and dining, an urban growing trail and attempts to 'scale up' local food production by connection with local producers in and near the city.

Only shortly after the opening events for EGC, a dramatic conflict broke out over the environmental priorities of the city. The Bluefinger Alliance[35] is a campaign group that has for several years been indicating the importance of an area of high quality agricultural land, predominantly in connected parcels of private ownership, on the city's northern edge. One area of this land in City Council ownership had been designated for a motorway extension to connect to a new public transport system. Meanwhile, the area was being used for allotments and situated next to a community gardening project.

The prospect of losing this land to development physically and symbolically threatened the ability of the emerging municipal strategy to support food production in the city. Once development plans were confirmed, a determined group of protestors occupied the area, despite the personal appeals of the Mayor, and were eventually removed by police. By February of the EGC year it had become clear that conflicts and disagreements over attaining Bristol's sustainability objectives could not easily be defused.

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[34] Bristol's EGC application to download: http://ec.europa.eu/environment/europeangreencapital/winning-cities/2015-bristol/bristol-application/index.html
[35] www.bluefingeralliance.org.uk

Examples

"The urban world is a cyborg world, part natural part social, part technical part cultural, but with no clear boundaries, centres or margins. All socio-spatial processes are invariably also predicated upon the circulation and metabolism of physical, chemical, or biological components" (Swyngedouw 2006, p.118).

The following examples of food networks in Bristol focus on circuits of what might be otherwise waste in the metabolism of the city. One, FareShare, is an initiative to divert food from waste disposal by setting up socially beneficial outcomes from its interventions. Whilst food waste recycling to capture energy and produce compost demonstrates a stratum of technocratic intervention within the metabolism of city, it also illustrates the limits of the network of activists. These networks are organised through the Internet and our third example focuses on those networks. The examples also illustrate what urban theorists ascribe to all institutions active in a city, namely that, socially and spatially, opportunities and benefits are distributed unevenly.

(i) FareShare

The FareShare project represents an innovative intervention in terms of diverting food waste, in that it seeks to prevent food from entering the energy-composting system described below, and to 'pre-cycle' it to those in need of food. FareShare argues that large quantities of food within the centralised distribution systems of the multiple retailers and the processors that supply them, becomes waste solely on the basis of logistical and economic efficiency measures. For example, a pallet of tins, some of which have become damaged in transport, will not be accepted into the retailer's inventory. However, it is uneconomic to return the pallet for repackaging and sorting. Previously, it was very likely that this food would be sent for disposal in landfill. FareShare intercepts rejected food, sorts and re-sells it at very low prices to social enterprises and care organisations. It generates its own income by using some surplus food in a commercial catering venture. Those with 'waste' food pay FareShare in lieu of the waste disposal charges they would have faced, and

the recipients pay for the food they receive; this combination finances FareShare's on-going intervention into this system.

To maximise the social benefit of this intervention, FareShare provides opportunities for volunteers and people who are finding a route back to work after long periods of unemployment. With a core of paid staff and volunteers, commercially rejected food becomes a way of creating employment opportunities and supporting other food networks whilst intervening in the metabolism of the city. Tension can exist with other parts of the network of food activists in the City because FareShare's activities depend on the existence of the logistical systems that activists aspire to replace. This tension is typical between groups focused on meeting immediate need and those seeking strategic change. Because food is the main focus of civil activity, nutrient flows and water usage are discussed less within the networks. In part, this is because the technocratic interventions, in their technical efficiency, render the problems less visible, or seem to offer solutions if effective scales of operation could be attained.

(ii) Geneco

Geneco, a subsidiary of the Wessex Water company, holds the municipal contract for food waste recycling for Bristol City Council. Using facilities in the docks area west of the City, Geneco collects biodegradable waste, including food waste, before anaerobic processes create methane gas and compost. The methane is either burnt to produce electricity, used in a district heating scheme, or as a fuel for vehicles. The compost is sold to local farmers, from whom there is such a demand that a futures compost market has been developed. In this way, the metabolism of the City is partly re-territorialised as nutrients pass through the city into the region, and energy from potential greenhouse gases is captured. As those who operate the system acknowledge:

> *"whether this can be justified in Life Cycle Analysis terms [may be questioned, but] it will be better than land fill"* (interviewee LT).

The paradox of these interventions that seek to close waste circuits is that they create an alternative system dependent on environmental externalities. Householders composting

their own vegetable waste, thereby closing the cycles at a domestic level, could render the heavy plant less efficient. Even so, with recycling at 58% there is little reason to suppose that increases in household recycling activity will threaten the efficiency or effectiveness of the investments already made. The city-region has some of the highest recycling rates in the UK, although the impacts of austerity and the recession have lowered the net figures from a peak around 2008/9 (Reed et al. 2013)

(iii) On-line networking

This pre-occupation with action is well demonstrated within a corpus of data from Bristol, emerging from 230 blogs and 16,000 tweets from 24 twitter accounts posted between 1st January and 31st December 2013. The authors collected these data using the Ncapture facility in Nvivo 10 and carried out three rounds of coding: word counts, broad thematic categorisation and, finally, narrow coding into 5 meta-themes covering 'locality', 'celebration', 'recycling', 'gardening' and 'volunteering' (Reed and Keech 2016). The corpus reveals a vibrant and well-informed food network that uses social media to make reflective comments about the sustainability challenges facing Bristol as a whole. Where particular neighbourhoods are mentioned, these posts usually publicise public celebrations and social gatherings around growing, cooking and eating food. Recycling forms a strong narrative in terms of 'making do' and sharing resources, as well as highlighting the wastefulness of the dominant food system, and composting emerges as a popular way to support the main-stay of citizen food practice: growing vegetables. In the majority of cases practice is social, collaborative and a source of new skills. Knowledge is offered (often, but not always, freely) by other Bristolians who share their knowledge as a contribution to advancing practical change in urban food systems.

These examples point to the interconnections of technical, social and physical solutions to the problems of food in the city. All of them make use of ICT and other contemporary technologies for co-ordination and communications, but are rooted in widespread, open participation.

Strategy

For some research participants, it was clear that greater investment would speed up the responsiveness of the local Councils and so accelerate the pace of change:

> *"The only thing that would really help was if we had the resource to start the community engagement process more quickly so we could get the feedback quickly.."(Interviewee JT).*

Some members of Bristol's food network are involved in the co-governance of food in the city, but others have a wider and more critical perspective:

> *"When you're in local government you spend all of your time thinking 'I don't want to do something that I think I'm going to get criticized for in the press'. Actually, I think we need stronger leadership on this [food]" (Interviewee RN).*

An activist from a neighbouring district was even more forthright about the tensions generated when working with local authorities:

> *"Nothing happens, and I have a reputation for being tough and critical with them... [The council's officers responsible for sustainable food] feel inhibited about how much they can push things with other teams within the council, because they feel it would be better to do a softly-softly approach, whereas if it were me, I'd be in there knocking heads together" (Interviewee UX).*

One of the city-regional councils was viewed as being particularly uncooperative, despite the collaborative structures used within CUBA:

> *"[Council] don't share anything with anybody. You can't get anything out of them"* (Interviewee HD).

Such frustrations do not reflect a lack of ambition or scope in relation to what urban food networks think is needed to organise a better city-level food system. At local and neighbourhood levels, activists identified access to publicly-owned land as a priority, while

demanding that councils should not sell productive urban land for other purposes. But barriers at national level were also identified, particularly that food production is not adequately considered within town planning and economic development policies, and that small-scale food processors remain structurally disadvantaged. This extended to the EU level where some regulations to protect competition were interpreted by some councils as barriers to localised food procurement for public kitchens.

Activists also pinpointed opportunities at the regional, national and EU levels that could accelerate change in the city. The first of these related to changes that are being proposed to give neighbourhoods greater control over planning. Viewed by some as a way of stopping unwanted developments such as wind turbines, they were also interpreted as offering potential for community control of food production assets. Improved opportunities to network with the Council was also identified as positive, and which have emerged partly through fiscal austerity and the somewhat *ad hoc* regionalism currently being developed in England (2012). Although detailed knowledge of the Common Agricultural Policy was limited among our research participants, the possibility that it could be re-focused to encourage regional production or facilitate urban production was widely discussed (Curry et al. 2014).

While the discussions described were structured via participation in SUPURBfood, the professional and well-informed backgrounds of the contributors facilitated the high quality of debate. This subverts the anticipated knowledge relationships in the system of local government, which positions the expertise of professional council officers alongside the lay knowledge of citizens. Often the activists in the networks are more knowledgeable not only about the technical aspects of food production, distribution and nutrition, but also about policy, although they lack the status or insider access available to council officers. Significantly the officers are accountable for their decisions to elected members and therefore to the wider public, whilst the network does not have such a democratic mandate.

Governing the network

"We decided to keep a close-knit, more focused group of activists going so we can get stuff done, as opposed to providing a venue for people to come along for their own reasons" (Interviewee UX).

The presence of a complex and sometimes dense network of leadership is not necessarily reliant on individuals, or a clear delegation or assumption of responsibility. Rather, it is a question of discussion and debate with a gradual, sometimes slow change of direction, which some key activists regard as wasteful of people's energy and opportunities.

Our research revealed that the co-ordinating actors within the urban food networks are often women. This does not appear to be an explicit policy linked to the development of a sustainable food system in the city, but may reflect some gendered perceptions of food as a domestic occupation (Hollows 2003). Equally, the concern about health and food, or food shortages, relate to the perception that social care and support are gendered topics. This has resulted in women playing prominent roles in many of the organisations, including the BFPC, FareShare Southwest, and the co-operatively owned Community Farm, among others.

The social media analysis and participatory qualitative research outlined, illustrate vivid examples of horizontal networking, and the creation of peer-to-peer bonds in public fora and in a distinct locality. In many ways, cyberspace is taking a key part in the formation of a sustainable community in place. As Franklin and Marsden (2015) note, there are many ways in which communities can become disconnected and this can be particularly the case when working with local councils. This is unfortunate, according to Morgan (2015:1388), because British urban food initiatives seem to be "ahead of the game" in avoiding food development being used as "the unwitting agents of green gentrification". In Bristol, there has been considerable difficulty in getting the plans of the Bristol Food Policy Council recognised and enacted as City Council policy, and it is not always possible for the city to react to the agenda of the food networks. This leaves food activities largely funded by EU sources and reliant on the time/energies of volunteers and NGOs.

This failure in part reflects what Franklin and Marsden (2015) note is a tendency towards 'linear' urban planning policy, despite national policies toward localism and the Big Society:

> *"...there remains a general absence within the UK, of any accompanying or equivalent set of government initiatives which are designed to be responsive to, rather than directive of, community-led sustainability initiatives"* (Franklin and Marsden 2015, p. 943).

It also reflects what those authors observe in their case studies, namely that vertical links of networks are not well developed, and by this they mean links to officers in the local council. The culture of debate and discussion in Bristol reflects an emphasis on participation and consensus that is more akin to the methods adopted by contemporary protest groups such as 'Occupy', than the formality of, for example, a labour organisation such as a trades union. Therefore, it can be difficult to identify when key decisions are made, or attribute them to a particular person. Instead, great importance is placed on reports and knowledge generation *per se* as the route for developing the consensus that allows the network, collectively, to advance.

The electoral system in the Bristol city-region is partisan, particularly within Bristol City Council, where the political parties are often sharply divided. However, the executive Mayor (a former Liberal Democrat) was elected as an independent and appointed a cabinet from across all the parties. This all-party approach has not defused partisanship in the wider Council or facilitated widespread adoption of the food network's agenda. The need to find consensus in this situation indicates some of the limitations of co-governance, where the networks of food activists assume responsibilities, yet without power to make changes. It also demonstrates the continuing power of elected councillors and party politics in an area where there are rarely public debates.

Citizen food sustainability

Bristol offers an example of a city in which the activism of its citizens has been highly influential in a number of ways:

1. The ability of people to organise themselves into a number of formal and inclusive networks, particularly BFN and BFPC, has inspired policy engagement with sustainable food within the City Council, particularly under the championship of an elected, politically independent Mayor and the opportunities offered through the European Green Capital profile. This includes learning about the food system, which, as Brunori and Di Iavoco (2014) note, is a re-localisation of knowledge:

> *"The critical point is that symbolic re-localisation breaks the monopoly of knowledge about food by the agri-food industry, and redistributes it among consumers, producers, and local administrations. Symbolic re-localisation is the precondition for 'relational re-localisation', which is a cognitive connection to a place that establishes contact with local producers."* (Brunori and Iavcovo Di 2014, p.7)

The effective communications of these networks, supported by the expertise of its stakeholders, has generated a wealth of food-related knowledge and good will that has had positive implications across public, private and voluntary sectors. This, in turn, is fuelling further encouragement for localised actions which underscore the multiple values and social/environmental functions of urban food production, while presenting compelling arguments in favour of a more diversified food economy. This recognition of the multifunctionality of food is creating a discussion where planning is no longer viewed as linear but an engagement with citizens that should result in actions that have multiple benefits (Morgan 2014).

2. The configuration of Bristol's local food initiatives, which include new financial, organisational and retailing methods, have led the city to become culturally identified as a place for food innovation in the south-west. This could be a prelude to a discussion about the relationship between urban and rural areas in the region, and a move towards opportunities to create a more equitable and sustainable food system (Kitchen and Marsden 2009).

3. Bottom up mobilization puts into question the agenda of the Smart City led by ICT and managerialist systems through a counter-proposal of a network of very

active citizens. As Kitchin and colleagues (2015) argue in creating the data necessary to make the smart city operation, explicit political and ethical choices are made:

> *"…how data are ontologically defined and delimited is not a neutral, technical process, but a normative, political, and ethical one that is often contested and has consequences for subsequent analysis, interpretation and action."* (Kitchin et al. 2015, p.16)

There is the possibility that this ontological definition, which is being worked through in the networks of food in and around Bristol, can reflect a more popular set of definitions. Further, as the horizontal networks of social media outlined in this chapter indicate, there is the potential to empower citizens to play a role in the collection, dissemination and analysis of any data collected. The data needed for city management to become more democratic in new ways includes crowd-sourcing data, with open access to the results and the possibilities of shared analysis.

Much of what we have seen in the city of the Bristol conforms to what Castells and colleagues have noted in the response to the economic crisis in Spain but also of longer-running and more deeply-rooted attempts to pre-figure change in the present (Castells et al. 2012; McKay 1998).   This strategy has been a constant feature in what have been described as New Social Movements, focused on identity and post-material values. The emerging edge of the food network in the city of Bristol is the common alliance between those focused on post-material values and the rising importance of material values such as the right to food and a wholesome diet. Presently, the limitations of local government and the distance of the food agenda from formal, party politics hamper its diffusion into city life. Yet the expectations raised by the year as Green Capital, and the frustrations of only limited formal support in the co-governance arrangements in the city, could result in a more radicalised approach in the near future.

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The Governance of Bangkok's City Food System

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Introduction

Bangkok is recognized as a place where food is abundant. In 2012, the number of market oriented full-time farming households working in Bangkok's peri-urban fringe was 13,774. They cultivate in the peri-urban areas of 71,287 acres (Policy and Planning Division 2012). Apart from this, there are also subsistence, leisure and recreation oriented small-scale food productions within the inner city conducted by part-time farmers. Roughly, 130 collective gardens developed by these part-time farmers are located in Bangkok metropolis (City Farm Program 2014). Against this backdrop, what follows shall draw attention to:

- the participatory aspect of Bangkok's city food governance;
- the food production that emerges from the sustainable growth and inclusive nature of this governance system;
- civil society's use of this as a means to empower communities and be smart in bridging territorial divisions, by way of local government strategies, secured through capacity-building exercises.

Bangkok's city food governance

As a metropolis, Bangkok is the capital and most densely populated city in Thailand. The city's population has increased roughly 3.13 times in 7 years (from 2.57 million in 2009 to 8.04 million in 2015) and accounts for 12.35% of total Thai population (Mahidon University 2015). Feeding this growing population is a major challenge. It has not only meant reserving land in peri-urban and inner city locations for agricultural use, but developing a network able to distribute the food produced across Bangkok. Fortunately, the Bangkok Metropolitan Administration (BMA) plays a role in reserving farmlands and the development of central fresh food markets including 'Talat Thai' and 'See Mum Moung'. It also plays a role in facilitating the investment of agri-business within the city. In particular,

by creating the modern trade system through the building of hypermarkets, supermarkets and convenience stores.

Within this governance system, the agri-business produce, process, and distribute a variety of instant foods and some fresh foods. As corporations, they own the modern trade system for the whole country, including thousands of hypermarkets, supermarkets and convenience stores in Bangkok. The top 25 largest stores are built on a total land area of 1,157 acres, which is more than the 158 acres used to build the 25 largest public parks in Bangkok (Thai Climate Justice 2012). They also attempt to develop their own brands. As corporations, they cooperate rather than compete with one another and have close links with both central government and the BMA.

Such co-operation between political parties, central government, the BMA and agri-business has affected the Thai food regime since 1961, when the "green revolution" in farming was first incorporated into the development plan. This changed the way people grow food to increase productivity by supporting research in agricultural science and technology and promoting chemical fertilizers sold by the agri-business sector. It led to a few large corporations monopolizing agricultural production across Thailand and forced farmers to sell their products under the contract farming system by which 90% of the total cost is spent buying their seeds, fertilizers and farming equipment - a system of governance the BMA has always supported (Leaunjumroon et al. 2011). Their package and marketing shape the way people consume food, while the growth and expansion of their modern trade system have gradually destroyed small and medium enterprises, as well as the local food system within the city. Such trends ultimately affect people's food choices. In addition to this, these large food corporations also shape consumer food culture. Indeed, a survey by BioThai (2013) found them to control a large portion of household spending on foods – which on average is 32% of the total income – and for the urban poor the figure is even higher.

However, the importance of large food corporations in the governance of Bangkok's food cannot be represented in merely negative terms. For they do provide the most effective food distribution network able to bridge rural, peri-urban and inner-city areas. Since 2011, they have also sought to enhance the resilience of city food systems. Some of them achieve this by promoting inclusive growth and supporting the increasing number of small

corporations in the agri-business working as social and green enterprises that organize green markets, open green restaurants and which offer expertise. These small corporations are significant because they champion alternative food agendas and while they do not challenge the structural injustice of the existing regime, they do offer a pathway towards a smarter cities food agenda by promoting sustainable and inclusive growth, secured by way of local government strategies and through community-building practices.

In Bangkok, such a growth regime is governed by the city's district administration offices (DAOs) and these play a pivotal role in promoting not only nutritious food, but also the health and well-being of city dwellers. Building upon the King's ideas, 50 DAOs in Bangkok have launched a variety of programs to support city farming. Some DAOs have also created their own initiatives, such as the development of rooftop gardens. They promote organic food production in their area and receive support from the Sustainable Agriculture Foundation, the Media Centre for Development, and the Working Group on Food for Change, the City Farm Association, the Slum Network, and the Informal Labor Network. These civil society organizations challenge the existing regime by advocating alternative food movements and then promoting local food systems under the umbrella of the "City Farm Program".

Civil society's involvement in promoting sustainable inner-city farming is possible because farming is part of Thailand's cultural identity and Bangkok has always been a valuable farmland area. Bangkok also has good quality soil and plenty of water, as it is called the 'River City' or 'Venice of the East' (1,165 rivers). Many inhabitants of inner-city Bangkok also attempt to grow their own food in their backyard and in small-scale collective gardens for subsistence purposes. These city dwellers include slum dwellers and informal labors who need access to affordable food. They also include hospital patients and schoolchildren, who require a secure intake of food, and other city dwellers who want to escape from the injustice of the existing regime, particularly members of middle and upper classes. The role this emerging group of civic organizations play in the food system, has also grown via, knowledge transfer and ability they have to build a sense of community.

Policy aims, objectives and strategies

In promoting Bangkok's food agenda, there are four main relevant policies (in terms of plans and public programs) including the urban land-use plan, the scenario plan (Bangkok 2020), the strategic development plan (4 years) and the City Farm Program.

The urban land-use plan, the scenario plan and the strategic development plan, both share the same objectives, including the protection of farming areas at the fringes of the city and conservation of green spaces in the city. The scenario plan also emphasizes the importance of peri-urban farming areas in enhancing urban resilience as such areas can be an emergency food source and act as floodways for draining water to the sea in the time of severe flooding.

As for the City Farm Program, it is implemented by a multitude of actors, including civil society organizations and some social or green enterprises. This Program began in 2010 and was funded under the Food and Nutrition Program of the National Health Promotion Foundation. It coordinates many non-governmental bodies and is led by the Sustainable Agriculture Foundation, the Media Centre for Development, the Working Group on Food for Change and the City Farm Association. The Program later combined many projects under its umbrella and is supported by many other organizations and groups.

In doing this, these organizations try to depoliticize the promotion of the city food agenda by avoiding the structural injustices and hiding conflict. They romanticize such programs by facilitating cooperation among public, private and civil society organizations without addressing conflicts of interests among them. For example, related public organizations presume that any political camp can promote a sustainable and inclusive food agenda. They also assume that civic organizations can leave their criticisms of large food corporations, which monopolize Thai food regime behind and try to work with them. This de-politicization of the food agenda leads to many collective actions and creative activities that contribute to the aforementioned policy aims, such as the increasing number of community vegetable gardens, green markets and members of community supported agricultural system.

The notions of 'sustainable' and 'inclusive' food systems are also promoted as a strategy by which to develop a coalition that advocates safer and more locally oriented farming practices. However, there is no evidence to suggest anyone really cares about whether these objectives are met. It just sounds good to do something that can be seen to map pathways to better food systems, which also have the benefit of being endorsed by the king of Thailand. It should also be noted that to refer to the King is one of the most effective ways by which to legitimate such objectives, as he is respected as the father of the country.

Another strategy is for the public sector to welcome working with civil society organizations. Thai public sector is progressed by way of a legal framework and set of administrative plans that promote the type of public participation specified as the World Bank as "good governance". To promote good governance as the principle of economic recovery became a condition for receiving loans from the International Monetary Fund in 1997, when Thailand faced a dramatic economic crisis. Indeed, public participation as a key principle of good governance now appears in the Thai constitution, the law it enacts and even the administrative plans it introduces.

To facilitate the participation of civic organizations is the most concrete way to meet this condition and this is why it has become the main target of such promotions. The lessons learned from such promotions is that where bottom-up initiatives from the people tend to fail, civic organizations fair better. For when they promote urban farming practices, the public sector realizes they cannot achieve civil society's expectations without engaging with the communities they represent. By doing so, civil society organizations can provide the support communities need. Consequently, the public sector decides to work with civil society organizations. This is why the public sector allows civil society organizations to co-manage the City Farm Program. It is because they realize it is these organizations alone that can empower a bottom-up, people-based exercise in community-building, capable of not only representing the poor (e.g. slum dwellers), but other marginalized groups of the population otherwise excluded from such developments (e.g. informal labors).

In Thailand, civil society organizations can mobilize resources by way of community-based networks. These organizations are better networked than the public sector, but in comparison are constrained by the resources they can leverage to support such community-based actions. This means they support each other by developing networks with those

organizations that have access to funds, which they need to leverage. Two main national funders of such organizations are the Health Promotion Foundation and the Community Organizations Development Institute. Both are public key agents that civil society organizations target as fund holders and develop participation strategies with under the auspices of good governance.   This is the reason why most civil society organizations cooperate with public agencies and focus most of their criticism towards large corporate providers in the agri-business. Indeed the recent growth of social and green enterprises in the food sector is predicated on the strategy civil society organizations have developed to leverage resources from these key funding agencies. They in turn do much to support the enterprises emerging from such organizations by funding agricultural training programs in the agri-business and developing green markets for food product, the outcome of which are then published in articles about farming.

Towards empowered participatory governance?

As mentioned, there are multitudes of stakeholders engaged in the promotion of Bangkok's city food system. As such, this governance system can be conceptualized through the lens of 'empowered participatory governance' (Fischer 2006, 2012; Fung and Wright 2003). According to Fung and Wright (ibid p.5), the public sector, via its influence on civil society organizations and communities they represent, is still important in this emerging governance system, even though the role of private sector has witnessed a significant increase. This is because, it is only this type of governance system which "elicits the energy and influence of ordinary people, often drawn from the lowest strata of society in the solution to the problems that plague them" (ibid pp.15-20). What-is-more only such a system has the capacity to address the key principles of empowered participatory governance, while also focusing on matters concerning the practical orientation of such bottom-up participation by communities as a deliberative exercise, able to engage ordinary people as well as officials in the solution (ibid pp.20-24).

Fischer (2006, p.19) adds that although participatory governance is employed in different ways without a clear definition, it is used to represent an empowering form of governance. One that advances the idea of good governance as networked by paying due attention to the role of social movements and civil society organizations. He later tries to deepen his

idea and provides a more radical perspective on such movements by considering why it is that participatory governance initiatives tend to be situated in the existing systems, which center on political and social inequality. For as Fischer (2006) stresses, participatory governance typically involves explicit struggles against such inequalities by civil organizations as social movements. To borrow these conceptualizations (based mainly on Fung and Wright's version), this paper takes empowered participatory governance to represent a governance system in which the public and private sector stand alongside civil society as organizations with the capacity to empower a community of laypeople.

For the purposes of this paper, it can be seen that in creating Bangkok's city food systems, the public sector is backed up by professional urban planners and planning think tanks (e.g. Smart-Growth Thailand), which structure the legal framework, plans and infrastructure development that facilitate food production and distribution via a regionalization process. In addition, that large food corporations and their agri-business, also play a top-level role in this process of regionalization by controlling agricultural industries and modern trade systems, which dominate the city food chains in an attempt to seize the largest portion of food distribution. In this system, food corporations also work to link local food and non-local food production by shaping the distributions of the region's rural-urban networks. Within this regional network, the operations of government agencies and corporations are also interrelated by the shared visions of food production advanced to represent everyone's interest in the growth of Thailand's agri-business.

In the middle of all this, local governments have their strategies to fill gaps and in securing this regionalization process, while at the bottom civil society organizations help to facilitate community-building practices. They bring about the expansion of household, community and institution gardens within the inner city. They also contribute towards the enhancement of food security, social cohesion and resilience, particularly for the poor. Their operation complements rural agriculture by promoting the health and well-being local food systems. They also support neighborhood planning and the role of urban agriculture in raising environmental awareness, managing wastes (reuse and recycling) and facilitating learning for urbanite kids. Besides this, they propose food sources and distribution networks that promote shorter food supply chains through weekly green markets, food fairs and vegetable box delivery directly from the producers to customers.

However, it is evident these organizations have insufficient resources to deliver more sustainable and inclusive city food systems, without empowering ordinary people in the types of collective actions able to create them. It is clear that public organizations, food corporations and even civil society organizations cannot source sufficient produce to feed everyone, or distribute it without the engagement of retailers, street food venders and mobile markets (including floating markets). Civic organizations also facilitate co-functions of formal and informal distribution activities. Indeed, they go beyond the limitations of other stakeholders by contributing to the development of a more effective food distribution system, diverse in nature and all the richer for this.

The implementation of the City Farm Program is the clear example of this empowerment. Here public, private and civil society organizations, collaborate in the empowerment of city dwellers in growing food by themselves and engaging in the alternative markets such as vegetable box delivery and green markets. This collaboration in turn contributes to the building of more sustainable food system in which the inclusion of community members, such as elders, schoolchildren, hospital patients, slum dwellers, and informal laborers, are all equally empowered to challenge the existing authority figures. For instance, many slum dwellers and informal laborers now challenge the legitimacy of the public sector. Such developments illustrate how such an empowered participatory governance goes beyond a command and control regime and the reproduction of patron-based-client relations, by opening up the spaces cities need for everyone to participate in creating their prospective food systems.

Sustainable growth is the dominant inclusive discourse of empowered participatory governance, because it provides the means by which to reach beyond political conflicts. In this way, the growth of sustainable city food systems through the inclusion of self-reliance capacities, offers the means for communities to transcend political conflicts and bridge such divisions by empowering everyone to participate in the governance of these developments.

Initiatives to sustain Bangkok's city food systems

Urban agriculture in modern Bangkok has been practiced since 1949. Inner city farms were promoted a few years after the end of the Second World War, when Thailand faced an

economic crisis. The Prime Minister at that time established a campaign to encourage city dwellers to grow vegetables in their houses (known as 'Edible Fence' policy). Over the years, the campaign faded away and terminated after the country recovered. This remarkable initiative, promoting inner-city farming returned at the time when bioorganic consumption had become a trend. In the 1990s, bioorganic food was in high demand from the middle and upper class inhabitants of Bangkok. Many bioorganic restaurants opened around this time, as well as alternative food systems to supply good-quality produce from niche restaurants. The Thai government began supporting the organic movement by certifying organic products and shops. Some private organizations were very active; for example, 'Golden Place' dedicated a large section of land in central Bangkok to promote organic farming. They opened organic shops such as Lemon Farm to sell organic products (Mr.N.Limpacuptathavon 2011, pers.comm., 15 July).

Initiatives for encouraging inner-city farming surfaced again in 1997, when the 'Tom Yum Kung' economic crisis took place. The King gave a speech about growing food in limited areas using low-input methods and for self-reliance. This became known as the King's 'New Approach of Farming'. This approach to farming assumes the economic crisis was a result of being highly dependent on outsiders (international sectors, particularly external investments). This approach suggested Thai people should increase their self-reliance and associate their cultural roots with agriculture. The second message is that Thai people should be resilient in adapting to changes, including by attempting to feed themselves by growing food in limited areas and using their own resources. This means, the King's initiative encourages Thai people to grow food everywhere, beyond limitations of scale and space.

The government also adopted his initiative by way of a response to the economic crisis that called for Thailand to 'follow the King's footpath' and allocated public spending to promote self-sufficiency. Building upon the King's ideas, BMA launched a variety of programs to support urban agriculture in the city, such as the establishment of urban farming learning centers. Some DAOs also created their own initiatives, such as to develop a rooftop garden and to organize farming training courses. Some non-governmental and international organizations also played a role in supporting the agenda. Most significant is the initiative of the Thai Environment Institution (an NGO), the International Centre for Sustainable Cities (Canada) and the Canadian International Development Agency in

promoting community vegetable gardens in inner-city Bangkok during 2000-2001 (Fraser 2002).

However, the most recent initiative that supports urban agriculture in Bangkok is the City Farm Program. Since 2010, this program has brought together a large range of policy actors, including central, regional and local government agencies, non-governmental organizations, community-based organizations, social and green enterprises. This has sought to link stakeholders together as food systems targeting the most vulnerable groups in the city.

Various initiatives have been promoted under the umbrella of the City Farm Program particularly during the recent crisis, and dramatic flooding experienced in late 2011. Rooftop gardens, vertical gardens and food growing in containers are the most outstanding initiatives promoted (and nowadays these initiatives still can be found everywhere in the city). In particular, the program's support for rooftop gardens. For this initiative, Kasetsart University installed 'lightweight soil and food growing plants', so otherwise unhealthy tall buildings can function as rooftop gardens. This innovation attracted much interest from the building industry who have since gone on to exploit its potential elsewhere. Apart from this, floating gardens are also promoted as a food innovation for living with water. Some training centers attempt to develop a model of floating gardens compatible with Bangkok's urban environments. In order to inspire city dwellers, as to the virtues of such initiatives, farm trainers cooperate with volunteers to build pilot floating gardens for the slum community settled along the river. Even after the flooding disaster, the development of floating gardens continue to be supported in anticipation of future risks and are becoming more popular. The designs for floating gardens are diverse as each locality attempts to use the local materials available to them. Plastic cans are often used instead of weeds, because they are easier to find in the city (Boossabong 2012).

Implementation and impact

The monitoring and evaluation of urban agriculture carried out by Mahasarakham University (2013) is drawn from 161 key informants located in 64 organizations and groups. According to figure 1, the key informants ranked need to enhance social cohesion through

urban agriculture promotion the highest, followed by innovation and learning. Key informants add that they can also see the beautiful spaces created from input exchanges (e.g. seeds), knowledge transfer and the sharing experiences of reciprocate (*'Mattra'*) markets. The evaluation also reflects how these promotion initiatives develop the resilience of communities in terms of their abilities to stand up to external threats (such as disasters, economic recession and political curfew).

However, there is a lot more to do in integrating farming as a part of an evolving urban metabolism, as it is still not clear how to link city food systems to waste management, water consumption and energy use. Apart from this, the key informants note the promotion of city food systems in Bangkok is still challenged by their capacity to sustain the volume of production needed to secure supply and reduce the number of vulnerable groups whose access to food products is limited. Last, but not least, there is still a long way to go before 'fair food chains' can become a reality.

By adopting Hajer and Dassen (2014) lens, Bangkok's city food system can also be seen as offering a new way to understand smart cities and as a take on the 'smart urbanism' perspective. This is because like Hajer and Dassen (ibid p.1), who suggest cities can be smart not just for professional urban planners, or other such privileged groups, but for everyone, this case study shows the food agenda is framed by a multitude of stakeholders, and as much by the laypeople who are equally responsible for delivering on it. Their initiatives and basic technologies make a significant contribution to the promotion of a sustainable food system in Bangkok. In this way the Bangkok reflects not only how default infrastructures are essential in promoting the smart city food agenda, but how empowered participation is also critical in facilitating that type of smart urbanism in which various meaningful initiatives are developed from the bottom and operationalized though civil society.
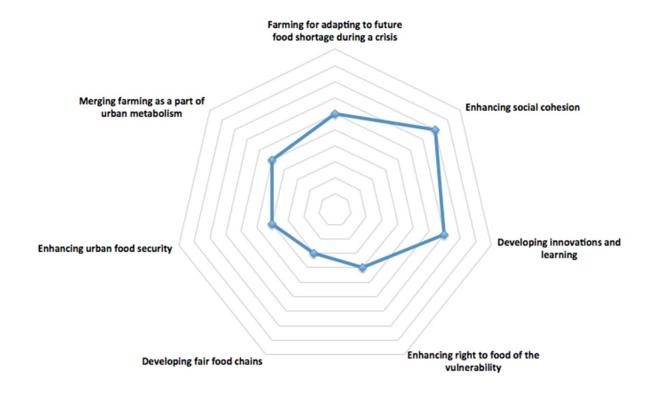
Figure 1: Impacts of Bangkok city farm promotion
Source: The City Farm Program Monitoring and Evaluation Report (MSU 2013)

Conclusions

To govern Bangkok's food system, multitudes of stakeholders are not just inter-related, but also linked and connected from top-to-bottom. These stakeholders include the central and local governments, large food corporations, civil society organizations and even daily life practices of street food venders and mobile markets. The governance of the city food agenda in Bangkok is well conceptualized as an empowered participatory governance, because operations from the top and the middle are unable to deliver more sustainable food systems without including ordinary people in the actions taken to create them.

In other words, legal frameworks, plans and related infrastructure development, are insufficient to promote the smart cities food agenda. Although the public sector facilitates food production and distribution through the regionalization process (including the conservation of the peri-urban agriculture, irrigation systems development, and central fresh food markets establishment), the smart city food agenda still requires operations from

below to secure such a process. Such systematic failings in the city food system may be overcome by doing what the large corporation fail to do. That is develop alternative food systems, which invest hope in the role of local governments and civil society organizations as smart city food providers able to sustain Bangkok's capacity to feed everyone in the administration's jurisdiction.

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The Role of Communities in the Governance of Jakarta's City Food System

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Introduction

Situated along the north Coast of Java Island, the Jakarta is a deltaic plain of 13 rivers that flow through the city to the sea. As the capital of Indonesia, Jakarta is a city of 10 million people and the intense pressure there is to accommodate this growth, means agricultural land is subject to development. As a result, ninety-four percent of Jakarta's food is imported. Given the continuing pressure Jakarta faces to secure food and feed the city's growing population, it is not surprising that Jakarta is not one of the cities signing the Milan Food Policy Pact. Indeed out of 117 cities signing the Pact, it is noticeable not one is from Indonesia, or Southeast Asia.

Jakarta

Jakarta is a city that struggles to "provide permanent and reliable access to adequate, safe, local, diversified, fair, healthy and nutrient rich food for all" and example of environmental degradation caused by "accelerated urbanisation"- two of the main challenges listed in the Milan Urban Food Policy Pact. Jakarta is also a city that serves to highlight the realities of the challenges, which the Pact raises, and limitations of the smart city agenda adopted to meet them. In this respect, Jakarta helps to shed light on the disjuncture between the Pact and smart city food agendas of those rapidly developing cities they serve.

What follows focuses attention on the rise of community-based urban agriculture as a method of food production in Jakarta, particularly along the Ciliwung River. This is one of the thirteen rivers flowing through Jakarta. Its watershed cuts across the three cities of Bogor, Depok and Jakarta, and one regency (kabupaten). Historically, the banks of the river were plantations, with farmlands extending into the cities of Jakarta, Depok and Bogor. Recent urban development has reduced the share of forests, plantations and farmlands

(Jones and Douglass 2008). Rather than being known as a food-producing landscape, Ciliwung River is now notorious as a source of flooding. However, under the smart cities agenda there are bottom-up efforts from local communities in Jakarta to revive the river landscape for food production, which Ellis and Sumberg (1998) have identified as potential livelihood strategies in developing cities.

The data that supports this paper is drawn from observation and interviews with river activists who serve the civic organizations of the bottom-up community developments it reports on.

Smart cities and sustainable food in Jakarta

Recent fascination with the smart city agenda in Jakarta has spurred the use of technologies. In December 2014, the city launched the Jakarta Smart City program as a "technology-based service for the residents" (Wardhani 2014). Jakarta Smart City features a website (Figure 1) promoting smartphone applications designed to share crowdsourced information on various common incidents in the city, such as flood, crime, fire, and waste (Wardhani 2014). Besides Jakarta Smart City, there are several other media applications relating to flood management and traffic control. In these applications, communication and media technologies are mobilised to map flooding incidents and book alternative transportation, such as shared cars and motorcycle taxis (Dewi 2015).

Figure 1. Jakarta Smart City Website (http://smartcity.jakarta.go.id/)

With its emphasis on technologies and the innovative use of social media, Jakarta's smart city agenda does feature creativity and entrepreneurship as the defining characteristics of a smart city (Kitchin 2013). However, the emphasis on technocratic governance is a feature of smart urbanism that celebrates the "real-time" efficiencies of city management, which not only ignores the diverse potentials of bottom-up creativities, but also marginalises groups. For example, on the Jakarta Smart City portal "unregulated street vendors" are "crowdsourced" problems, despite the fact they support the needs of the low-wage service sector workers, who cannot afford to source goods from established traders. The lack of attention this portal's crowdsourcing service gives to food production and specifically urban agriculture is not only limited to Jakarta's smart city agenda, but is more widespread. Indonesia currently has a significant number of incidences of undernourished five-year-old children in the world and while this stands at 37.2 percent (National Report on Basic Health Research 2010), this is not reported on the portal either.

In line with the urban entrepreneurialism ethic of the smart city agenda (Hollands 2008), there have been conversations about urban farming between the government and the independent sector, but despite this urban agriculture in Jakarta is currently driven by a series of bottom-up initiatives. The Indonesia Gardening Community (*Komunitas Indonesia Berkebun*) has been actively utilising abandoned land to plant productive crops. This movement has now spread to 30 cities and 8 university campuses in Indonesia. It continues to rely on social media - mainly Twitter and Facebook - to spread information and broaden the movement (Indonesia Berkebun Website 2016). In Jakarta specifically, there has been community gardening and greening as local efforts to promote urban agriculture. One prominent example is *Kampung Hijau Rawajati* (Green Kampung Rawajati). This is a dense settlement of 9,000 people per square kilometre that cares for the environment by recycling waste and composting for community gardens (Aprianto 2008).

Cities in Jakarta's mega-urban region have previously endorsed urban farming, particularly fruits, as identifiers of the landscape. At least two types of fruits, starfruit and snakefruit, have been planted in the Ciliwung watershed. Tugu District in the city of Depok is one of the places where farmers traditionally planted starfruit. However, the pressure to build housing and commercial land uses has converted many of the plantations: a recent study found the number of farmers in the Tugu District to account for only 0.3% of the population, the lowest among all other occupations in Jakarta.

In comparison, Condet snakefruit was promoted as one of the icons of Jakarta by a governor's decree in 1975. In 1976, the city government issued an instruction to limit developments in Condet, in an effort to preserve the site as plantations. Nevertheless, the decision to make Condet a heritage site has also made it a desirable place to live in. Within ten years, land use conversion in Condet stretched to 217.8 hectares (Kodir 2010). In spite of another decree in 1989, declaring Condet snakefruit and *bondol* eagle Jakarta's mascots (Republika 2014), the growth of the housing market in Jakarta continued.

Although government policies identify urban agriculture as cultural heritage, urban development in Jakarta continues to exert pressure on existing food-producing landscapes along the riverbank. In direct response to this, the Ciliwung Bojonggede community, through its leader Mr Hasanuddin, has expressed concerns over the scale of real estate development. The Condet area is also turning into a dense settlement that converts plantation land and which marginalises the existing plantations. As a result, Condet snakefruit is quickly losing its status as Jakarta's city icon. Indeed, this is now dominated by images of the National Monument and *ondel-ondel* – effigies dressed in Betawi traditional outfit (Republika 2014). The city tourism and culture bureau is also supporting this rebranding of Jakarta by featuring old buildings, monuments and colonial heritage, while urban agriculture is missing from the city (Figure 2).

Figure 2. Jakarta's tourism and culture bureau frontpage image, showing presence of ondel-ondel, national monument building, other monuments, transportation and leisure activities but no snakefruits (Source: Jakarta Tourism and Culture Office website, http://www.jakarta-tourism.go.id/taxonomy/term/4?language=id)

Profit-driven developments are not the only threats to the plantations. Decades of negotiable law enforcement have brought Ciliwung to progressive environmental degradation. There are now less than 20 species of fish left in the river, far less than 187 in 1910 (The Jakarta Post 14 May 2010). Aquatic life is threatened by the alarming rate of the Biochemical Oxygen Demand (BOD) and the Chemical Oxygen Demand (COD) of the river, particularly in downstream area, due to the liquid waste that pollute the river from the nearby cities of Depok and Bogor (Padawangi & Douglass 2015). Interviews with riverbank residents in Bukit Duri and Kampung Pulo, two urban villages at the riverbank, consistently revealed that when the river was clean they would fish in the river. They admitted that they have not been doing this anymore because there was not as many fish and because the water is polluted, compared to the "good old days", when the Ciliwung River was clean and "full of fish".

The reduction of fish species in Ciliwung River was the trigger to form communities as bases of Ciliwung River activists. Polluted river water also affects the fruits and vegetables grown in the watershed. This is because the trees along the river are subjected to chemicals from commercial and domestic waste.

Policy Aims and Objectives

In July 2015, the city administration developed 66 "modest urban farming spots" spread in various neighbourhoods (The Jakarta Post 14 July 2015). This program is administered by the City's Fisheries, Agriculture and Food Security Agency. Nonetheless, the aim of the program is to "make the city greener" rather than develop a food security agenda. The plants chosen are vegetables, with the *vertiminaponik* technique, which allows them to plant vegetables together with fish farming. The head of the agency emphasised the benefit of developing residents' gardening skills for their own consumption rather than for the larger scale of the city.

An announcement in August 2015 revealed the plan by the Central Jakarta administration to create green neighbourhoods. Under this initiative, the city and the Bank of Indonesia combine with private sponsors to provide planting tools and seeds to residents, who then care for the vegetables (The Jakarta Post 29 August 2015). This program aims to create 50 green neighbourhoods and includes a narrative on food security.

Although the officials claim that the green neighbourhood initiative has a good response rate, food security is not a citywide initiative. Jakarta does not have particular policies that integrate agriculture into the urban agenda. Indraprahasta (2013) noted that in Jakarta there is "no synchronisation between spatial planning and agricultural policies", no economic incentives and no government support. A survey in Jakarta and Bandung, published in 2004, indicated that the majority agreed of the necessity of clear regulations and policies for urban agriculture to implement it. In 1999, land in the city of Jakarta met only 1.2% of rice demand, 0.5% of vegetables demand, and 19.6% of fruit demand (Purnomohadi ca.2000). The number of farm land owners were 7,733 as of 1997, with 92,501 farm workers. However, these numbers continue to decline, with production falling from 1997 to 2013, which is seen in the decrease of rice production from 13,467 tonnes to 10,268 tonnes (Jakarta Provincial Government 2015). The number of households who conduct various types of farming also decreased to less than half between 2003 and 2013 (Figure 3). Despite many calls from scholars, activists and non-governmental organisations, the city of Jakarta does not have policies to support and intensify urban agriculture.
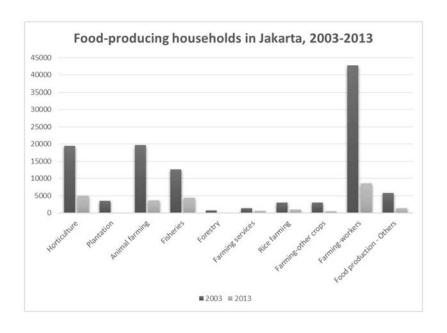

Figure 3. Number of food-producing households in Jakarta, year 2003 and 2013 (Source: BPS Provinsi DKI Jakarta 2015)

Strategies

Currently, there are at least eight bases of Ciliwung communities that are linked in the Ciliwung Community network and which address the environmental concerns of the river. In addition, there are several other Ciliwung communities such as Mat Peci and Ciliwung Merdeka, that are also conducting activities in relation to community-based environmental movements and training, although with different agendas. Urban agriculture becomes one of the main themes in the Ciliwung Community network, although not all communities are using this theme. In general, communities in the network are embracing the environmental agenda, with several focusing on food, although arguably this agenda is embedded within the larger environmental sustainability debate. Table 1 lists food-related activities conducted by the communities in the network.

Environmental framing is the main advocacy strategy of the Ciliwung Community network. The inclusion of the food agenda under the umbrella advocacy for sustainable environment reduces the emphasis on food security in the general advocacy of the groups in the network. Critique of environmental degradation of Ciliwung River is the dominant agenda, with food production as part of the green agenda as a solution to the degradation of the environment. This strategy is contrasted with the plan by the Jakarta government to apply massive concrete embankment of a 19-kilometer stretch of the river as part of flood mitigation effort.

Community Base	Location	Food-related Activities	Strategies
Komunitas Ciliwung Puncak	Cisampay Tugu Selatan / upstream	Mapping and listing fish species	1. Collaboration with universities (particularly Bogor Agricultural Institute and its research centre) 2. Audiences with policy makers, city leaders, and relevant national ministries
Ciliwung River Fishing Community	Gadog	Mapping and listing fish species	
Komunitas Peduli Ciliwung Bogor	Bogor	Mapping and listing fish species	

Komunitas Ciliwung Bojonggede	Bojonggede, Bogor	Mapping and listing fish species, intensification of production of local fruits	3. Activities and events that are open to the general public
Komunitas Ciliwung Depok	Depok	Mapping and listing fish species, intensification of production of local fruits	4. Soliciting private sector involvement through contributions (particularly from corporate social responsibility / CSR programs)
Komunitas Ciliwung Condet	Condet, Jakarta	Mapping and listing fish species, advocacy campaigns for local fruits as heritage	5. Media outreach
Komunitas Kampung Kramat	Cililitan, Jakarta	Mapping and listing fish species	6. Facilitation of local and international researchers

Other Ciliwung community initiatives outside the network			
Mat Peci	Cawang, Jakarta	Community gardening	1. Collaboration with relevant ministries 2. Collaboration with university professors 3. Media outreach
Ciliwung Merdeka	Bukit Duri, Jakarta	Composting, advocacy for alternative planning of riverbanks for food production	1. Collaboration with university professors and students 2. Audiences with policy makers, city leaders,

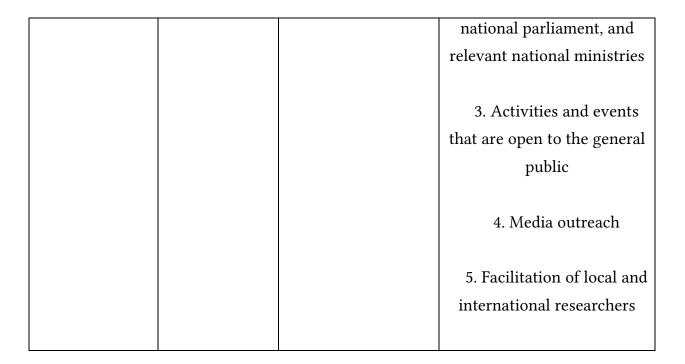|			national parliament, and relevant national ministries
			3. Activities and events that are open to the general public
			4. Media outreach
			5. Facilitation of local and international researchers

Table 1. Ciliwung River Urban Agriculture-related strategies and organisations (Sources: Various, compiled by author as of January 2016)

Members of the network advocate the green agenda through social media outlets that include a YouTube channel "Layar Ciliwung" and which is regularly updated with new videos of their activities, events, and interviews with government officials.

Besides featuring urban agriculture as part of environmental sustainability, members of the Ciliwung Community network also reclaim plantations as the cultural heritage of the Ciliwung River. Since the cities of Bogor, Depok and Jakarta historically developed along the river, the landscapes become the cultural heritage of the city. Ciliwung Community Condet and Depok; for example, are embracing the idea of local fruit production as a cultural heritage needing to be preserved.

The environmental sustainability activities and heritage framing of the Ciliwung River advocacy campaign are also features of their strategies. First in forming collaborations with universities, through which they conduct research, such as land use mapping, fish species mapping, and identification of plant species. They also facilitate researchers from local and international universities who would like to conduct research on the Ciliwung River and its environment. Second, they make attempts to meet with policy makers and to involve them in their activities. Representatives from Ciliwung Condet community met with the Governor of Jakarta in July 2015 to propose a green approach to riverbank rehabilitation,

with fruit plantation being an important part of this. Representatives from the city and the Ministry of the Environment, regularly attend Ciliwung Day events every 11 November, although these have not resulted in changes of policies and projects implemented along the river.

Besides approaching policy makers, the Ciliwung communities have events that are open to the public. They publish open invitations by way of their Facebook page and phone messages and through the network. These activities include trash collection, planting trees, fishing, or celebrations such as Independence Day and Ciliwung Day. The larger activities usually feature sponsorships from the private sector that come from the communities' approaches or recommendations. For example, they acquire boats through sponsorships from Carrefour supermarket in the vicinity of Condet, while the Ciliwung Day event in 2015 was sponsored by the water utility company Palyja and Astra Motor Company.

Although the activities may invite government officials, neither local government nor the ministries fund the Ciliwung communities and their activities. Because the official food agenda of the city of Jakarta does not include the Ciliwung River, communities who are advocating their environmental agenda face the challenge of critiquing the official government plan for the river, which is to pour concrete on its banks. The movement to advocate a green approach to the riverbank is facing an uphill battle as the river continues to be perceived as a source of flooding needing to be controlled.

Governance system

The initiatives to promote urban farming along the Ciliwung riverbank are inseparable from the fact that riverbanks in the cities are often sites of contestations. In the RUAF Foundation's case study of Jakarta, riverbanks are one of the categories of sites appropriated for urban agriculture. The riverbanks are generally claimed by the Ministry of Public Works as part of their flood canal system coordination and control. However, the lack of clarity of land tenure and ownership in many parts of Indonesia has made riverbanks sites appropriated by urban residents, who may have continued to reside there for many decades. In dense areas of the city, these appropriations may be in the form of settlements, but in other parts, they become sites of urban agriculture (Purnomohadi ca.2000.)

Therefore, the governance systems of these riverbank agriculture initiatives are mainly community-led, with little formal involvement of the government besides occasional funding or visits. Each Ciliwung Community base has one or more contact persons, who are informally known by most people in the network. These contact persons are also conducting outreach efforts to spread information about their activities. Local members host activities in each of the communities, although usually participants would include those from the wider network.

The local bases for these Ciliwung communities usually rely on the participation of a landowner in the area adjacent to the river. The Ciliwung Condet community, for example, has its base at a plantation land whose owner has the interest and passion to open his land for Ciliwung activities and to promote fruit plantations along the riverbank. The Ciliwung Bojonggede community also constitutes of several owners of land and houses along the riverbank, who are concerned about the conversion of land to housing estates, which reduces the land available for fruit production.

The Ciliwung Institute connects the communities across the watershed. Besides maintaining communication and activities within the network, the Institute is also actively involved with other organisations along the Ciliwung River, as well as those along rivers in other cities. Representatives from the Ciliwung Institute regularly attend gatherings and conferences on rivers in Indonesia, and have good relationship and knowledge of them. For example, Brantas River in East Java has often been cited by the Ciliwung Institute as one of the working models of a community-based river care initiative.

Initiatives

Urban farming is mainly practiced by the Ciliwung communities in Condet, Depok, and Bojonggede. Condet promotes its special breed of snakefruit as Jakarta's cultural icon, Depok its special breed of starfruit, and Bojonggede champions fruit trees. Pak Hasanuddin, the community leader at Bojonggede, claims there are at least 83 species of local fruits in the Bojonggede area, a suburban area of Bogor. The Ciliwung Community Bojonggede also

takes pride in donating hundreds of fruit trees to Jakarta and other cities[36]. In these cases, fruits produced from the plantations may not dominate the food market. However, the emphasis on fruit production as having the potential to secure food for the city becomes the moral high ground for these activists to argue their cause to policy makers, the general public, and to the media.

The main strategy of the Ciliwung communities to promote urban farming along the river, particularly local fruits, is by stressing the interconnectedness that exists between fruits and society. To do this, the communities have inaugurated an annual "Ciliwung Day" to commemorate the presence of large, soft-shell turtle in the downstream area of the Ciliwung on 11 November 2011. In 2014, the commemoration of the Ciliwung Day was through a community bazaar as art, culture and Betawi[37] culinary, music and cultural appreciation. Ciliwung Day becomes an annual event in which different Ciliwung communities can initiate their own celebration before and after, but on the day itself, they take turns every year to host the main event (Figure 4). As stated by a Ciliwung Institute representative:

> *"The main point is to celebrate Ciliwung Day to increase awareness on the importance of the river and on alternative ways to rehabilitate the river. Any group can have their own celebration to promote Ciliwung Day."* (October 2015)

Figure 4. Ciliwung Day celebration at Ciliwung Condet community base, 11 November 2015 (Source: Author)

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[36] Interview, September 2015
[37] Betawi is considered the indigenous ethnic of Jakarta

The mapping initiatives of Ciliwung communities are also progressing via collaborations, usually with local universities. The mapping of fish and plant species along the river are some examples of these mapping initiatives. They also map the polluters of the river to identify the sources of pollution. These mapping activities, however, are not yet connected to Jakarta's official Smart City program, which uses technology to crowdsource spatial information of urban problems.

Implementation/impact

Development continues to degrade the quality of the river over the years, resulting in serious water pollution and river runoff fluctuation. Despite objections from environmental and urban poor activists, the Jakarta government and the national government continue to widen the river using concrete embankment for a stretch of 19 kilometers, which means that the plantation along the riverbanks in this stretch is either reduced or removed. The river embankment has been widely cited as flood control program, under the public works department, with no mention on urban farming or cultural heritage. In the meantime, the encroachments of the riverbanks and the intensity of development in the watershed, which is currently housing a population of five million, have resulted in the degradation of the river environment, with extreme water volume fluctuation between dry season and wet season. During the dry season, especially prolonged ones, the water volume could go down to zero at the main Katulampa watergate on the upstream, causing problems for farms dependent on the irrigation channel from the watergate (Figure 5).

Figure 5. Ciliwung River upstream drying up during a prolonged dry season, September 2015
(Source: Ciliwung Institute 2015)

The contradiction between the concerns of environmental sustainability, urban farming, cultural heritage and pressures for urban development has also contributed to different visions of the river by environmental and urban activists. While environmental activists idealise plantations and green spaces along the river without housing encroachments, urban activists fight for the right to stay on the land and claim cultural heritage as well as historical significance. Urban farming has also become a strategy for urban poor activists to expand their support base. Ciliwung Merdeka, a non-governmental organisation (NGO) that actively works with riverbank communities of Bukit Duri and Kampung Pulo, has offered an alternative housing design on the riverbank, which features plantation areas as alternative jobs for the residents (Figure 6). Green development and urban farming are featured as the strengths of the design, which signify the importance of food production as the moral high ground that is used by the activists to legitimise the presence of settlements along the riverbank.

Figure 6. Design concept by Yu Sing/Akanoma, partner of Ciliwung Merdeka, to open possibility for on-site upgrading of riverbank settlements (Source: Yu Sing/Akanoma and Ciliwung Merdeka 2015)

Community-based efforts to sustain plantations along the Ciliwung riverbank and watershed are unable to avoid the impact of river water pollution, river water fluctuation, and are side-lined by the government's technocratic interventions on the river. The framing of the river in popular imagination as well as government projects tends to emphasise the flooding rather than urban farming and cultural heritage. The development of the cities along the river, including the application of technologies to boost Jakarta's smart city status, are moving away from food production and are increasingly marginalising urban agriculture in the name of urban development. While social movements to promote urban food production along the Ciliwung River banks and watershed demonstrate the aspirations of environmental activists, residents, plantation owners and workers, urban development is increasingly displacing these plantations by rendering them obsolete.

Conclusions

The integration of the "Smart City agenda" into the "Jakarta Smart City" program has opened possibilities for public participation by identifying urban problems such as traffic and trash, but the application has not integrated food security in its platform. Instead, participatory urban farming becomes an alternative in which citizens can utilise abandoned land for productive use along the Ciliwung River. While community-based movements for urban agriculture demonstrate the energy for environmental social mobilisation, in which urban farming as cultural heritage enters the picture, here community efforts are also constrained when the urban and regional development continue to degrade the surrounding environment.

Under these circumstances, community-based urban agriculture remains limited becasue land is subjected to a property market regime that makes it almost impossible to expand urban farms without government intervention or support. This lack of government intervention or support makes it impossible for Jakarta to feature as a signatory of the Milan Urban Food Policy Pact, as local communities do not have access to the means needed to endorse the urban farming it champions. The Indonesia Pavilion in the Milan Expo 2015 was a display of the richness of food products from Indonesia, such as rice, coffee and fish, but there was no reference to the role of cities as sites of urban agriculture that produce them.

Although urban food production is now the moral high ground for new developments, it will require the state to facilitate these community initiatives or to tap into the network to promote environmental improvement of the river. Current green initiatives by the city of Jakarta have not developed Ciliwung River as a food-producing landscape, in spite of the historical connection between the river and plantations. In contrast, official plans on the river are treating it as a source of flooding, rather than as the raw material for a larger debate on food security. Rather than canalising the rivers, the 13 rivers in Jakarta could be sources of water and food, provided they are governed in a way that protects them from degradation and pollution.

The evidence this case study offers demonstrates how urban farming is inseparable from the larger environmental sustainability agenda of the city. This corroborates the relevance of the Milan Urban Food Policy Pact that highlights environmental degradation as one of the challenges of current food systems.

Acknowledgement

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Singapore's Smart Governance of Food

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Introduction

Singapore residents enjoy a relatively affordable supply of readily available food and they benefit from one of the lowest incidences of food borne disease outbreaks anywhere in the world. In the 2015 edition of the Economist Intelligence Unit's Global Food Security Index, Singapore ranked the second most food secure nation in the world, after the United States. It excelled in the categories of 'affordability', 'availability', and 'quality and safety of food', ranking 1st, 11th and 13th respectively. While this is not a rigorous measure of food security, it does benchmark where Singapore stands in relation to other countries. This standard of security is achieved despite more than 90 percent of Singapore's food being imported.

Singapore's high ranking in food security is attributed to the smart governance system led by the Agri-food and Veterinary Authority (AVA). This case study shares some insight into this governance system. It will set out the context of Singapore's food and farming development, and examine Singapore's food policies through the lens of smart governance principles. Finally, it will detail considerations for Singapore's continued food security.

Background on Singapore's Food development

Unlike most countries, Singapore is a city-state, with negligible rural areas or hinterland. Within its 718.3 square kilometre (see Figure 1) - smaller than New York City (789 km²) and Hong Kong (1,104 km²) – its land must be allocated for defence, water reserves, roads, industry, housing and of course, agriculture. Singapore's providence, however, is that it is located along one of the busiest international shipping and trade routes in the world. This has allowed it to prosper from humble beginnings as a trading town, to an international shipping hub. This has enhanced Singapore's capability to source food from international sources. These circumstances render the Singapore food model unique. Keeping food accessible, affordable and safe in such a small market, however, requires considerable government involvement and leadership.

Figure 1: Map of Singapore in Southeast Asia (ASEAN n.d)

When Singapore gained independence in 1965, it was partially self-sufficient in food. Approximately 20,000 farms occupied more than 25% of land (14,500 ha), supplying up to 60% of Singapore's vegetable needs (see Figure 3). The land was occupied by small-scale, family-owned farms and by plantations. Aside from vegetables and livestock, cash crops such as rubber, coconut and gambier were farmed. Then, Singapore's population was 1.6 million.

The Singapore government, in its bid to facilitate a better quality of life for all residents, supported attempts to raise the productivity of farms. Formed in 1959, the Primary Production Department (PPD), a small unit charged with the task of managing rural areas and agriculture, introduced modern practices, breeds, and technology to improve farming. PPD received assistance from the United Nations Development Programme and other countries, particularly for livestock improvement and disease control. These programmes were a success. By 1975, Singapore had achieved relative self-sufficiency in the production of poultry (80%), eggs (100%) and pork (104%) (AVA 2015a).

From the late 1970s, the Singapore government steered the economy towards industrialisation to create jobs and growth. As part of this growth strategy, small farms were relocated to make way for planned new towns with high-density housing and industry. In the 1980-90s, farms were resettled to designated sites or Agro-technology Parks

in the North and Northeast of Singapore. These were equipped with drainage, piping, sanitation and waste treatment plants (See Figure 4), however food production gradually declined (Figure 2). Where the cost of resettlement was too high or environmental impact too large, farms were phased out and compensation provided. The Pig Farming industry was particularly affected. Due to its considerable environmental impact and un-economical costs of treatment, all pig farms were phased out by 1989. Farmlands gradually shrunk, and by 2014, only 1 percent of land, approximately 700 ha, was used for farming (see Figure 5). There are 117 coastal fish culture farms, 5 poultry farms, 56 vegetable farms and 9 land-based food fish farms in Singapore.[38] .

Food imports increased over the years due to increasing consumer demand from population growth, coupled with a decrease in local food production. To manage the ever-increasing volume and variety of imported food, PPD grew its capabilities in food safety assurance, compliance and enforcement. In 2000, PPD subsequently became the Agri-food and Veterinary Authority (AVA), which further developed its food safety mandate. Its food safety systems were tested in time by shocks. One of these was in 1999, during the time of the outbreak of the Nipah Virus in Malaysia, which, when contracted, was fatal to pigs as well as humans. At that time, most of Singapore's pork came from its closest neighbour, Malaysia. Singapore tracked the source, and took swift action to ban all imports of live pigs from Malaysia; millions of pigs were eventually culled in Malaysia in an attempt to contain the disease. As pork was a major food item in Singaporean diets, government agencies speedily worked with traders to find alternate pork sources. Within a few weeks, pork was available on Singapore shelves again in the form of chilled pork air flown in from Australia. This was made possible through cold chain implementation.
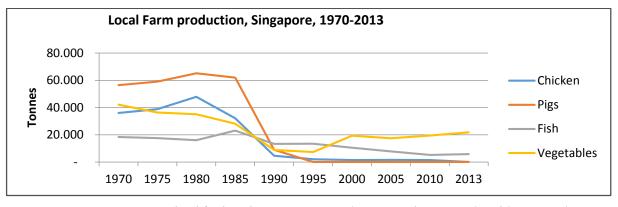

Figure 2: Singapore local food production, 1970-2013. (Ngiam & Cheong, 2006) and (AVA, 2014)
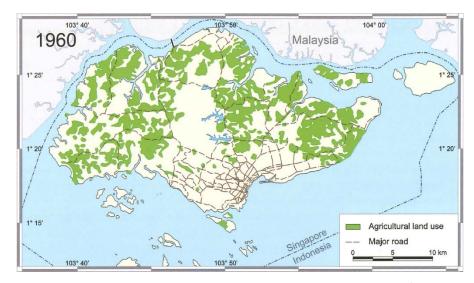
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[38] As of 2015.

Figure 3: Agriculture land in Singapore, 1960 (Koninck, et al. 2008)
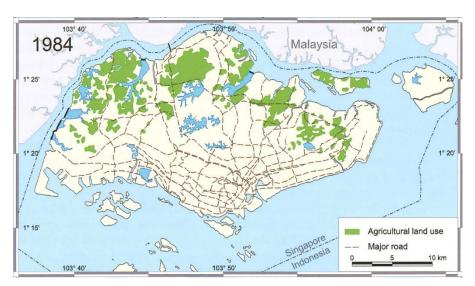

Figure 4: Agricultural Land Use in Singapore, 1984 (Koninck, et al. 2008)
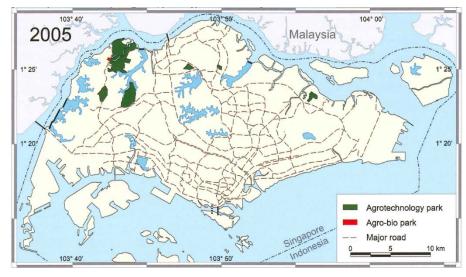

Figure 5: Agriculture Land in Singapore, 2005 (Koninck, et al. 2008)

The global food crisis in 2007/8, led to a 12.1% increase in prices of imported food (between December 2006-2007) (Ramesh & Perry 2008). While this was not a major crisis, it instigated a rethink of Singapore's food resilience policies. The government initiated a study to analyse Singapore's food supply resilience. In consultation with stakeholders, a Food Security Roadmap was created, which identified a suite of strategies Singapore could implement to improve its food security.

Singapore's Smart Governance of Food

Singapore's government recognised early on the need for sustainable development. There was no "Singapore B", thus it could not afford to adopt the "develop first, clean up later" model. Its development was, in the final analysis, towards a balance of a high quality of life, a competitive economy and a sustainable environment. With limited land and competition from other countries, Singapore continued to plan for industrialisation. However, the Singapore government approached the food agenda in the same way it approaches all aspects of the nation's development- by adopting dynamic governance and long term planning.

The Centre for Liveable Cities has distilled Singapore's development principles in its Liveability Framework (see Figure 6). Four of its principles –*execute effectively, working with markets, innovate systematically* and *involving the community as stakeholders*, condenses how Singapore has chosen to govern its food agenda.
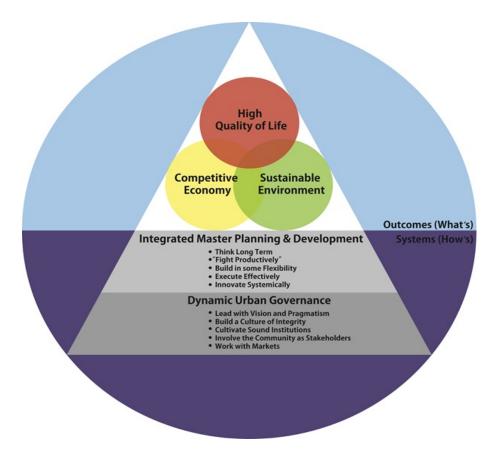
Figure 6: The Centre for Liveable Cities' Liveability Framework

Execute Effectively

As previously stated, the global food crisis in 2008 instigated a rethink of Singapore's food resilience policies. Based on results of wide consultations with industry players, including producers, processors, retailers, importers and logistic companies, and government agencies, AVA devised Singapore's Food Security Roadmap (Figure 7).

Food source diversification continues to be Singapore's core strategy to ensure security. While Singapore actively promotes diversification - to guard against supply disruptions – it also supplements food imports through local production of three key food items (namely eggs, fish and leafy vegetables). Other strategies include supporting agricultural productivity by way of research and development, as well as though actions designed to reduce food waste.

Singapore's Food Security Roadmap

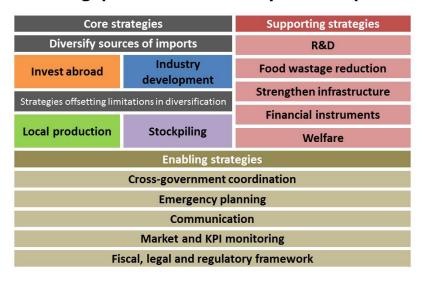| Core strategies		Supporting strategies
Diversify sources of imports		R&D
Invest abroad	Industry development	Food wastage reduction
		Strengthen infrastructure
Strategies offsetting limitations in diversification		Financial instruments
Local production	Stockpiling	Welfare
Enabling strategies		
Cross-government coordination		
Emergency planning		
Communication		
Market and KPI monitoring		
Fiscal, legal and regulatory framework		

Figure 7: Singapore's Food Security Roadmap (AVA 2013a)

The roadmap consists of medium to long-term strategies for Singapore's food security, including:

- **Core strategies:**

o food source diversification to mitigate supply disruption;

o local production optimisation to provide buffer for key food items in times of disruption; and

o stockpiling for price stabilisation and supply stability in times of short-term shortage.

- **Supporting Strategies:**

o research and development to boost productivity and improve cold-chain infrastructure, packaging and post-harvest management facilities to prolong shelf life; and

o reduce food waste along the whole food supply chain.

- **Enabling strategies:**

o multi-agency coordination for policy formulation and implementation of food security measures;

o emergency planning or scenario planning for food security risk management;

o communication on issues related to food safety or risks; and

o monitoring of global markets for commodity price and supply changes.

As the strategies under the Food Security Roadmap are cross-cutting and require multi-agency coordination, an Inter-Ministry Committee on Food Security (IMC-FS) was formed in 2012. The IMC-FS functions under the National Security Coordinating Committee, which sits within the Prime Minister's Office, to formulate policies and strategies to mitigate food security risks and vulnerabilities.

Working with Markets and the Private Sector

Today, Singapore sources food from more than 160 countries to the tune of S$15.57 billion (US$10.9 billion) in 2014 (Tortajada & Paramasilvam 2015). Naturally, it relies on some sources more than others (see Figure 8). For example, more than 80% of chicken in Singapore is sourced from Malaysia and Brazil; approximately 75 percent of Singapore's fish is from Indonesia, Malaysia and Thailand (AVA 2013). Singapore also imported US$575 million worth of retail food products from the US in 2013, and A$1.1 billion (US$760 million) worth of food products from Australia, making Singapore its 13th and 9th trading partner for food respectively (Tortajada & Paramasilvam 2015). Disease, price hikes, geopolitical stress and shipping disruptions, can easily affect the supply of these major food products, thus diversification is vital.

Figure 8: Major food supply sources to Singapore (AVA 2015b)

Additional and necessary efforts to ensure food source diversity include:

1. **Facilitating trade and accreditation:** Singapore's agencies actively engage the industry through business cluster meetings to share information and discuss potential new sources of food for Singapore. The agencies function as agri-trade coordinators to facilitate trade between local and international traders and diversify food sources through overseas sourcing. For example, in recent years, AVA conducted overseas sourcing trips to various countries such as Indonesia, Philippines, Poland, Denmark and South Africa (Tan 2013). AVA also carries out accreditation for meat and eggs. In one such visit to Indonesia, Singapore's delegation included representatives of industry, including participants from the Seafood Industries Association Singapore, Singapore Fish Merchants' General Association, and major supermarket retailers such as Dairy Farm International and Sheng Siong Group. The trip secured new import contracts of 30 metric tonnes of fish. In a more recent sourcing trip to South Africa, three containers of persimmons and 3 containers of pomegranates were successfully imported into Singapore from the new contacts established.

2. **Securing food from source:** AVA is also looking deeper into moving upstream, securing food from source. With this, there is greater control of the product quality, as well as first right of purchase when there are supply crunches (Tan 2013). One such project is the Singapore-Jilin Food Zone. Here AVA, along with its private partners, are facilitating and monitoring the development of an integrated pig farm in a *Foot and Mouth Disease-Free Zone.* Working with its counterparts, AVA managed to get the Food Zone recognised as a Disease Free Zone by China's Ministry of Agriculture (MOA) in 2012. While the project has had its own set of challenges, the project, once completed, would make Singapore's food supply more resilient (AVA 2014).

Thus far, the food diversification strategies have been relatively successful. In 2013 when Malaysia introduced a 2-month ban on the export of 5 species of fish, it did not significantly impact on Singapore's fish supply, as there were more than 100 species on the market from more than 60 countries (Khaw 2013).

Aside from Food diversification, AVA also works with markets to improve food safety assurance. It assists food establishments to improve food safety grading, and offers the Food

Safety Excellence Scheme, which rewards and highlights companies with exemplary food safety practices. AVA also scans public information sources to detect overseas reports on food safety incidents, as well as industry practices and takes necessary actions, such as issuing precautionary food recalls. Its integrated food safety system of checks and tests, accreditation, import control, inspection, surveillance, and laboratory testing ensures that all locally produced and imported food products are safe for consumption. Food safety standards are based on the Codex Alimentarius standards and AVA adopts a science-based approach towards risk assessment, management and communication. Beyond import controls, it regularly conducts planned and random food safety checks.

The Veterinary Public Health Centre (VPHC), has built up considerable capability to test for food safety hazards and risks, including (AVA 2014):

- Using nuclear techniques to trace foods to its origins, this includes Isotope Ratio Mass Spectrometry, Inductively-coupled Plasma Mass Spectrometry, and the Inductively-coupled Plasma Atomic Emission Spectrometry. This capability can be used as a verification tool to determine food supply chain integrity and food traceability systems, which serve to protect public health; and Non-targeted analytical tests and molecular characterisation, to identify rare or unanticipated compounds in foodstuffs that may be hazardous to health.

As food becomes more complex and technologically advanced, safety tests must improve to match the challenges this poses. In 2013, AVA also initiated plans for VPHC to establish new laboratory facilities able to detect nano-materials in food.

Singapore's food safety checks are aligned with international standards and comparable to those of developed countries. In FY2014, AVA inspected 71,819 meat consignments with a total weight of 287,121 metric tonnes valued at $1.27 billion. Of these, only 117 consignments (0.16%) were rejected, mainly for *Salmonella* and *E.Coli* counts. Seafood, vegetables, fruit, and processed food were also inspected and overall, violation rates are low (AVA 2015b).

The VPHC also contributes to regional food safety. In 2014, it was endorsed by the World Organisation for Animal Health (OIE) as Southeast Asia's first OIE Collaborating Centre for Food Safety, which also serves Asia and the Oceania region. Singapore has recently signed

a Memorandum of Understanding with the Food and Agriculture Organisation (FAO) to further collaboration in areas such as food security and nutrition. Regionally, Singapore actively participates in regional organisations, such as the Association of Southeast Asian Nations (ASEAN). It also promotes regional cooperation to enhance the international competitiveness of the agriculture sector and strengthen the region's food security arrangements through initiatives such as the ASEAN Integrated Food Security Framework (AIFS) and the Strategic Plan of Action on Food Security (SPA-FS).

Innovate Systematically

Local production complements Singapore's diversification efforts and provides stability in times of abrupt supply disruption, providing psychological assurance. It maintains farming skills and expertise within the community, and serves as a platform to test-bed agricultural innovations.

The Singapore government has set local production targets for the 3 key food items it produces, namely leafy vegetables, food fish, and hen shell eggs (see Figure 9). As land is limited, productivity improvement must come through yield increase and waste reduction. These are achieved through innovation and technological adoption.

Key food items	Local Production targets	2014 production
Hen shell eggs	30%	25%
Leafy vegetables	10%	12%
Food fish	15%	8%

Figure 9: Targets for key food items. Source: AVA

To support innovation and the adoption of new technologies, Singapore introduced the Agriculture Productivity Fund[39] (APF) in 2009. The fund has thus far committed approximately S$31million and has disbursed more than S$15 million. The Fund has benefited approximately 60 percent of key local food farms.

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[39] Formerly known as the Food Fund. The Food Fund has been subsumed under the Agriculture Productivity Fund since August 2014.

One example of the Fund's use is in addressing Singapore's shortage of labour; few young Singaporeans are interested in farming, thus securing an adequate labour supply is a challenge. To meet such challenges, a local layer house farm was granted monies from the APF to purchase robot cleaners. This technology reduced the layer house cleaning time by 25-33% and manpower requirements by up to 80%, removing up 5 headcounts in the farm annually (Tan 2013). Another vegetable producer received support from the APF to purchase machinery and upgrade its growing houses. This farm was then able to enjoy a 60% reduction in manpower for one of its processes and increase the annual yield of the plant by 20% (AVA 2014). Another innovation is in vertical farming for leafy vegetables. Here AVA, in collaboration with farm entrepreneur Sky Greens, conducted research on vertical farming systems. This is based on a water pulley system, where plants are rotated through an A-Frame for uniform sunlight. This low-energy, award-winning system could potentially offer a yield of up to 10 times greater than traditional land based farming (Lim 2015).

AVA also leads prototype development. One such proto-type is an indoor multi-tier, water saving seedling production system that works using artificial lighting. It produces 4 times the number of seedlings in the same unit area, and saves up to 90% of water usage. This enhances seedling growth by up to 30% compared with conventional seedling production. The system was demonstrated to companies in 2014.

Innovation has also mitigated the adverse effects of climate change. In 2014, when Singapore experienced its worst drought since 1869; reduced levels of dissolved oxygen in the seawater led to mass fish deaths at the coastal farms. A local fish farm won grant funds from the APF to install solar powered aerators and water quality monitoring systems. The company now efficiently monitors real time data to protect the fish stock. The information collected is shared with AVA and disseminated across the sector. AVA is now working with industry stakeholders to develop a closed containment sea-based aquaculture system to mitigate against adverse environmental conditions (Osman 2014).

Innovation has also been applied in the area of food loss and waste. According to FAO, nearly a third of all food is spoiled, lost or wasted before it is consumed (FAO 2013). In Singapore in 2014, approximately 788,600 tonnes of food waste was generated, equivalent

to approximately 130kg of food waste per capita. Of this, 13 percent was recycled (NEA 2014). Food waste has increased by 48 percent since 2005, and is expected to continue to grow due to population increase and greater affluence.

Food loss and waste can be reduced by trimming the percentage of food spoiled and by recycling the by-products. Several government agencies, including the National Environment Agency (NEA), AVA, and the Standards, Productivity and Innovation Board (SPRING) in Singapore, have developed guidelines for food manufacturers and retailers to identify areas of waste in the supply chain. To incentivise innovation in food waste reduction, companies are encouraged to apply for NEA's 3R Fund[40]. AVA also has a Post-Harvest Technology Centre (PHTC), which researches, in collaboration with tertiary and research institutions, show how technological innovations can be used to reduce, recycle, utilise, and recover food waste. Through collaborative applied research and extension services, PHTC focuses on improving the efficiency of the food supply chain, reducing food waste in farming and post-harvest processes, and developing value-added products from the by-products (AVA 2014). Some of the current projects include:

- improving packaging and thus extending shelf life through:
o Nano-composites packaging materials to reduce food spoilage due to oxygen, moisture, and UV;
o Modified Atmosphere Packaging for specific foods such as threadfin fish;
o Non-invasive, cost effective stick-on sensors for fruit ripeness to better control food distribution based on fruit quality.4

- food preservation techniques, such as light-emitting diode (LED) treatment for vegetables, or advanced cold chain technologies; and
- enhancing post-harvest protocols and good handling practices for improved sanitation or sustainability.

Another innovation currently researched is the conversion of homogenous food waste from manufacturing to other edible or productive products. Examples of this include the conversion of soybean waste to Okara floss for human consumption and the use of fish trimmings (combined) for fish food.

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[40] Reduce, Reuse, Recycle Fund

Innovation can also reduce labour redundancies. SPRING Singapore and the Singapore Food Manufacturers' Association (SFMA), have collaborated to support the Restaurant Association of Singapore's development of an e-procurement portal to raise procurement efficiency. Instead of ordering food products via phone, fax or email, restaurants can save manpower and reduce paper work by using this online portal to automate purchasing processes (Khaw 2013).

Singapore also tries to create enabling environments to attract innovators into the food sector. By providing a pro-enterprise tax and financial environment, with good R&D infrastructure, and a robust Intellectual Property (IP) regime, Singapore has attracted leading agriculture companies, such as Bayer CropScience, which has set up a rice research laboratory to develop new varieties and hybrids (Osman 2015).

Involving community stakeholders

To tap into the wealth of knowledge and experience of others in the food sector, Singapore's government agencies work closely with community stakeholders. It engages universities, regulatory agencies and members of the community through various platforms, such as professional and scientific meetings and advisory committees, as well as collaborative projects, for example, in research and development.

One area of successful community involvement is in the area of community farming. The National Parks Board (NParks), the Ministry of Education and the Housing and Development Board (HDB), offer gardens and farming education classes at schools, residential neighbourhoods and rooftops for use by students, residents and small businesses. These spaces are equipped with planter beds and irrigation systems to facilitate community farming. While this does not contribute significantly to food supply, it does serve to build a measure of competency towards farming in residents. Furthermore, it raises awareness on food security challenges

The business community is also involved in the development of urban farms. One of these is ComCrop, a social enterprise that conducts aquaponic and vertical farming on a 550 m² rooftop in the heart of the upscale shopping and dining district of Orchard Road. One fifth

of the rooftop farm is dedicated to engaging the public in urban farming, while the rest is commercial. Hotels, restaurants, universities and even a hospital have also developed urban farms within their buildings to provide fresh vegetables and herbs. A Singapore Standard on Organic Primary Produce is being produced to support these developments (SPRING Singapore 2015).

Ensuring a robust food agenda for Singapore

Singapore's attentive governance and collaborations with industry, research institutions, and engagement with stakeholders in the community has also strengthened its food security. However, Singapore needs to continue to keep abreast of global developments and update its approach to deal with complexity of the challenge food security poses. Singapore's population is projected to grow from its current 5.4 million to 6.9 million[41] by 2030, and food demand will continue to grow apace. Internationally, the effects of population growth, changing diets, climate change, resource scarcity and geopolitical instability, continue to impact on food production and trade. Thus, Singapore's food security will continue to be vulnerable to external forces of global food shocks, price volatility and supply disruptions, over which it has limited control. At the same time, it faces the challenge of sustaining local production amidst land and labour constraints, leveraging on technology and innovation.

Anticipating such challenges and planning ahead, Singapore is already taking a number of steps to strengthen its food security measures. These include:

- encouraging food companies to adopt contingency plans for their continued success. Supply disruptions, even short term ones, may adversely impact on business continuity and sustainability. This may be in the form of individual stockpiling, pursuing alternative supply sources, and widening industry partnerships;
- driving and championing research in fields across the food chain and assist with the transfer of this into practical use;
- working with international partners and local industry stakeholders to keep abreast of latest developments and learning from global best practices;

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[41] Singapore's planning parameter based on the Population White Paper released in 2012.

- establishing early alert systems to keep track of global developments in relation to food supply and safety that may impact on Singapore;

- undertaking emergency and future planning, which includes national stockpiling of rice and the development of protocols to soften impacts of food disruptions; and

- enhancing its proactive and timely communication to residents, so as to meet the public's increased expectations on disaster management.

Beyond these, it is recognised that dependence on external food sources procured via the market, may not be adequate in the long run. One option is to consider acting more boldly and innovatively, to overcome constraints, capitalise on strengths, and seize opportunities. For example, Singapore could combine farming innovations with its expertise in green building, park maintenance, biodiversity and logistics, to seamlessly integrate into green food production. Intensive farming in intra-urban spaces - such as between housing, roads and commercial spaces, may provide the "space" needed to increase local production.

A study conducted by the National University of Singapore has identified there is potentially 1000 hectares of rooftop space in Singapore's prevalent public housing blocks[42], which could be retrofitted for rooftop farming (Lee & Tan 2010). Traditional farms could also be re-designed to co-locate multiple functions, including production, packaging, processing and logistics, to improve productivity and competitiveness.

Besides this, the government may also facilitate Singapore firms' agri-investments overseas in a way to augment local production. Increasing collaborations with other countries and mutual exchange of farming expertise would also serve to expand Singapore's potential sources of food. With smart governance, Singapore can retain its high levels of food security into the future. To this end the Inter-Ministry Committee on Food Security, and its implementation agencies such as AVA, will have to continue to play strong roles in steering policies to be responsive and nimble to the constantly changing global state.

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[42] Singapore's Housing and Development Board (HDB) public housing houses approximately 80% of Singapore's population.

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Conclusions

In reviewing the smart city governance debate surfacing from the Milan Expo, the first paper finds that it is not the technical innovations, which the infrastructural developments leave behind, but legacy this global event offers up for the future, which is important. For the value of these governance legacies reach beyond the Milan Expo as a global event for the localization of innovative infrastructures and towards the governance of their true status as place-based transformations, whose generic qualities are in turn capable of being mainstreamed across the world.

Consequently, this case study also finds, the smart city governance these polices bequeath are particularly valuable for the reason they provide critical insights into how to reach beyond the site-specific nature of such actions and towards their true status as place-based transformations. Towards their place-based status as transformations, which not only instruct civil society on how to cultivate the institutional capacity needed for policies to chart them, or pacts to project their international status, but that are also required for them to be expansive in communicating the intention they harbour to feed the planet and energize life.

The paper also goes on to find the values civil society in Milan City cultivates and builds the institutional capacity for, go beyond the terms previously used to communicate the status of such smart city governance developments. That is, beyond references to bottom-up constructions and in this instance, towards ground swells of innovation, which grow into a social movement. Into a social movement, whose civitas cultivate this place-based transformation into the tectonics of that institutional capacity, which they in turn build as policies, pacts, charters and projects, able to rile against the injustices of that inequality, which characterize the food regime. In particular, rile against the injustices of that inequality, which has come to characterize the food regime over the past decade and smart city governance, not only generate the technical innovations needed for infrastructural developments to overcome them, but install as the services required for social movements of this kind to break with the limitations of. In order for social movements of this kind to break with the limitation of as a civitas that cultivate this place-based transformation as the tectonics of those institutional capacities, which they in turn build as policies, whose charters, pacts and projects defining their environmental qualities. That is, as charters, pacts and projects, which define their

environmental qualities as place-based transformations, able to restore justice and be equitable in securing universal access to food.

As the second case study finds, Mayors signing the Milan Urban Food Policy Pact commit to using such a "Framework for Action" as the starting point for cities to develop sustainable food systems. Given its record on food security policy and programming in the past 20 years, this paper finds Belo Horizonte is ahead in the implementation of many of the 37 actions recommended in the Milan Pact framework, but certainly not in all.

As to the recommended actions for "ensuring an enabling environments for effective action (governance)", the paper finds Belo Horizonte is doing well, particularly with the recent decrees formalizing the participation of civil society and the collaboration among different city departments. On the recommended actions for "sustainable diets and nutrition", it finds Belo Horizonte has made particular progress, selling 20 fruits and vegetables at lower-than-market prices and in Popular Restaurants, where nutritious meals are provided at affordable (subsidized) prices. Despite this, it finds more must be done; for example; the marketing of food and non-alcoholic beverages to children needs to comply with WHO recommendations. Belo Horizonte and Brazil as a whole also need concrete actions to achieve universal access to safe drinking water and adequate sanitation.

Overall, it finds Belo Horizonte is in a good position to fulfill its commitment under the Milan Urban Food Policy Pact. It suggests the Pact will provide an extra incentive for the continuation and growth of the city's agenda on food and nutrition security. Through such incentives, it is hoped that Belo Horizonte shall continue to serve as a model of excellence in urban food policy and inspiration for other jurisdictions in Brazil and around the world.

The Vancouver case study asks: why should municipal governments create a policy to promote food when those involved report minimal environmental impact and produce low yields relative to the volume of food necessary for maintaining the urban population? So, it asks, is developing, promoting and supporting food policies the best use of limited resources? The answer is found to lie in the multifunctional nature of the "conscious-awareness raising" opportunities food policy offers. As the Vancouver case study finds, the question should not be, "can urban agriculture feed the city?". Rather, the question should be "how the city is fed?" By transforming urban landscapes to produce food, increase food

literacy and dialogues about the role of food in urban communities, agriculture demonstrates how food matters and deserves to be brought back to the policy arena.

As the paper makes clear, the challenge lies in not letting the conversation stay within city limits. For we need to leverage current municipal and civic interest in urban food systems to re-think peri-urban, rural and global food policies, where the scale of unsustainable practices is much more significant, but distant enough from urban populations that it can be "out-of-sight and out-of–mind". Given urban food production will continue to be directed on the idea of the city "feeding itself", greater potential for "feeding the planet and energizing life", lies in focusing the minds of civic leaders, community activists and ordinary citizens, on important peri-urban and rural landscapes. That is on those spaces, which actually feed the city and are in dire need of progressive food-related policies. To achieve this, the case study finds that we need to expand the momentum, which is already present in cities like Vancouver, Belo Horizonte and Milan. What-is-more do this by reconnecting civil society to the broader system of food provision and as a way to support the development of sustainable food systems, at regional, national, and global scales.

As the fourth case study finds, work on the Edible Edinburgh Sustainable Food City Plan is designed to do this and several lessons are worth sharing:

- sustainable food is an emerging area of public policy and action. There is no one-size-fits all model or framework and as a result, a holistic, flexible approach is required, because sustainable food is about so much more than just food, spanning the breadth of social, environmental and economic agendas;

- it is important to ground sustainable food in established city governance systems – and keep it there. This must integrate sustainable food with other key city agendas – planning and land use, procurement, climate change adaptation, waste, anti-poverty measures, health, economy, culture, etc.

- it is also hugely helpful to have champions – those who make and influence decisions in cities and who network with others across a range of sectors;

- a clear plan is essential, as this enables good management and aids communication. Having the plan adopted by the local authority and other public bodies is critical in embedding sustainable food in organisational and city agendas.

Bristol offers a case study of a city where the activism of its citizens has been highly influential and the critical insights this paper shares, serves to highlight:

- the ability civil society has to organise itself into a number of formal and inclusive networks, whose symbolic re-localisation breaks the monopoly of knowledge about food by the agri-food industry and redistributes it among consumers, producers and local administrations.

- these knowledge-based networks, supported by the expertise of their stakeholders, generates a wealth of food-related knowledge and good will shared across public, private and voluntary sectors.

- the way localised actions of this type underscore the multiple values and social, cultural and environmental functions of food provision, while presenting compelling arguments in favour of a more diversified food economy.

- how this configuration of local food initiatives lead cities to become culturally identified as places for food innovation and urban transformations that are able to restore justice by creating a more equitable and sustainable food systems.

- bottom up mobilization brings into question the smart city governance agenda led by ICT and managerial-ist systems and as a social counter-point based on a network of very active citizens.

- the possibility, which exists for these ontological definitions to be worked up by way of social media, that empowers citizens by participating in not only the uploading of crowd-sourced data, but sharing of such information with others in the networks.

The case study on Bangkok also finds, legal frameworks, plans and related infrastructure development, are insufficient to govern the smart city food agenda. This, the paper finds, is the product of multiple-stakeholder groups, who are not just inter-related to one another in some kind of horizontal arrangement, but also linked and connected from top to bottom. In Bangkok, these stakeholders include the central and local governments, large food corporations, civil society organizations and even daily life practices of street food venders and mobile markets.

This case study finds that in Bangkok, this smart city governance agenda is well conceptualized, because stakeholder arrangement found at the top and in the middle of the city's food system, mean it is not possible to sustain this without empowering ordinary

people at the bottom. It finds that, while the public sector facilitates food production and distribution through a process of regionalization (including the conservation of the peri-urban agriculture, irrigation systems and central fresh food markets), any governance of the smart city food agenda still requires action from below.

Questioning the injustices and inequity of Bangkok's city food system, it finds these maybe overcome by doing what the large corporation fail to do. That is by developing alternative food systems, which invest hope in the role of local governments and civil society organizations as "smart" city food providers, able to sustain Bangkok's capacity to feed everyone in the administration's jurisdiction.

As the case study from Jakarta finds, while community-based developments go to demonstrate the potential of such social movements, they are also constrained when urban and regional development continue to degrade the surrounding environment. This paper also serves to highlight the complexities of these socially-grounded, bottom-up and community-based developments in city food provision, because the solutions to environmental degradation they offer are too neo-liberal in the way they rely more on the workings of the land property market, than the ecological-integrity called for. In terms of the relationship, which the resurgence of food provision has to the river basins of cities, this paper's findings are specific. It finds that when big business is involved, the predatory nature of capitalist development means the smart governance of any community-based and crowd sourced sentiments, can all too easily undermine the social, cultural and environmental weight of such movements and serve to merely shore up the economic.

The case study on Singapore, finds that while it needs to continue gathering intelligence on global developments and adapt to the complexity of the food challenge, the collaborations with industry, research institutions and engagement with stakeholders in the community, has strengthened food security. However, it also finds that with a projected population growth of 5.4 million to 6.9 million by 2030, its food demand will continue to increase and therefore, be vulnerable to the external forces of global food shocks, price volatility and supply disruptions, over which Singapore has limited control.

Adapting to this situation and "planning ahead", the paper finds Singapore is already taking steps to strengthen its food security by:

- encouraging providers to adopt contingency plans for their continued success. As supply disruptions, even short term ones, may adversely impact on business continuity and sustainability. This may be in the form of individual stockpiling, pursuing alternative supply sources and widening industrial partnerships;

- driving and championing research in fields across the food chain and assisting in the translation of this into practical action;

- working with international partners and local industry stakeholders, to keep abreast of latest developments and learn from global best practices;

- establishing early alert systems, to keep track of global developments in relation to food supply and safety issues impacting on Singapore;

- undertaking emergency and future planning, which includes national stockpiling of rice and protocols to soften the impacts of food disruptions;

- enhancing Singapore's proactive and timely communication, so as to meet the public's increased expectations on disaster management.

Beyond these, it is recognized that dependence on external food sources procured via the market, may not be adequate in the long run. One option is to consider acting more boldly and innovatively, to overcome constraints, by capitalizing on strengths, and seizing the opportunity Singapore has to become a leader in green building, park maintenance, biodiversity and logistics.