and SurveyMonkey®, a web-based survey platform, with the aim of further discussing the survey outcomes in an ex-post workshop with all participants.

Identification of eight selected causal models of vulnerability and resilience

Following an extensive review of literature, the vulnerability/resilience-adapted framework for the global food system (Figure 7.1) was proposed as the basis for discussion during a first focus group with a panel of multi-disciplinary experts. The vulnerability/resilience framework was proposed as suitable for our research as it was regularly quoted by multiple sources discussing food systems sustainability and presented a broad hierarchical system of information that could serve as a starting point for discussion. The identification of a causal pathway (adapted from Metzger & Schroeter, 2006) allowed locating the role of the three variables of exposure, sensitivity, and resilience.

Following the first focus group, eight specific causal models of vulnerability and resilience were selected within a larger set of models. Shaping the interactions where a set of drivers of change – that is, *water depletion; biodiversity loss; food price volatility; changes in food consumption patterns* – directly affect a set of food and nutrition security outcomes at a sub-regional level – that is, *nutritional quality of food supply; affordability of food; dietary energy balance; satisfaction of cultural food preferences*. Those drivers of change, as well as food and nutrition security outcomes and the related interactions, are specific to the geographical area of the Latin Arc within the Mediterranean region (for a justification of the geographical scale and information on local food system characteristics see Allen and Prosperi, 2016). Each interaction was disentangled in exposure, sensitivity, and resilience. In particular, these sets of characteristics are indicating how changes in water, biodiversity, food prices, and food consumption patterns are transmitted through the regional food system. This includes the sequence of events and the scale of interactions: (a) how the regional food system is sensitive to these changes; and (b) the subsequent adaptive capacity of the food system (see Box 7.1 for brief definitions of these main issues and drivers; see Figure 7.3 and Table 7.1 for both a graphic and an analytical description of the eight causal dynamics).

Box 7.1 **Proposed drivers and issues**

Drivers

Water depletion is 'a use or removal of water from a water basin that renders it unavailable for further use' (Molden, 1997). Water availability

is closely related to climate change trends altering precipitation patterns and rainwater (SCAR, 2011). It is also related to agrofood patterns and the use and concentration of agrochemicals, impacting the quality of water, further contributing to water scarcity.

Biodiversity loss is defined as 'the long-term or permanent qualitative or quantitative reduction in components of biodiversity and their potential to provide goods and services, to be measured at global, regional and national levels' (Convention on Biological Diversity, 2004). Biodiversity loss is cogenerated by climate change, environmental depletion, and water stress. It is strongly related to modern food production and consumption patterns (Altieri, 2000) that have become more intensive and homogenizing.

Food price volatility refers to large and atypical 'variations in agricultural prices over time' (FAO, 2011). Climate change, changing trade patterns, new dietary trends, and growing demand for biofuels are often invoked as causes of food price volatility. Speculation on commodity markets and reduction of food stocks are also crucial determinants of price variations (Robles et al., 2009).

Changes in food consumption patterns refer to the changing structure of global food consumption, related to changing dominant values, attitudes, and behaviours (Kearney, 2010; Johnston et al., 2014). Individual food consumption patterns – that is, diets – are the results of changes in culture, social values, and representations attached to food consumption, driving effectively behavioural changes and resulting in modified diets. The global changes in food consumption patterns – with a shift to more animal-sourced products, and foods high in fat, energy, and salt (Drewnowski and Popkin, 1997) – are largely driven by demographic factors and income growth, and are related to changes in activity levels, lifestyle, globalization, urbanization, markets, changes in occupational status and employment distribution, and more effective dissemination of information (Meade, 2012).

Food and nutrition security issues

Nutritional quality of the food supply refers to the nutritional composition of the food products on the market (Observatoire de la qualité de l'alimentation – Oquali, Institut national de la recherche agronomique – INRA). The improvement of the nutritional quality of the food supply is one of the eight specific actions defined by the Word Health Organization European Action Plan for Food and Nutrition Policy 2007–2012. A balanced diet is achieved through personal habits but also requires that the foods eaten by consumers have a satisfactory nutritional composition.

Affordability of food is defined as 'the purchasing power of households or communities relative to the price of food' (Ingram, 2011). It refers to the 'economic access' to food (Foran et al., 2014). Affordability is about food being available at prices that people can afford to pay, and in particular, whether low-income consumers can afford to buy enough nutritious and healthy food to meet basic needs (Barling et al., 2010).

Dietary energy balance refers to the balance between energy intake and energy expenditure (Patel et al., 2004). Excessive fat accumulation is acknowledged to be a risk factor for various health problems, including cardio-vascular diseases, diabetes, cancers, and osteoarthritis (WHO, 2008). A range of environmental, social, and behavioural factors interact to determine energy intake and expenditure, such as sedentary lifestyles, consumption of and heavy marketing of both energy-dense foods and fast food outlets, adverse social and economic conditions, the consumption of high-sugar drinks, etc. (Swinburn et al., 2004).

Cultural food preferences are powerful environmental factors related to social background and behaviours, which contribute to food choices and intakes. Recognizing ethnic and cultural food preferences and changes, compatible with nutritional requirements, is essential for food acceptance and well-being. Food preferences, socially or culturally determined, are now recognized as a key consideration in food security.

Next, a large list of indicators was identified by the research team and discussed in a second focus group with the same expert panel. Additional indicators were proposed by the experts, while some were deleted, and the process resulted in a shortlist of 136 indicators. Both the suggested framework and the shortlist of indicators were then submitted to a large panel of experts for further discussion though a Delphi consultation.

Identification of indicators

Following the protocol of the Delphi survey (Allen et al., 2019), 52 experts from more than 40 academic and policy institutions worldwide were asked to discuss and refine the framework and the underlying assumptions, and to test the framework by selecting proxy indicators.

First, an extensive list of 213 potential experts was developed by reviewing academic publications. An electronic letter of invitation was sent to the identified experts to explain the goals and protocol of the study, and permitted potential participants to self-estimate their expertise and aptness to the study. Two weeks later, a general email was sent to all identified experts containing a link to the questionnaire and background material.

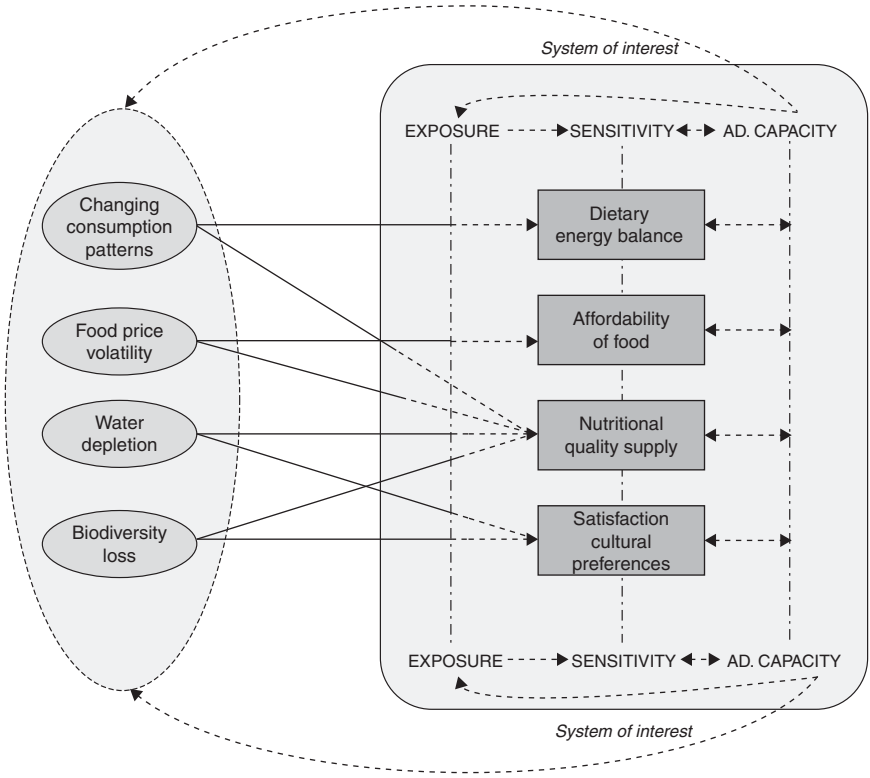

Figure 7.3 Interacting drivers and outcomes – graphic description.
Source: Allen and Prosperi, 2016.

This material included a document explaining the conceptual background, the specific aim and purpose of the Delphi study, and the summary details of the proposed indicators.

After each round a statistical analysis was run to provide participants with feedback to revise the questionnaire. Feedback reports providing each participant with the group results and their individual previous responses were sent via email after each of the three Delphi rounds. Overall, the final results were presented four months after sending the first letter of invitation. In each round, participants were asked to select their preferred indicator for each of the 24 components of the framework from a menu of five to eight preselected indicators (see Table 7.2). Twenty-four indicators are the desired outcomes from the selection of three indicators (i.e. exposure, sensitivity, resilience) per interaction analysed (i.e. eight selected interactions between drivers of change and food security issues). Participants had the opportunity to propose new indicators. Indicators that did not receive any

Table 7.1 Interacting drivers and outcomes – analytical description

Drivers of change	*Food and Nutrition Security Issues*		*References*
	Nutritional quality of food supply		
WATER DEPLETION	Potential Impact	• Contributing to decreasing production and productivity of nutritious foods. • Engendering low dilution capacity and contamination of agri-food products. • Impacting the availability of quality foods for poor consumers through higher cost of water.	SCAR, 2011; Wood et al., 2010; PARME, 2011.
	Recovery Potential	• Fostering water productivity to guarantee adequate nutritional values of foods. • Contrasting water scarcity through agrobiodiversity richness. • Enhancing adaptation through food import from water rich countries. • Reusing wastewater safely for use as water sources. • Focusing on human capacities and institutional framework.	SCAR, 2011; UNWATER, 2014.
	Affordability of food		
	Potential Impact	• Altering productivity, prices, and trade, and then food availability and affordability. • Increasing water prices lead to higher costs of agrofood production and to decrease in food affordability.	Wood et al., 2010; SCAR, 2011.
	Recovery Potential	• Encouraging drought-resistant crop utilization. • Fostering food import from water rich countries. • Improving irrigation efficiency. • Promoting waste water treatments.	Hellegers et al., 2008; Waughray, 2011.

	Nutritional quality of food supply		
BIODIVERSITY LOSS	Potential Impact	• Shifting to ecologically simplified systems based on cereals, which contributes to poorly diversified diets. • Hampering food systems responses against climate change, with consequent impact on productivity. • Increasing the dependency on global varieties on external inputs.	Arimond et al., 2010; SCAR, 2011.
	Recovery Potential	• Promoting agrobiodiverse systems for ecosystem services, food security benefits (nutritional value of foods), the viability of agricultural systems, and long-term productivity. • Fostering organic farming.	Thrupp, 2000; Reidsma & Ewert, 2008.
	Satisfaction of cultural food preferences		
	Potential Impact	• Putting at risk cultural traditions and preferences, linked to regional varieties and diets. • Homogenizing food production. • Contributing to reduce the enormous amount of information on nutritional and health benefits of the foods that shape the food cultural preferences of people. • Decreasing food biodiversity, which could result in the loss of unique and traditional foods.	Kearney, 2010; SCAR, 2011.
	Recovery Potential	• Knowing how to prepare a more varied diet can influence consumption of different food products. • Providing more varied and tasteful diets. • Enhancing and keeping traditional food cultures.	Termote et al., 2010; Johnston et al., 2014.
FOOD PRICE VOLATILITY	Potential Impact	• Impacting food production and consumption. • Altering food supply towards disadvantaged groups. • Leading to profound changes in the composition and availability of food supplies. • Hampering the present agrofood system supply, strongly interlinked with the fossil fuels system.	DEFRA, 2008; SCAR, 2011.

(*continued*)

Table 7.1 (Cont.)

Drivers of change	*Food and Nutrition Security Issues*		*References*
	Recovery Potential	• Enhancing dietary diversity for avoiding dependency on few groups of foods. • Fostering local provisioning and production, less involved in price variations.	Pinstrup-Andersen, 2013.
	Affordability of food		
	Potential Impact	• Impacting household incomes and purchasing power. • Affecting agrofood productivity, and therefore food affordability and availability. • Exacerbating economic shocks for the poor, who depend on wages and the rest of the economy. • Shifting purchasing strategies to lower quality products.	Wood et al., 2010; HLPE, 2011; SCAR, 2011; Regmi & Meade, 2014.
	Recovery Potential	• Fostering food industry's focus on consumers and their need for 'affordable food of high quality and diversity'. • Shifting towards cheaper or locally available foods, meeting the same caloric and nutritional requirements. • Implementing food policies for diversifying supply sources through different strategies (subsidies, food stamps). • Promoting diversity in food consumption patterns.	European Technology Platform, 2008; Brunori & Guarino, 2010.
	Nutritional quality of food supply		
CHANGES IN FOOD CONSUMPTION PATTERNS	Potential Impact	• Influencing food industry production patterns, overall food security, and nutritional characteristics of diets. • Shifting the demand towards cereals, simple sugars, animal products, and highly processed foods.	European Technology Platform, 2008; Brunori & Guarino, 2010; SCAR, 2011; UNEP, 2012.
	Recovery Potential	• Improving the understanding of the determinants of consumer choices. • Empowering consumers' choice for healthy and safe provided food. • Engendering consumption patterns cognizant of the impact of food choice on health.	SCAR, 2011; Allen et al., 2014.

Dietary Energy Balance		
Potential Impact	• Increasing consumption of fats, sugars, sweeteners, animal products, highly processed foods, and in fast foods and vending machines products. • Decreasing consumption in plant proteins and of home-prepared foods. • Strengthening 'obesogenic' environments with little energy expenditure and sedentary lifestyles. • Altering frequency and the amounts consumed of foods. • Decreasing dietary diversity.	PARME, 2011; SCAR, 2011; UNEP, 2012.
Recovery Potential	• Fostering public awareness for healthier diets through campaigns and community movements. • Enhancing cultural knowledge on preparing varied diets and on nutritional and health benefits of the foods. • Promoting weight loss and metabolic health through appropriate changes in the gut microbiota. • Supporting guidelines on dietary strategies to counteract overweight and obesity.	Barling et al., 2010; Termote et al., 2010; Lopez-Legarrea et al., 2014.

participant preference were excluded from the following rounds. New indicators were added if at least two participants proposed the same, or a similar, variable. A 'Don't know' option was always included in the menu to allow experts to express their lack of knowledge on a specific component.

After a first open-ended round, panellists were presented with the opportunity to justify or amend their first choices. Succeeding rounds have been designed to bring the group to focus or consensus. An upgraded framework and a restricted set of indicators were reached, after three rounds, from this consultation process. The Delphi study revealed low-, medium-, and high-consensus and a majority-level on indicators in 75 per cent of the interactions out of the 24 initial ones. The results obtained in terms of global response, expert participation rates, and consensus on indicators, were then satisfactory. Also, experts confirmed with positive feedback the appraisal of the components of the framework.

Consensus was finally reached in round three for 14 of the 24 desired indicators (see Table 7.2). Eight indicators have met the high threshold consensus criteria (80 per cent), three other indicators have met the medium threshold consensus criteria (70 per cent), and another three have achieved the low threshold consensus criteria (60 per cent). Four indicators have been selected by the majority of the participants (above 50 per cent). For five dimensions (out of 24), clear bi-dimensionality can be reported (two indicators above 35 per cent). In some of these cases, several experts recommended constructing a composite indicator. Three dimensions remained unresolved with a wide dispersion of expert opinions among indicators and little improvement of the consensus through the rounds (see final round results in Table 7.2).

The chosen list of 14 indicators includes:

1. Water Footprint of nutrient-dense foods [cubic metres/kg]
2. Intensity of use of actual water resources [%]
3. Irrigation Water Efficiency Index [%]
4. Water Footprint for an average diet [cubic meters/yr]
5. % of total acreage of top 5 varieties
6. Nutritional Functional Diversity
7. Crop Agrobiodiversity Factor
8. % of diets locally produced
9. % of nutrient intakes (Vit. A, Zn, I, Fe) from 10 most volatile foods
10. Household Dietary Diversity Score
11. % of food household expenditure
12. Sensitivity to price volatility
13. Food Purchasing Power Index
14. Household Dietary Diversity Score

    Prevalence of overweight and obesity is just below minimum threshold consensus criteria (60 per cent).

Table 7.2 Level of consensus reached by indicator

		Nutritional Quality of Food Supply	*Affordability of Food*
Water Depletion	Exposure	75% Water Footprint of nutrient-dense foods	86% Water Footprint for an average diet
	Sensitivity	61% Intensity of use of actual water resources	53% Price index for 10 most water-demanding foods
	Resilience	83% Irrigation Water Efficiency Index	47% Cross-price elasticity of demand of high/low water demanding foods
Biodiversity Loss		**Nutritional Quality of Food Supply**	**Satisfaction of Cultural Food Preferences**
	Exposure	64%	47%
		% of total acreage of top 5 varieties	Import Dependency Ratio
	Sensitivity	83%	72%
		Nutritional Functional Diversity	% of diets locally produced
	Resilience	89%	53%
		Crop Agrobiodiversity Factor	Integration of biodiversity considerations in business
Price Volatility		**Nutritional Quality of Food Supply**	**Affordability of Food**
	Exposure	72%	81%
		% of nutrient intakes from 10 most volatile foods	% of food household expenditure
	Sensitivity	47%	86%
		Price elasticity of 10 most nutrient-dense foods	Sensitivity to price volatility
	Resilience	92%	53%
		Household Dietary Diversity Score	Presence of safety net programmes
Change in Food Consumption Patterns		**Nutritional Quality of Food Supply**	**Dietary Energy Balance**
	Exposure	64%	47%
		Food Purchasing Power Index	Caloric share of ready-to-consume products
	Sensitivity	83%	58%
		Household Dietary Diversity Score	Prevalence of overweight and obesity
	Resilience	28%	28%
		% of public expenditure on food subsidies AND Existence of national dietary guidelines	Existence of policy plan for overweight/obesity AND Funding allocated to nutrition education

Lessons learned

Discussing implementation of the framework

This study aims at filling the theoretical and methodological gaps in quantitative assessment of sustainable food systems, combining a theory-driven approach with expert judgment, rather than a data-driven process. Since 'what is badly defined is likely to be badly measured' (OECD, 2008), efforts were concentrated on the operationalization of theories (vulnerability and resilience) in order to build a solid, common and replicable basis for defining a metric system. Within a broad systemic approach, the research attempted to operationalize the framework for the assessment of the sustainability in food systems through multidisciplinary and multi-stakeholder consultation. This research effort is provided to the scientific community, practitioners, or policymakers who might be interested in assessing and disentangling the characteristics of a given food system through the operationalization of this dynamic framework.

First, one challenge was to identify pathways leading to vulnerability, and the characteristics and opportunities ensuring resilience of the food system in a context of change. Resilience and vulnerability are considered problematic to operationalize through precise assessment methods due to their theoretical and multidimensional nature. It emerged from the workshop convened after the Delphi survey that participants had sometimes an incomplete understanding of the proposed framework. This is a shortcoming of the operationalization of the vulnerability and resilience framework as it has been already observed by working with practitioners (Foran et al., 2014) and it can have an impact on the indicator selection.

Second, several participants would have liked to have seen other food systems' outcomes than food and nutrition security issues considered. As it was already emerging from the Delphi consultation, environmental and social outcomes are standing out as crucial elements to consider and include in the assessment exercise. It was highlighted that this would be more in line with the general perception of what sustainability means: 'People think about sustainability as an outcome'. 'People want a descriptor of a state rather than the prediction of a state'. Furthermore, some experts would also have liked to complement the list of food and nutrition issues, adding elements such as 'dietary quality'.

The use of the food system framework developed was nevertheless acknowledged to anticipate and predict possible future outcomes of the food systems. A participant presented the framework as 'a model', highlighting the causal pathway that it aimed at providing. Some participants recalled that 'understanding what is driving the outcomes is important'.

Informing policy towards sustainable food systems

Assessing issues related to sustainability problems, with the goal of informing the decision-making process, has a number of critical implications. There

is, in fact, a growing debate about the importance of the role, utility, adoption, focus, and final goals of the sustainability indicators. There are several different ways to interpret indicators and select data. It is therefore important to know how the information provided by the indicators is going to be transferred to policymakers, and what the actual aims are of using the indicators. Aggregation of data can strongly alter the messages for policymakers, and several studies demonstrate that often the indicators that have been prepared in an appropriate technical manner are not actually applied nor do they have a real impact on policymaking (Bell & Morse, 2013; see also Chapters 5 & 11, this volume).

Referring to the European Union institutions, Sébastien and Bauler (2013) proved also the need for a greater involvement of the actors of the political and institutional contexts where indicators have to be identified and applied. A strong and active involvement of the local/community stakeholders is key to designing a set of metrics that will be useful to measure real progress and gaps towards the sustainability of food systems (see also Chapter 6, this volume). Moreover, the theories of vulnerability and resilience are often acknowledged as particularly effective by the scientific community for both conceptual and methodological aims of research, while development practitioners find those theories difficult to operationalize, with local actors at a context-specific level, for their complex and systemic nature (Foran et al., 2014). However, practitioners consider metrics as crucial tools to measure development and sustainability goals achieved in a given food system (Dicks et al., 2013).

Another important question is the type of policymakers targeted and the role of the media in informing policymakers. 'Who are the stakeholders we need to influence?' 'Who are the policy makers?' An expert suggested that there may be different goals for policymakers at different levels, for example, (1) 'to communicate to high-level policy makers and media about the overall state of the food systems by focusing on food system outcomes', and that (2) '[i]mplementing diagnostic models and causal analyses can help food-focused policy-makers as well as other types of policy-makers'.

Conducting a Delphi survey

A number of lessons can be drawn in terms of practice to enhance validity, replicability, participation, and consensus for further Delphi studies:

- It is important to demonstrate to participants the benefits for society and science of the proposed survey, while considering the potential shortcomings of this approach
- Given the diversity of views and understandings of what sustainability means, discussions need to be guided through structured and replicable methods, in particular if metric systems are the final outcome of the discussions. In this regard, iterative approaches are appropriate

- Transparency and multidisciplinary participation are crucial in the development of sustainability indicators, but present the risk of weaker consensus. Therefore, allowing a longer time-frame for decision-making may involve trade-offs
- Agreeing on a detailed background framework is essential for the development of indicators, but unlikely to happen if the framework is either too specific or not adaptable. The objectives of informing local stakeholders and aiding decision-making should be the driving principles when reducing the framework to its core elements, prioritizing short-term decision efficiency over long-term sustainability
- Having institutional support could help participants feel the beneficial purpose for society instead of fostering an exclusively profit-seeking aim for the team running the study
- If possible, holding a face-to-face meeting would help to dissipate remaining uncertainties and possible misunderstandings. For instance during the Delphi survey it was mentioned that a technical workshop (actually held in Montpellier, France, on November 2014) would have been convened at the end of the Delphi study and that participants would have been invited for further scientific discussion and involvement
- For selecting appropriate sustainable food system metrics, it is crucial to convene a diverse and appropriate expert team with a very good knowledge and understanding of the problems of the sustainability of the food systems
- Gathering two preliminary focus-group sessions as a pilot application for a Delphi helps to conceive properly the first questionnaire, managing, motivating, and administrating feedbacks
- Sending qualitative personalized feedback with comments, explanations, and suggestions from the experts enables real interaction of the group
- The use of Internet technology allows for the opportunity to consult large, geographically dispersed, expert communities
- Providing relevant but not overloaded scientific content and materials to participants allows them to be informed participants
- Structuring the survey makes each round progressively less time-consuming
- Further efforts are needed to build context-specific vulnerability and resilience frameworks that are adaptable and suitable to effectively identify metrics with both researchers and development practitioners

Conclusion

The 'Metrics of Sustainable Diets and Food Systems Project', led jointly by Bioversity International and CIHEAM-IAMM, has contributed to the exploration of assessment approaches to develop information systems for sustainable food systems. The broad vulnerability and resilience framework has been proposed to capture the food system as a whole and identify

key system elements that policy can control or mitigate. Food systems are networks in which components are connected to each other through causal pathways operating at different geographical or time scales. Distinguishing three components – exposure, sensitivity, and resilience – allows the model to specify which attributes need to be measured and how to structure the different indicators in a coherent assessment framework. The operationalization of this framework in a limited geographical area (i.e. the Latin Arc in the Mediterranean region) allowed for modelling dynamic interactions specific to the analysed region.

An innovative participatory research methodology – a Delphi survey – has implemented discussion of this framework, guiding the identification of indicators. It provided the systematic and scientific approach to propose a first core set of indicators to assess the sustainability of diets and food systems. The Delphi method, with the participation of several experts coming from different disciplines and institutions, provided practitioners, and eventually policymakers, with a transparent view of the process of developing sustainability metrics for food systems. The participation of experts was included all along the theoretical and operational research process. Before the Delphi process, two focus group feedback sessions with experts have contributed to improving the theoretical framework and tailoring the questionnaires. Expert opinion was crucial from the beginning to select the most urgent food system's drivers of change, and food and nutrition security issues, as well as to validate the dynamic interactions proposed in the framework. Also, with particular regard to the questionnaire, focus group experts helped finding the best way to address Delphi participants with questions on the set of metrics, in order to make the questionnaire more understandable and, therefore, to make the iterative process successful in terms of response rate.

This exercise has shown what is required to construct a shared information system for the assessment of sustainable food systems, replicable at different scales: (a) developing a sound and general conceptual framework of food systems outcomes and drivers, based on theories and evidence-based observations at both the global and local scale; (b) facilitating the involvement of experts in knowledge production to provide critical feedback and create consensus; and (c) identifying context-specific metrics and guaranteeing a traceable and reproducible selection process.

The process resulted in consensus on 14 indicators. Moving forward, an enhanced understanding of the availability of data to compute these indicators and of the interpretation of their results is needed.

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Notes

1 Sustainability science was introduced in 2001 by Kates et al. (2001).
2 Exposure is the nature and degree to which a system is likely to be affected by the occurrence of a change. Sensitivity is the degree to which a system is affected either adversely or beneficially, by a change. Resilience is the ability of a system to anticipate, absorb, accommodate, or recover from the effects of a potentially hazardous event in a timely and efficient manner, through ensuring the preservation, restoration, or improvement of its essential basic structures and functions (IPCC, 2012).
3 This project implies a multidisciplinary approach since it involves participation of academic experts from different disciplines. However it does not imply – at least at this stage – a transdisciplinary approach, since local practitioners or stakeholders are not directly involved in the participatory research process for indicators, but the effort consists of providing practice actors with metrics obtained through traceable and scientific knowledge-synthesis methods. Nevertheless, the research process was built on literature taking Mediterranean policy reports as main references.

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Part III

Impacts and outcomes of sustainable food system assessment

8 Building the foundation to grow food policy

The development of a toolkit to measure advocacy capacity

Anne Palmer and Raychel Santo

Introduction

In order for social change to be effective and long lasting, change needs to occur at the political, social, and economic levels (Economos et al., 2001). Programmes and services directed at changing human behaviour can influence social norms, but those norms need to be reinforced by a supportive policy environment to achieve scale and sustainability (Stachowiak, 2013). Advocating for policy change helps to create a supportive policy environment for programmes to operate successfully (Huang et al., 2015). Ideally, programmes and policy mutually support one another, but in practice, this convergence is challenging (see also Chapters 2, 5, 6, & 11, this volume). Advocacy can help to overcome that challenge and is a critical tool for food policy councils (FPCs) to utilize.

Broadly defined, advocacy is any activity that aims to shape political, social, and economic outcomes in government and society (Reid, 2000, p. 6). Organizations use various methods to advocate for issues such as mobilizing and training community members, conducting public education, using mass and social media to change social norms, pressuring companies and corporations to enact socially responsible policies, registering voters, and conducting research. Lobbying is a form of advocacy that is directed at influencing policymakers or the public to support or oppose a specific piece of legislation (Harmon et al., 2011). Many FPCs are reluctant to lobby because of its inherent political nature, however, lobbying is an important tool for any group advocating for social change (Chen et al., 2019).

This chapter is specifically focused on how FPCs can build their capacity to advocate effectively for their issues (see also Chapters 2, 4, 5, 9, 10, & 11, this volume, for more on capacity building). They have opportunities to shape public policy, particularly at the local and state levels where relationships with policymakers may have a more immediate influence. FPCs are groups that engage diverse stakeholders to address food systems-related issues and needs within a specified jurisdiction, primarily through policy. Our definition of policy is broad and includes laws and ordinances;

how policies get administered, funded or implemented at local, state, tribal/First Nations, or federal levels of government; as well as changes in institutional (e.g., schools, hospitals, government agencies) practices. Policy work could include working directly to change these various policies, as well as educating or coordinating others who might be advocating for such policies. Other groups that have chosen a different name, such as food council, network, alliance, coalition, committee, collaborative, or partnership, may also fit this definition and benefit from the toolkit. We choose to refer to them as FPCs because that is the most commonly used term[1] to describe such a group in North America.

FPCs organize at the local (city or county), regional, state/provincial, or Native American/First Nations levels[2] to discuss, shape, and assess food system policies and programmes in their communities. While many exist as grass-roots coalitions independent of government, they may also be sanctioned by a local or state government body. Heterogeneous in structure, membership, and issue priorities, they share a collective desire to reform food system programmes and policies through strategic partnerships. While many FPCs aspire to influence policymakers, they may lack knowledge about how government works, whom to approach, and how to frame their issues, all of which hampers them from achieving their advocacy and policy goals. Others strategically decide to avoid policy work because of political realities in their communities.

Recognizing these common challenges, we created a comprehensive online self-assessment toolkit that helps stakeholder groups like FPCs reflect upon their capacities to influence local and state level[3] food policy in order to identify how and where they can build upon them. The toolkit elicits responses to a number of indicators that reflect the specific activities or capacities that each FPC may have. It also provides a sequence of activities to help FPCs better understand the advocacy and policy process, evaluate their current advocacy capacity, or use the results to guide discussions about how to get started. While the toolkit was designed to assist FPCs embedded within the North American policy context, FPCs and similar entities in other industrialized countries (CLF, 2018b) may also benefit from employing it with their groups. With the exception of indicators on specific policy actions that groups may take – which local, regional or state governments in other countries may have different authorities over – the indicators on organizational leadership, decision-making, strategy, and communication are all integral to efficacious organizational operations even beyond advocacy.

This chapter discusses the development of the toolkit; its goals, objectives, and contents; and an example of how it has been used. In the following section, we describe how the toolkit was grounded in Kingdon's (1995) policy windows theory, an approach that encourages advocates to both create and take advantage of opportunities to promote their policy issues when certain conditions are met. In the subsequent sections, we describe the goals, development, and content of the toolkit, with specific attention

to equity and systems-thinking metrics. We then reflect on the experience of one FPC that used the toolkit to assess their readiness to advocate. We conclude by discussing how the process of creating this toolkit could inform other efforts aiming to measure the impact of local food initiatives on local food policies.

Theoretical foundation

Several theories of change exist that explore how policy change happens and the effectiveness of specific advocacy tactics, from the 'Large Leaps' (Baumgartner & Jones, 1993) and 'Power Elites' (Domhoff, 1990; Mills, 2000) theories at the global level to tactical theories around 'Messaging and Frameworks' (Tversky & Kahneman, 1981) or 'Diffusion of Innovations' (Rogers, 2003). Stachowiak (2013) presents a summary and comparison of ten different theories of change. By assuming a proposed policy strategy, one is selecting a theoretical approach that will undergird the design and implementation of advocacy efforts. We selected John Kingdon's (1993, 1995) policy windows theory to inform the development of the toolkit because it accounts for the opportunistic nature of policy change, while not discounting the need for a strategy.

This theory suggests that certain conditions foster a 'policy window' to attract policymakers' attention: (1) The issue needs to be identified by policymakers as a serious issue that warrants intervention; (2) Ideas need to be generated about potential solutions to the problem that are feasible, supported by the public, affordable, and reflect commonly held values among policymakers' constituencies; and (3) Political factors such as who is in office, the current political climate, and the influence of the opposition are also considered. According to this theory, at least two of these conditions need to be in place in order to create a 'policy window' – that is, an appropriate and effective time to introduce a new policy.

First, a condition needs to be elevated to a level of concern to be considered actionable. Conditions may garner public attention because of publicized research findings, advocacy campaigns by alliances, or natural or human-caused disasters. Some conditions transition to problems when the public perceives the issue as contrary to public values and subsequent attention shifts towards solving the problem. Next, policymakers propose how they would approach policy discussions to address the problem. When the problem moves into the proposal phase, policymakers inquire about the feasibility and associated costs of the potential solution as well as the public's perceptions of potential solutions. Policy proposals may be influenced by research, but researchers are not the only experts whose advice needs to be heeded. Finally, politics of the problem will be factored into whether or not a policy gets support. When the problem, proposal, and politics align, there is the strongest chance for policy change. According to Kingdon (1993), being positioned to respond to a policy window is more important for advancing

policy change than gathering substantial empirical evidence that may or may not influence policymakers.

Many FPCs follow a policy windows approach to their work, although they likely do not identify it as such. The genesis of FPCs' work clusters around food system themes including food access/security, economic development, environmental sustainability, health, food justice/equity, community foods infrastructure such as food production, food processing, food distribution, food procurement, and food recovery/waste. Members may have different perceptions of the problem(s) informed by their world views. Ideally, they gather to understand how solutions need to consider their various perspectives and positions, although it should be acknowledged that some are involved to protect their self-interests. In these early stages, their work may focus on building social and commercial networks, collecting and reviewing existing data, sharing knowledge of the issues, and conducting assessments of their current local or regional food system. This enhanced understanding can help all members appreciate the dimensions of the various issues and how to position those issues to attract support. Significant time, resources, and energy are needed to move a problem into a policy opportunity.

Most FPCs organize themselves into working groups divided by food system sector (e.g., food production, food waste/recovery), function (e.g., fundraising, communications), or both. Working groups assess problems and actions that are likely to have the most influence in their sector. Policy may be one of those actions. Regardless of what policy or policies they focus on, they undergo a process to determine the feasibility of success. Ideally, an FPC will have several options it is ready to propose, when and if the political conditions are deemed appropriate; hence, they will seek to open policy windows as opportunities arise.

One hallmark of most FPCs is diverse membership, with representation from actors across the supply chain and those influencing the sectors, such as government, civil society, and academia representatives. Many FPCs, even those that are not embedded within a government agency, include government staff (79 per cent of US FPCs) or elected officials (30 per cent of US FPCs) as part of their membership (CLF, 2018a). These partnerships with policy experts provide legitimacy and visibility for the FPC, as well as insights as to whether the political context is – or could be – supportive for policy change (Clayton et al., 2015). Those relationships are also vulnerable when political leadership changes. The most effective groups also spend significant time allowing members to develop relationships with each other. These internal relationships can help FPCs hone their policy agendas by providing a diversity of member opinions about the logistical and political feasibility and impacts of potential solutions (Clayton et al., 2015) and may help groups weather leadership changes. Members educate one another about respective challenges and reach consensus on which policies to move forward (see also Chapter 7, this volume). In practice, this process can

take years and leans heavily on visionary leadership, in-kind contributions, strong relationships with existing organizations and communities, and a strategy or plan as to how the group will move forward. Many FPCs also include (though not always successfully) citizens who are most impacted by food system challenges and potential solutions (McCullagh & Santo, 2014). Their on-the-ground experiences can provide meaningful 'reality checks' for FPCs as they are designing and implementing policy changes.

Goal of the toolkit

The Johns Hopkins Center for a Livable Future's Food Policy Networks (FPN) project began in 2012 to build the capacity of local, state, regional, and tribal groups that seek to influence food policy in their jurisdictions. By hosting a listserv of nearly 1,500 members, the FPN project maintains a virtual network of individuals and organizations that shares resources, success stories, and challenges in order to support the greater community of practitioners. The FPN website also collates a database of 1,200 resources, compiles a directory of all the food policy groups in the US and Canada, and engages researchers via a research forum. Project staff provide in-person and virtual technical assistance to groups around the country. These engagement methods allow staff to gauge the struggles FPCs experience while working on policy and tailor FPN's work to fit their needs. FPN's annual census survey collects information on FPCs' demographics, structure, funding, achievements, and challenges. Through this census, FPN has learned of numerous FPC policy accomplishments, ranging from mobile meat processing ordinances and farm-to-institution policies to acquiring funds for farmer trainings and anti-hunger programmes (CLF, 2018c). Notably, the longer a council has existed, the more they are likely to engage in a variety of policy activities, from submitting testimonies and providing policy recommendations to supporting or directing an advocacy campaign (CLF, 2018a). Groups also frequently mention that they are unsure of how to engage in advocacy work. In fact, policy training/guidance was listed among the top three technical assistance needs reported by FPCs from the 2013, 2014, and 2015 surveys (CLF, 2016). It was because of these findings that the Food Policy Networks project decided to create the 'Get It Toolgether: Assessing Your Food Council's Ability to Do Policy' toolkit (Palmer & Calancie, 2017).

The toolkit has a lot to offer FPCs and their members. Given the variety of sectors and experiences that FPC members represent, they may have little previous exposure to policy work. Thus, educating members on the advocacy and policy process is critical to optimizing their participation. Education can take many forms including informal conversations with other council members, presentations by local or state government staff on how policy changes are made, guided discussions on why advocacy and policy

are important, and opportunities for people to see first-hand what issues stakeholders are facing.

The short-term goal of the toolkit is to provide a foundation for FPCs to better engage in advocacy. This includes identifying who needs to be involved, suggesting steps to develop a strategy, demonstrating how to conduct and sustain advocacy efforts, and increasing FPCs' understanding of how policy is implemented. Using Qualtrics as its software platform, the toolkit's length and scope can be adapted to meet the needs of each FPC. Each section takes less than 15 minutes to complete and participants are provided a cumulative score at the end of each section based on their responses. Once the survey has been submitted, participants are emailed their scores with a corresponding set of resources to increase their capacity in specific areas of need. The scores provide a metric that FPCs can use to identify their strengths and weaknesses. By completing the assessment, groups improve their understanding of the policy process and their group's assets and challenges, thereby increasing their capacity to advocate for policy change. Over the long term, groups can use the toolkit to monitor their performance and assess progress in areas in which they have concentrated resources over several years. The FPN project will use the responses to track FPCs' evolution and capacity over time and as a data source for programming decisions.

Process of developing the toolkit

FPN staff began developing the toolkit by conducting an extensive search for other policy evaluation resources and tools that could be adapted for this purpose. The Alliance for Justice's (AFJ) Bolder Advocacy project, which provides expertise and information to non-profits and foundations to support their engagement in advocacy, was particularly impressive. They created the Advocacy Capacity Tool (ACT) as a guide for non-profits engaged in advocacy (Alliance for Justice, 2018). Also available online, the ACT guide provides real time scores that give a numerical measure of groups' advocacy capacity, and specifically, their readiness to engage in advocacy work.

In addition to using ACT, FPN partnered with Larissa Calancie, a Postdoctoral Fellow at the Center for Health Equity Research at the University of North Carolina Chapel Hill, who developed a self-assessment for FPCs as part of her dissertation (Calancie et al., 2017). We adapted her survey for the toolkit's first section on organizational assessment. We also reviewed tools and surveys specifically designed to measure equity and inclusion and adapted questions for our purpose (University of Virginia, 2010; Curren et al., 2016; Public Health Law Center, 2018). Finally, we had representatives from nine organizations – Greater Cincinnati Food Policy Council, Jefferson County (Colorado) Food Policy Council, Lehigh Valley Food Policy Council, Memphis Tilth, Omaha Food Policy Council, Prince George's County Food Equity Council, Public Health Law Center, United Way of New York City, Virginia Food System Council – pre-test the toolkit

and make recommendations for clarification and relevancy. Most of their suggestions were included in the final version.

Contents of the toolkit

The toolkit is divided into six sections: (1) organizational assessment; (2) advocacy goals, plans, and strategies; (3) conducting advocacy; (4) advocacy avenues; (5) organizational operations to sustain advocacy; and (6) policy implementation (see also Chapter 9, this volume, about the development of a City Region Food Systems toolkit). Below, we provide a brief description of each section of the toolkit, along with example indicators. Because some FPCs may also support other organizations' advocacy efforts, sections two through six offer a 'relies on partners' response option, which is not scored but noted. 'Relies on partners' means that the FPC has determined that they do not need to embark on this activity themselves and have identified partner organizations on which they can rely, or in some cases, support.

The toolkit can be completed by the organizational leader or facilitator, working group leaders, or by many members of the group or network. For example, it was rolled out among a network of FPCs in Michigan in fall 2018. The respondent's role(s) in the group is identified as part of the demographic information collected with each survey. As the name implies, the toolkit is a tool to gather different perspectives on the readiness of a group to engage in advocacy work; the diversity of those perspectives creates a profile of what members consider to be the group's strengths and weaknesses and can be used to guide a group discussion about next steps.

The first section of the toolkit, on organizational assessment, has three sub-sections: leadership; structure and membership; and networking and relationships. We use indicators such as receptivity to new ideas; decision-making processes; and creating an organizational climate that welcomes participation, provides leadership opportunities, and helps resolve conflict. The structure and membership indicators stress diverse membership and identify steps that enhance the functionality of the group such as by-laws and working groups. Networking indicators seek to determine the connectivity and perceived value of networking among members.

Section two concentrates on advocacy goals, plans, and strategies. It covers three topics related to this theme: preparedness; food policy agendas, plans, and strategies; and adaptability. Preparation acknowledges the need for the group to engage its members in creating a vision that is regularly communicated to all stakeholders. As part of those goals, FPCs should understand the potential policies, priorities, and environment in which they work. When they delve deeper into this process, they may conduct a policy scan or talk to other stakeholders, especially people affected by the issues. The final section includes indicators that consider knowledge of the power structures that influence the policy issue as well as monitoring schemes to assess progress.

The third section on conducting advocacy is the most robust section and explores what research the FPC uses, how they build the capacity of their members to conduct advocacy, whom they partner with to achieve their goals, and how they use communication activities to support their work. Research and analysis questions inquire about their data sources: from whom they get data, if they collect their own data and what methods they use, how they verify accuracy, and collaborative partners.

Section four assesses the FPC's administrative, institutional, and legislative advocacy skills, knowledge, and actions. Administrative advocacy (Alliance for Justice, n.d.) refers to actions related to rules, regulations, and other administrative actions that are not specific to legislation. Institutional advocacy refers to actions within government or a private institution. Legislative advocacy refers to actions that take place in legislative bodies such as a municipal council or state congress rather than other government bodies. The questions assess the extent to which the organization understands the processes involved in advancing these different types of policies; works on – or supports partners working on – the development of such policies; and serves as a resource for policymakers.

Section five reviews the organizational operations that support advocacy such as leadership's understanding of regulations about advocacy and lobbying, investment in training for members to do advocacy, and involvement in passing policies. Ability to fundraise for advocacy activities has been a challenge for many FPCs and this section also includes a number of metrics that assess relationships with funders, ability to obtain support for their work, and financial management practices.

Section six focuses on policy formulation, enactment, outputs, and outcomes. Indicators assess if members have organized community members to advocate, and whether they have provided testimony in support of or against any policies, met with policymakers, and developed monitoring mechanisms. In addition, this section asks about whether or not there has been an increase in awareness of food policy issues among various audiences, and whether or not the group is perceived as a resource for policymakers. A long list of possible food policy outputs is intended to expose participants to the variety of policies that groups can work on. Finally, we ask groups to speculate about how the policies they have worked on may have contributed to desirable outcomes in their communities.

Evaluating equity and inclusion

In addition to thematically organizing the toolkit into sections based on the steps of engaging in policy advocacy work, we integrated into all sections of the toolkit two themes that we believe should be central to the work of all FPCs: (1) equity and inclusion and (2) systems thinking. Table 8.1 highlights the metrics we selected for groups to determine if they are implementing their work with a lens on equity and inclusion. Equity was explored in terms

Table 8.1 Indicators assessed in each section of the toolkit

Section	*FPC features assessed*	*Equity and inclusion metrics*
Organizational assessment	• Leadership, group structure and functions, membership recruitment, engagement, networking	• The organization promotes and supports diverse representation and participation on the council; provides opportunities for members to build leadership within the organization; and shares power in decision-making with the organization's members. • The organization adequately reflects the racial, economic, gender, and ethnic diversity of the community it represents.
Advocacy goals, plans, and strategies	• Clear, relevant agenda that defines food policy goals, prioritizes activities, and reflects community needs • Flexible plan to carry out policy priorities	• The organization regularly provides opportunities to hear about food-related issues from community members who are not on the council. • The organization partners with community groups to increase and promote community engagement in local decision-making, particularly in low-income and historically marginalized neighbourhoods. • The organization has considered how the proposed policy agenda will impact socially disadvantaged and marginalized groups.
Conducting advocacy	• Organization researches policy issues and good practices • Capacity building of members to work on policy issues • Partners with other organizations and decision makers to advance policy goals • Communication strategy and media engagement	• The organization uses surveys, focus groups, or other research methods to better understand community interests, needs, or concerns about a specific policy issue. • The organization identifies segments of the public to educate about its agenda. • The organization implements a plan as needed to expand the size and diversity of its membership to achieve policy objectives.
Advocacy avenues	• Organization's skills, knowledge, and actions related to administrative, institutional, and legislative advocacy	• None specific to equity and inclusion.

(*continued*)

Table 8.1 (Cont.)

Section	*FPC features assessed*	*Equity and inclusion metrics*
Organizational operations to sustain advocacy	• Organizational commitment, funding advocacy, and decision-making structure indicators	• The organization invests in building the capacity of its members to strengthen its advocacy work. • The organization has increased its budget over time.
Policy implementation	• Policy formulation and enactment	• The organization has mobilized community members to advocate on behalf of a priority policy issue. • The organization engaged community members in forming policy statements. • The organization has included community members to help with policy adoption, implementation, or evaluation processes.
	• Policy outputs	• The organization has worked on policy changes that support living wages. • The organization has worked on policy changes that improved labour conditions. • The organization's actions have provided financing or credit for people who would otherwise not have access (for food-related enterprises). • The organization has worked on or supported organizations that are working on policies that address economic or housing development and food access simultaneously.
	• Policy outcomes (have contributed to an increase in …)	• The wages of food systems workers • (Improvement in) the state of working and living conditions for food or agriculture workers • Jobs for people that have had employment challenges • Access to credit or capital for people who would not have had access through traditional means • Value-added processing facilities that provide economic opportunities to those who need them.

of how the group considers the effect of policies and programmes on communities of colour, people living in poverty, indigenous groups, rural communities, (im)migrants, and youth and how it elevates the power of those groups to participate in food system changes. As mentioned previously, the survey can be completed by group leaders or by many members, which elicits various perspectives in the organization's assessment.

Systems-thinking metrics

In addition to equity measures, we included metrics that would nudge groups towards systems thinking. Systems thinking can be defined as 'an enterprise aimed at seeing how things are connected to each other within some notion of a whole entity' (Peters, 2014). Complex issues such as those that affect the food system, are best understood when using systems thinking and systems approaches (Clancy, 2014b, see also Chapter 4, this volume). Systems thinking acknowledges that solutions will require engagement from more than one sector/organization; considers long-term, short-term and unintended consequences; identifies leverage points that could lead to change; and considers how things change over time and accounts for tracking changes. Many of these concepts are allied with the principles of FPCs, although members may articulate them differently. We hope that by making these concepts more explicit, groups will be more comfortable in the application of systems thinking throughout their work.

Even if and when FPCs apply systems thinking, it is worth acknowledging that they may encounter difficulties when attempting to tackle multidimensional food systems issues within conventional policy paradigms. Most food issues are typically addressed in silos within traditional policy sectors (e.g., production, economic development, health), which makes advocacy on systems issues more diffuse and complex.

Toolkit in action: a reflection on one FPC's experience

Since the toolkit was released in winter 2017/2018, at least 70 people from 30 FPCs have completed it. These numbers were too small to analyse the toolkit's impact on practitioners at a quantitative level. Thus, we decided to speak with three representatives from one of the toolkit's early adopters, the Lynchburg Area Food Council (Virginia), to provide some initial qualitative perspectives.

Background

The Lynchburg Area Food Council (LAFC) formed in 2012 with the goal of collaborating on tangible programmes that would support the community across several counties in central Virginia. Informant 1, a charter member and vice president of the LAFC, was involved in the council's early efforts, which

Table 8.2 Systems-thinking considerations

Section	*Systems-thinking considerations*
Organizational assessment	• The leadership is receptive to new ideas. • The organization promotes and supports diverse representation and participation on the council. • The organization adequately reflects all food system sectors (producers, policymakers, food businesses, public health, etc.). • Joining the organization has helped coordinate efforts among various organizations that other members belong to or represent.
Advocacy goals, plans, and strategies	• The organization understands the overall policy environment related to its priorities. • The organization gathers information and recommendations from constituents and other stakeholders in the development of its food policy agenda. • The organization has considered how the proposed policy agenda will impact socially disadvantaged and marginalized groups. • The organization has some monitoring mechanisms in place to help assess progress and make course corrections when necessary.
Conducting advocacy	• The organization seeks guidance from other organizations and stakeholders to understand their policy priorities. • The organization identifies stakeholders (outside of its membership) that have similar goals, including those with complementary knowledge/skills, with which it could collaborate on policy. • Outside of its membership, the organization seeks support from stakeholders who may not be traditional allies, but with whom it could partner on a specific policy issue.
Advocacy avenues	• N/A
Organizational operations to sustain advocacy	• N/A
Policy implementation	• The organization has monitoring mechanisms in place to know whether or how the policy is being implemented. • The organization's actions have led to an increase in awareness of food system issues among the FPC members, elected officials, or general public.

concentrated on food access and food security research to identify food deserts. In response to those efforts, Randolph College conducted a community food assessment with residents living in low-income neighbourhoods, and United Way played a facilitative role for the council. Over time, the LAFC has shifted to focus more on local food, small farmers, sustainable production, and agricultural extension activities and less on food access, primarily due to membership changes. For example, after the local health department received a grant to construct a garden, LAFC also began offering small garden grants to communities.

At one of their bi-monthly meetings, Informant 2, one of the council members, introduced the toolkit to the group as a way for them to gather information to decide what they should focus on next. The timing seemed fortuitous. Informant 1 and Informant 3, an employee of the Virginia Department of Health, noted the group's readiness and desire to move activities forward. Every member was encouraged to complete it (8 out of 10 of them did), so that the results would include a range of perspectives.

What they learned

Once LAFC completed the toolkit, Informant 2 discussed her realization that 'we have been limited only by the fact that we didn't know all that was possible. That's one benefit of completing the toolkit, it gave us ideas we may have not thought of before.' While they excluded the term 'policy' in their council's name, she recognized that they could still work on policy; they just needed to consider how they could manoeuvre into the policy arena. As a group of community members, the LAFC aspired to work with city council members. Answering the toolkit's questions helped them acknowledge that in order to do that, they needed to identify specific policy partners. The section that helped them review their tangible accomplishments would further build momentum to work on policy.

The toolkit also helped the LAFC members realize that they had not taken time to think about their current role in the community and what they would like that role to be. Completing the toolkit encouraged members to think about those issues and use the results as a discussion starter. The scan of potential food and agriculture policies that FPCs could work on also prompted them to think about the council's potential to serve as a resource to gather information to share with the public, and more specifically, how they might be more of an asset to the community. As Informant 3 shared,

> we need to be creating knowledge and educating. We haven't been amassing a group of people who care about this work and what we do. Having a communications strategy would help us to communicate with the public. I don't think many people know we exist right now.

Informant 1 valued how the process of completing the toolkit gave members time to reflect on broader questions such as what the LAFC's overall goal is, what their individual roles as council members are, and how they make things happen. 'The toolkit asks good questions as to what your leadership looks like, what difference are you making in social change or policy? Have we done enough in our local city council to have a voice?' He also remarked that while they have made several attempts at short- and long-term planning, the toolkit experience highlighted how asking the right questions and listening to the answers may be more important.

The results illuminated points of convergence and divergence among members, such as whether or not the LAFC's representation reflects the diversity of the community they support. Some people thought it did, others not so much. As Informant 2 contemplated, 'Is it important for us to have agreement about these issues? How do we come together and answer those questions?' Where there were areas of discrepancy in the responses, they realized they would like to have a better idea of how to approach such differences in opinion. In its list of additional resources, the toolkit does include two documents that provide guidance on problem-solving and decision-making in groups (CLF, 2017).

The toolkit also revealed opportunities for enhancing the LAFC's organizational structure. Informant 3 described their group as relatively informal and embraced several suggestions about policies and procedures that they could work on to improve the group's operations. For instance, she noted that they have no orientation for new members and thought they could do more activities to build relationships among members. Such activities could help members learn from one another, 'We need to expand our horizons and group learning; members need to be educated about other [food] issues.'

As with many FPCs, the Lynchburg Area Food Council tries to balance its time and resources to meet community needs. Informant 1 described it as the tension between 'Are we about programs, or are we about systems change and advocacy and policy – the 30,000-foot view?' As Informant 3 reflected, the toolkit helped them assess where they are right now and where they might go in the future. 'We've got a lot of work to do, and a big future ahead and now we have a target line as to what we can be shooting for.'

Conclusion

We embarked on developing this toolkit as a way to provide FPCs with an easy means of assessing their current capacity to advocate on behalf of their food system issues. Time and again we found themes from the FPN trainings, listserv conversations, conferences, surveys, and research, which indicated that people were looking for a how-to guide to begin their advocacy work. By necessity, many groups spend a couple of years in development before they actually begin identifying a 'policy' issue that begs for

attention. Once they arrive at that place, their next steps are not always clear. The toolkit presents an opportunity for any group working on food system change to better understand the advocacy process and what needs to be in place to optimize their resources. This learning occurs at various scales. The people using the toolkit get feedback on their status and can periodically repeat the assessment to measure change over time. Groups can also use the results to make decisions about how their resources are allocated, who else needs to be engaged in the work, and what strategies they could employ to improve their outcomes. Simultaneously, FPN project staff use the data to determine what additional materials, webinars, or other activities can be offered to support groups. Moreover, aggregated results from the toolkit can be shared with other food policy groups working on food system change to transfer knowledge among groups at the local and state levels (Clancy, 2013). All of this feedback helps to avoid repetition of mistakes.

Another concept that is covered in the toolkit is governance: 'managing, steering and guiding of public affairs by governing procedures and institutions in a democratic manner' (Pisano et al., 2011, p. 3, as cited in Clancy, 2014a). Many FPCs structure themselves to influence public or institutional policy, sometimes both. By building relationships with actors in the various food sectors, identifying government departments that influence particular administrative actions, examining legislative options, and inviting institutions into that process, they encounter short- and long-term policy opportunities. As Informant 2 from Lynchburg noted, the toolkit 'made me realize that we were limiting ourselves to what we thought we could do'.

When many FPC members from the same organization complete the assessment, the points of convergence and divergence among member perspectives become obvious. This heterogeneity reflects a feature of systems thinking (Clancy, 2014b). More important than any score, if facilitated effectively, these differences provide insights into various world views and a starting place for rich discussions.

When the group agrees to allocate time to using the toolkit, they may also want to consider how they will manage survey administration and interpretation of results. FPN has held phone consultations with a few groups as well as compiled the scores and shared the raw data, in the event they want to do any analysis. It may be appropriate to invite an outside facilitator to help the group process the results, particularly if dramatic differences emerge. Taking time to discuss those differences will test the trust among group members. Since most groups use consensus-based decision-making, these discussions can help members understand conflicting views and discuss promising places for policy change. How to form a specific policy position among a diversity of member perspectives is still a challenge that many FPC leaders face, but maintaining a place to have those conversations is the first step to overcoming such divergences (Santo & Moragues-Faus, 2018; see also Chapter 6, this volume).

The final step, which is never really final, is deciding what's next. It would be easy to get overwhelmed by the volume of questions and subsequent scores. Given the paucity of resources for most groups, prudence in moving forward is highly recommended. FPN created the list of resources for precisely that reason – to give people a limited amount of information that they can choose to use if they want to improve their ability to work on a particular issue. When possible, each question was considered a discrete metric and a companion resource was identified for that metric. Most of these resources already existed in the FPN resource database. Some groups may not search the resources to answer their questions, instead using the process of doing the toolkit as a starting place to collectively answer the question, 'what's next?' Deciding to explore further, with resources in hand, can improve the efficacy of any group's work.

The toolkit can help FPCs pause and reflect, a process that is difficult for individuals, let alone when one is part of a group. A group may decide to use it annually, as a way to measure any change. Or they may only focus on one section with the goal of improving their performance in a particular area. The goal is to provide a starting point for all the members to think about broader goals and objectives. Reflecting on their work forces them to think and rethink about how they are adding value to the greater good of creating a healthy, sustainable, and fair food system. Many groups hesitate to explicitly state that they work on policy (Schiff, 2008, p. 211; Santo & Moragues-Faus, 2018, p. 10), but they might be underestimating their ability to work on policy issues. Policy is just a way to change standard operating procedures, whether they exist in legislation, within government administrative actions, or in private institutions. FPCs are more frequently mentioned as a means of mobilizing at various levels to affect food system change, however, that recognition has not attracted commensurate resources to match the interest. With diverse partnerships, adequate resources, and training, their capacity to actively engage in advocacy and policy can increase substantially. FPN aspires to use the results from the toolkit to improve the content, expand the indicators on systems to a more sophisticated level and, if groups choose to use it on a regular basis, compare their change over time. These metrics shape our understanding of how policy can be driven by food policy groups.

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Notes

1 Of those that have responded to an annual census of food policy groups in the US and Canada, 28 per cent of the 'active' groups in 2018 had names that included the term 'food policy council', 21 per cent used 'food council', 9 per cent used 'network', 8 per cent used 'alliance', 8 per cent used 'coalition', 5 per cent used 'committee', and 21 per cent used other terms (CLF, 2018a).
2 Seventy-one per cent of FPCs in the US and Canada operate at the local level, 20 per cent operate at regional (e.g., multi-county, multi-state), 8 per cent at state/provincial, and 1 per cent at Native American/First Nations levels (CLF, 2018a).
3 It is worth noting that many local and state-level policies are often constrained by national (e.g., Farm Bill) or international (e.g., trade agreements) policies over which local FPCs do not often have significant capacity to influence individually (Clancy, 2012, 2014a). Some FPCs do engage in public education about such policies, and a few are very active in the national policy scene. In theory, local groups could also collectively advocate around higher-level policies, though such activity has been limited thus far (Santo & Moragues-Faus, 2018).

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9 Tools for food system change

City Region Food System assessment, planning, and policy

Guido Santini, Marielle Dubbeling, and Alison Blay-Palmer

Introduction

While linked to other concepts such as foodsheds, bioregions, short food-supply chains, and territorial food systems, in recent years, the City Region Food System (CRFS) approach has emerged as a way to connect typically divided urban and rural spaces (see also Chapters 2 & 4, this volume). In addition to spatial integration, the CRFS approach also emphasizes coherence across food-chain dimensions, taking into account environmental and socio-economic aspects as part of fostering more resilient and sustainable food systems (for a more detailed analysis please refer to Blay-Palmer et al., 2018 or Blay-Palmer & Renting, 2015). To realize these goals, city regions can apply a large number of strategies and tools, such as the promotion of (peri)urban agriculture; preservation of agricultural land areas and watersheds through land-use planning and zoning; development of food distribution and social protection programmes; support for short supply chains and local procurement of food; and promotion of food waste prevention, reduction, and management. Developing a resilient CRFS, however, requires political will – integrating available policy and planning instruments (e.g. infrastructure, investment, logistics, public procurement, land-use planning); involvement of various government departments and jurisdictions (local and provincial); and inclusive organizational structures at multiple scales (municipal and district among others). Improved CRFSs offer the opportunity to help achieve better economic, social, and environmental conditions in both urban and surrounding rural areas by activating new or reinforcing existing concrete policy and investment opportunities.

In 2015, FAO and RUAF Foundation, in collaboration with the Laurier Centre for Sustainable Food Systems (LCSFS), and with the financial support of the German Federal Ministry of Food and Agriculture, the Daniel and Nina Carasso Foundation, and the CGIAR Water Land and Ecosystems Programme led by IWMI, embarked on a collaborative programme with regional partners to operationalize the CRFS approach. The goal was to assess and plan increasingly sustainable city region food systems in seven city regions around the world with an emphasis on the Global South.

The pilot cities are: Colombo (Sri Lanka), Lusaka and Kitwe (Zambia), Medellin (Colombia), Quito (Ecuador), Toronto (Canada), and Utrecht (the Netherlands) (FAO & RUAF, 2015; Dubbeling et al., 2017).

The CRFS approach builds on a formalized process of identifying and engaging all relevant stakeholders from the start of the assessment process through to policy review and formulation (see Chapters 2 & 7, this volume). This means that a CRFS process can result in revised or new urban food policies, strategies, and projects, and also in the creation of new – or revitalized – networks for food governance and policy development, such as urban food policy councils and new institutional food programmes and policies (Blay-Palmer et al., 2018).

Following the CRFS research, the approach was translated into a toolkit that provides guidance on how to assess a CRFS and then helps to build a more sustainable city region food system (the methodology is available at http://www.fao.org/in-action/food-for-cities-programme/toolkit/introduction/en/). The toolkit was developed out of, and is supported by, three phases of research that produced synthetic reports covering each pilot project. These phases involved data identification and consolidation from existing sources, and then the generation of new data followed by policy assessment and recommendations. The toolkit is available online (http://www.fao.org/in-action/food-for-cities-programme/toolkit/en/) as a set of linked documents that guide users through an iterative, non-linear process, including non-sequential phases to establish multi-stakeholder task forces, develop a vision, collect data, identify areas for improved food system sustainability, and work towards policy coherence. The toolkit includes more than 40 tools and resources – such as meeting guidelines and policy examples – developed and identified during the pilot phase. These examples from the cities offer an overview of why and how each city region implemented their changes and what outcomes each achieved. It is meant to be a resource for policymakers, researchers, and other key stakeholders who want to better understand their own CRFS and plan for improvements. In this way the examples and tools provide valuable experiences, expert guidance, and lessons that may accelerate the development of similar initiatives in other city regions that wish to apply, customize, or scale up similar practices.

This chapter provides an overview of the research results from the pilot cities that inform the CRFS toolkit as well as concrete examples that illustrate how pilot city regions adopted and adapted their strengths and peculiarities of their own contexts to generate and share evidence that led to policy outcomes. In particular, the chapter delves into the experiences of the pilot city regions that include Colombo (Sri Lanka), Lusaka and Kitwe (Zambia), and Medellin (Colombia). We also include brief overviews of the work in Toronto and Quito.

The CRFS process in the Colombo region triggered policy discussions beyond the local level that are spreading into provincial (regional) and national levels. It created the basis to start visualizing the importance of

a territorial approach to food systems and the actions needed to offset the impacts of natural resource management challenges, climate change, and shocks on city regions. It shed light on food safety, nutrient safety, value chain management, and food waste and losses in relation to urban spaces (FAO, 2018). In the two Zambia regions, the CRFS approach raised awareness and political momentum to reinforce the role of horticulture to promote diversified food production and sustainable consumption through joint planning specifically as proposed for the Urban and Regional Planning Act and could also be formative for the ongoing National Urbanization Policy. In the Medellin case, the CRFS approach enabled key policymakers, planners, and practitioners to move from a singular focus on urban food security and nutrition to a more integrated food systems vision that was applied across the region. This facilitated the identification and formulation of territorial planning strategies that strengthen more sustainable and resilient food chains from production to consumption. In turn, this enabled cooperation and coordination of the actors, including new forms of integration and collaboration between producers, agents, and markets, for example, the construction of a closer and more equitable relationship between rural and urban areas, which was designed to meet the needs of the urban and rural areas, producers, and consumers.

The CRFS toolkit and approach

Building from the experiences in the pilot cities, the toolkit was developed to include different considerations typically needed to support a CRFS assessment and planning approach (A diagram of the City Region Food System Approach is available at: http://www.fao.org/in-action/food-for-cities-programme/toolkit/introduction/en/).

The phases in the CRFS process are iterative and not intended to be linear. Consistent with other place-based research, the entry points should be defined based on the local contexts including available evidence and information, capacity, stakeholder engagement, and existing policy agendas (Sonnino et al., 2016). In some contexts, setting the policy agenda could be the starting point and an assessment may be used to explore and assess the policy priorities identified moving back and forth between data gathering and policy development. A city may enter at any point in the process suitable to its local context.

To begin, the CRFS team needs to: engage a multi-stakeholder task force, including researchers, policymakers, and food system participants; establish goals and objectives; and then determine what data and information exist. Typically, this initial phase produces outputs including terms of reference for the project as well as a workplan and timeline. Once the task team has been established, the approach develops based on the needs of the specific city region and would include some or all of the following elements:

- **Defining the nature and boundaries of the CRFS**: A key activity in the defining stage will be to conduct a participatory mapping exercise with a wide range of stakeholders to define the nature and boundaries of the local city region and the city region food system. In many cases these boundaries are based on either available data and/or political boundaries and other administrative considerations. In some cases, boundaries were set based on food-flow considerations as, for example, in Medellin.
- **Characterizing the CRFS – the CRFS scan**: The toolkit provides guidelines about how to map and describe the local city region food system. This includes questions such as: who feeds the city region, where is the food processed, how is it marketed, what do people eat and what is their food security and nutrition status, how is food waste managed and who are the government and institutional actors involved in the food system?
- **Visioning**: The toolkit outlines how to build a shared common vision for a sustainable and resilient CRFS. The vision underpins the different parts of the entire CRFS assessment and planning process. The aim is to build a vision that transcends the given project and can eventually grow into a more refined, consolidated – and political – set of priorities that is agreed upon by all stakeholders involved as the project progresses. The vision gives direction to the implementation of the CRFS assessment and planning.
- **Analysis of the CRFS**: The toolkit suggests ways to analyse current food system performance with regards to different sustainability dimensions, food system vulnerabilities, assets, threats, and weaknesses. The analysis also allows for the identification of opportunities to strengthen the CRFS.
- **Policy planning**: The toolkit provides recommendations for concrete policy and planning interventions in the CRFS and identification of stakeholder roles, (new) institutional frameworks, proposal writing, programmes, and action plans. This may also include the identification of lobbying opportunities and elaboration of specific advocacy materials. The policy support and planning could involve further policy analysis, policy formulation and revision, policy integration, and planning of further action. Continued engagement of policymakers across multiple scales and other stakeholders can be key to ensuring policy uptake and effective implementation.
- **Governance and multi-stakeholder dialogue process**: From a governance perspective, the toolkit presents a CRFS approach that aims to be highly participatory and promotes local ownership of the process through multi-stakeholder, multi-scale engagement as it seeks to foster inclusive dialogue among all the relevant stakeholders involved in the CRFS. The goal is to support local governments and multi-stakeholder bodies in taking informed decisions on food planning and capacity building, recognizing the added value in the consultation–participative processes,

and knowledge sharing. In some cases, the CRFS process has improved food system governance by consistently applying a multi-stakeholder participatory approach and process throughout the various steps of CRFS assessment and planning. This, in turn, can lead to strengthened existing, and the creation of new, networks and/or food governance structures, the improvement of government and stakeholder capacity in implementing a CRFS process, and the promotion of food policy design and monitoring.

The tools, material and examples provided on the toolkit website need to be adapted to the specific circumstances and interests of a city region through the creation of a local CRFS team that can use the toolkit according to local concerns and capacities. Examples of this are provided later in the chapter through case-study work. A sound CRFS process takes into account existing and specific agronomic, economic, and institutional–political conditions; the variety, interests, and expertise of the different involved stakeholders; available resources, existing data and information; and specific set goals in the local context (see Chapter 8, this volume, for other examples of toolkits leading to change).

Outcomes of the CRFS assessment and planning process in pilot city regions

Considering that each city region has its own context, the toolkit is not meant to represent a guideline that fits all. Instead, it has been designed to be a flexible instrument and to adapt to the characteristics and needs of each context. In that respect, the seven pilot city regions have adapted the approach, building on their specific contexts.

As discussed below, in each of the pilot cities the CRFS process has built more awareness and information exchange about the characteristics and functioning of the CRFS and has created the basis for a common and shared vision of a sustainable CRFS. In each city, the CRFS process has led to a set of key policy proposals and recommendations. In some cities this has resulted in policy or project activity, including new governance structures. In other cities, processes will be carried forward by local stakeholders or under new projects.

Case study 1: Two regions in Zambia – The role of the CRFS approach in raising awareness and political momentum to promote diversified food production and sustainable consumption

Zambia is a landlocked country located in south-central Africa. Forty-one per cent of its population lives in urban areas (urbanization rate in Africa: 38 per cent), mostly gathered in two regions (World Bank, 2016); Lusaka, the capital city (1.7 million inhabitants, Lusaka Statistical Office 2010) and

surrounding districts; and the Copperbelt Province, including the city of Kitwe (468,682 inhabitants). With the repetition of droughts and rapid urbanization patterns, both regions face diverse challenges to ensure food security and nutrition for all, while providing decent livelihoods to farmers and making efficient use of natural resources.

In addition, the existing food system in Zambia, built on large-scale mono-cropping of maize, is eroding ecosystems and crop diversity and reducing diversity in consumption and diets. Today, the Zambian diet is mainly composed of cereals, predominantly maize, starchy roots and, to a lesser extent, fruits and vegetables. Cereals provide almost two-thirds of the dietary energy supply. According to the National Food and Nutrition Commission (NFNC), one of the major causes of a high rate of malnutrition in Zambia is the mono-diet practice. The culture of mono-diet is born from mono-cropping food production, which is heavily slanted towards maize (Lusaka Central Statistical Office, 2010; Lusaka Government, 2015; Biriwasha, 2017).

In both city regions, prior to the CRFS pilot project, very little had been done to either analyse or plan the food system. As a result, few data and studies were available, and looking at food through a system and multi-stakeholder lens was still at a very preliminary stage. Despite the existence of a Ministry for Local Governments, food supply and distribution is still mainly handled by the Ministry of Agriculture. Both city councils showed interest in taking up this approach providing the needed political buy-in to initiate the process.

In both city regions, a multi-stakeholder group was formed including: producers, supermarkets, marketeers, processors, cooperatives, ministries, NGOs, municipalities, and consumers associations. The city regions were defined based on administrative boundaries and food flows (i.e. the sources of most of the food items consumed in the city) (FAO). (The map for Lusake is available at: http://www.fao.org/in-action/food-for-cities-programme/pilotcities/lusaka/en/; the map for Kitwe is available at: http://www.fao.org/in-action/food-for-cities-programme/pilotcities/kitwe/en/.)

Based on the approach and goals defined through each CRFS process, each of the defined city regions has the longer-term aim to make its CRFS more sustainable and resilient, and to improve the livelihoods of rural and urban dwellers in the city region, with special attention to the challenges of: (a) how to improve access to adequate food for the vulnerable and poor urban population; and (b) how to improve market access for the smallholder farmers in urban, peri-urban, and rural areas in the city regions. This connective approach to assessment examined current and future constraints affecting the local and regional food value chain. It used local knowledge to help analyse and prioritize these constraints and explore new ideas to strengthen the sustainability and performance of the food system.

Since very few data were available, an important focus was made on collecting primary data, unlike in the other project pilot cities. Data were

collected around the main priorities identified by multi-stakeholder groups to enable solid locally owned strategies and advocacy towards the key local institutions. The multi-stakeholder group was mobilized through a series of workshops to discuss, validate the assessment and identify key strategies to be implemented, and define associated action plans, including timeframe, funding needs and sources, as well as actors to be involved.

The CRFS assessment and planning process played a crucial role in contributing to identifying gaps and bottlenecks to create more resilient and inclusive food systems within specific city regions. In particular, as maize occupies a central position in Zambia's agricultural political economy, the CRFS process highlighted the importance of crop diversification and, specifically, the role of horticultural production and the value chain in feeding the urban population and contributing to healthy nutrition.

As a result of this process, there has been an increased awareness of the importance of joint planning between the two cities and their surrounding districts for the implementation of each CRFS. Joint planning is proposed in the Urban and Regional Planning Act, but guidelines and standards are not available yet. This would provide a policy and institutional framework to anchor implementation processes (FAO-RUAF, n.d.).

In addition, there has been renewed interest and policy discussions at institutional levels. In particular, this process has built bridges of communication among institutions to introduce a more integrated and territorial perspective in planning sustainable food systems. For instance, the CRFS project facilitated dialogue between the Ministry of Agriculture and the Ministry of Local Government on the importance of mainstreaming food and agriculture in the process to decentralize authority from the national level. In each city region, the whole process heightened awareness about the importance of going beyond the sectoral approach when looking at food, and the need to integrate all actors in the discussion.

In the framework of the decentralization process in Zambia, the CRFS assessment and planning process, together with its findings and recommendations, were part of the basis to contribute to the ongoing formulation of the National Urbanization Policy (NUP). The NUP aims to provide an overarching coordinating framework to address urban challenges and to maximize the benefits of urbanization, while mitigating potential adverse externalities. The CRFS assessment and planning process will be essential for providing key inputs to ensure that food security and nutrition, as well as food system dimensions, are part of the policy. In addition, the CRFS process highlighted the challenges that arose as a result of the current fragmented governing bodies for food systems that do not normally work in collaboration; a multi-stakeholder and interinstitutional mechanism or body responsible to define food strategies and policies would be key to reinforce the food system, in order to ensure food and nutrition security, including food safety (Hemmati, 2012; Vervoort et al., 2014). Furthermore, the decentralization policy offers a good platform for setting up a food council as it

is linked to certain national government functions such as policy and programme responsibilities for agriculture and health being devolved to local government. This means the local authority, Ministry of Agriculture and Ministry of Health are already working hand in hand but also highlights the other stakeholders that can be included to create well-adjusted strategies and policies, in order to, for example in Lusaka, reinforce the food system.

Case study 2: Colombo, Sri Lanka – from poverty and health focuses to (food) system thinking

Colombo District has more than 2.3 million inhabitants, with a population density of more than 3,300 people/km^2 and increasing. To meet the needs of this growing population, food is sourced from many parts of the country. However, owing to inefficiencies in the wholesale market system, food prices are high, resulting in high levels of food insecurity. There is also concern for food safety, as pesticide use is not well controlled.

Based on a scan of existing institutions and their connectivity as part of the CRFS assessment, it is clear that at the institutional level there is significant fragmentation in regard to food as there is no specific authority in charge of urban food security, agriculture, or rural–urban food supply. As documented in the pilot city synthesis report, there is a considerable number of relevant government departments and authorities at national, provincial, and municipal levels that oversee the system, especially focusing on food supply, prices, and consumer protection (FAO et al., 2018). Potentially adding to the urban–rural divide, the Sri Lankan government has recently set up the Ministry of Megapolis and Western Development (MoMWD), a dedicated ministry to implement Megapolis, a large-scale, multibillion-dollar urban development initiative in Western Province where Colombo is located.

The Colombo city region food system (CRFS) was defined based on: (a) built-up areas and population density (less dense areas of the region could act as suppliers to Colombo city); (b) jurisdictional and administrative boundaries (governing units that take policy decisions); and, (c) supply areas of macro- and micro-nutrients to the Colombo city region (for more information about boundary setting see Blay-Palmer et al., 2018). From a geographical viewpoint, the Colombo city region has been defined as the Colombo Municipal Council (CMC) and district areas. (The map of the Colombo City Region Food System is available at: http://www.fao.org/in-action/food-for-cities-programme/pilotcities/activitiescolombo/en/.)

When the CRFS process was launched, Colombo did not yet have a clear policy commitment and objective to design a more comprehensive and integrated food system agenda involving the rural areas where food is sourced. Nevertheless, at the municipal level, food was already among the priorities of the municipal government in terms of food safety (public health), food waste (waste management), and with attention to food price increases

along the value chain (poverty and food insecurity) in the context of wholesale market system inefficiencies (Tacoli, 2006). At the provincial level, food was prioritized through the promotion of urban and peri-urban agriculture strategies and activities. Nevertheless, food was not analysed or planned in a systemic and integrated manner; current policies and programmes on food systems are fragmented and sectoral, while attempts to achieve macro-level improvements are mostly disconnected and in isolation (FAO et al., in press).

Public health, food security, poverty, and waste issues have been the entry points to initiate a comprehensive and integrated assessment of the food system and were instrumental in fostering stakeholder dialogue and building a common understanding on the interdependence of these issues and their relevance in a broad vision of the Colombo city region food system. This eventually determined further political and stakeholder interest and commitment. In that respect, the CRFS process, while targeting the local-level policy context, allowed initiating the policy discussions and processes at local, provincial (regional), and national levels. In addition, it also contributed to increased attention about the importance of integrated regional food system approaches at provincial and national levels. At the municipal level, the CRFS process has helped the Colombo Municipal Council (CMC) and other institutions to understand the Colombo food system in its complexity and has created the basis to build a common vision on a more sustainable and resilient city region food system. The process has allowed identifying the opportunities, challenges, and needs to be addressed. It was indeed instrumental in understanding the importance of how the urban food system and its regional supply chains and flows across the urban–rural spectrum are interlinked with other high-priority policy objectives. As tangible policy outcomes with the potential for a more coherent regional food systems approach, the CMC agreed to introduce local-level by-laws to promote and regulate Reduction, Reuse, and Recycling (RRR) of food waste at the CMC level. As well, they will introduce a separate division dedicated to food safety within the health department and concentrate more on RRR from food waste.

At the regional level, the Western Province population is growing quickly and the regional Government will have the responsibility to ensure appropriate levels of food security and nutrition in a sustainable manner. While this requires long-term, integrated, and holistic food policies and strategies that include all actors involved in the food system, food continues to be excluded in urban and regional planning. Although a territorial approach is mostly beyond the control of local level authorities, the regional level authority (Western provincial council) has started to recognize the importance of the territorial approach in food systems. In addition, the MoMWD has realized the importance of including the CRFS concept and has made a request for support to build on the findings of the CRFS initiative in integrating prioritized areas of food systems into Western Megapolis urban and regional planning (FAO et al., in press).

At the national level it emerged that existing food policies needed to be evaluated and adjusted. This was well taken by the national authorities, and initial policy discussions to integrate the results of the CRFS assessment into the National Agricultural Policy, the National Nutrition Policy, and the Food Act have begun. However, concrete measures to align local, provincial, and national strategies and action plans are still needed.

Overall, the CRFS process has shed light on food safety, nutrient safety, value chain management, and food waste and losses in relation to urban spaces. Using the CRFS framing triggered policy discussions beyond the local level to provincial (regional) and national levels (Blay-Palmer et al., 2018). It has created the basis for starting to visualize the importance of a territorial approach to the food systems and actions needed to offset the impacts of natural resource management, climate change, and shocks on city regions.

Case study 3: Medellin's approach to city region food systems and enhancing rural–urban linkages

The Municipality of Medellin is the second largest city in Colombia after the capital city of Bogota, with close to 2.5 million inhabitants. The department of Antioquia, where Medellin is located, is made up of 125 municipalities grouped into nine sub-regions. The definition of the city region was based on the social, economic, and political dynamics around the food system associated with Medellin and its Metropolitan Area (a region called Valle de Aburrá) that is constituted by ten municipalities, in which 59 per cent of the population of Antioquia resides.

The Medellin city region was defined using five different criteria: (a) food supply: the municipalities contributing more than 1 per cent of the food consumed through the supply centres; (b) production including those municipalities contributing 1 per cent or more of the total food produced in the Department of Antioquia; (c) proximity with those territories within the Aburrá Valley that currently have agricultural production; (d) potential for agricultural expansion based on food-flow analysis by volume (weight in tons); and finally (e) political participation to consider municipalities important to governance even though they do not participate significantly in the production or supply of agricultural products for Medellin (Dubbeling et al., 2017; FAO-RUAF, 2018). (The map for the Medellin City Region Food System is available at: http://www.fao.org/in-action/food-for-cities-programme/pilotcities/medellin/en/.)

The city of Medellin is a pioneer in its approach to urbanization by ensuring the well-being of its citizens through food. For example, food security and nutrition issues have received growing interest from decision makers over the years, which has now spread to the public and media of the city and the Antioquia region. In 2009, Medellin became the first city in Colombia with a dedicated Food and Nutrition Security unit. The role of the municipal authorities in public policy on food and nutritional security

has been growing – the government of Antioquia also institutionalized the issue of food security and nutrition as public policy in 2003 through the Management of Food Security and Nutrition (MANA) programme (Hackett et al., 2008).

Accordingly, these food-flow and programme initiatives were the entry points to initiate the CRFS process that started with a solid urban food policy agenda as a basis to promote a city region food system perspective. The process focused on the policy phase to ensure that a CRFS approach was embedded in new political programmes and agendas. Once support was ensured, the CRFS approach continued with the assessment, while work on policy processes proceeded in parallel.

The CRFS assessment and related processes highlighted the strong interdependence of the city with surrounding territories and the need to address issues of fragmentation and the inefficiency of the supply system as well as the significant social and economic territorial inequalities between urban, peri-urban, and rural areas. There are limited direct relationships between rural and urban spaces, with a lack of interaction among producers, marketers, and consumers. As a consequence the food provisioning systems in and around the city of Medellin are quite inefficient, resulting in considerable food loss and waste and limited market regulation for prices, due to the hegemonic role of a limited number of actors involved in food logistics and commercialization that act as an oligopoly without real control on price generation. This points to opportunities to strengthen food production in the peri-urban areas of cities in the Medellin city region, as well as to improve linkages between urban food demand (especially from lower-income neighbourhoods) and cooperatives of small agricultural producers in the city region (Blay-Palmer et al., 2018). Considering interventions in other food systems, public administrations could focus particularly on improving the logistical infrastructure of publicly supported markets and possibly creating 'food hubs' for local food to enter and be distributed throughout the city (Blay-Palmer et al., 2013; O'Connell and Kiparisov, 2018). Local leaders could enable this through inclusive food governance mechanisms that address the complexity of the food system in the city region of Medellin to generate political, administrative, and economic synergies that facilitate the implementation of actions in the city region.

The CRFS process facilitated institutional integration between the regional government of Antioquia, the Medellin Mayor's Office, and the Metropolitan Area of the Valley of Aburrá. Advances have been made in starting the creation of a new governance structure and institutional platform in which the three public authorities collaborate. This tripartite platform on territorial food policy issues, called the 'Alianza por el Buen Vivir' (the 'Alliance for Good Living'), serves as a forum and mechanism for coordination, knowledge sharing, and articulation of the collective development and implementation of policy and project interventions from a territorial governance perspective in the Medellin food system. Some examples of

this tri-partite collaboration are: (a) The commissioning of a study to further assess possibilities for the production and commercialization of food products from the region's rural villages; (b) A proposal has been developed to renovate the *Campo Valdes* urban food market into a regional food logistics centre or 'food hub' within the city to make it more accessible for producer associations in the rural areas around Medellin; (c) The platform is also exploring strategies for the regulation of intermediaries to allow these fresh products to reach consumers at much more accessible prices (Dubbeling & Santini, 2018).

Policy outcomes in other city regions

Other city regions participated in the CRFS pilot project, including Toronto, Canada and Quito, Ecuador. In the example of Toronto and the surrounding Greater Golden Horseshoe region, while the CRFS work was only one minor contributor to food policy considerations at multiple scales, pre-CRFS work helped to shape other food policy initiatives either directly or indirectly. In Toronto, complex, long-term, and strong food-related ties between food and governance have existed for many years. For example, the Toronto Food Policy Council was established 30 years ago within the Public Health department of the City of Toronto. This deep history enabled the CRFS process and the coherence of the work by the CRFS Task Force. The multi-stakeholder Task Force included municipal officials from: Toronto Food Policy Council, and Toronto Food Strategy as part of the City of Toronto Public Health as well as City of Toronto Food and Beverage Sector; the provincial Ministry of Agriculture Food and Rural Affairs; a representative from the Golden Horseshoe Food and Farming Alliance; and academic experts in food policy, food security and nutrition, and sustainable food production and food systems. Through the CRFS Task Force review, these key food system actors who normally attended to specific, narrower responsibilities and related policies and programmes were able to come together to identify common issues and cross-cutting solutions to recommend systemic policy changes. The CRFS project contributed to increased awareness about regional food opportunities and concerns, a growing awareness of multi-scaled policy interactions starting with the Toronto Food Policy Council and opportunities to build synergies through, for example, a food–energy–water nexus (Miller and Blay-Palmer, 2018).

In Quito, Ecuador, participatory governance in the territorial food system is recognized as a way to guarantee the achievements of the set goals and outcomes of the food strategy (Dubbeling et al., 2017). These contribute to initiatives across the sustainability spectrum, including the Right to Food, promoting sustainable diets, improving urban–rural linkages and ensuring participation of small producers and local authorities in the city region. The CRFS research in Quito helped to advance this work by supporting network capacity building. Through a consultative process, Quito has designed

an appropriate food system governance structure that takes the form of a food policy council, seeking involvement of local, provincial, and national government actors, the private sector, and civil society. This has helped to further reinforce the regional food system and provide a platform for more robust urban/peri-urban/rural networks.

Conclusions

The CRFS approach confirms that each city region food system is unique. Each has its own peculiarities, challenges, and solutions (Marsden, 2013; Sonnino et al., 2016; see also Chapters 2, 3, 4, 6, & 7, this volume). The CRFS process in the different pilot city regions has generated a broad variety of policy results and has faced several challenges that have limited the impacts as documented in the toolkit.

Overall, the assessment process as part of the CRFS pilot projects allowed multiple stakeholders in the city regions to understand how urban and surrounding rural areas are fed and what their food dependencies are and to identify weaknesses and potential pressure points. This raised general awareness and enabled the basis for policy transformation and the implementation of more sustainable and resilient CRFS through targeted strategies to improve their food systems. With the current pressures from climate change and related disasters, the CRFS approach could offer a way to mitigate, adapt to, and prepare for these changes, creating more resilient regions by providing a method to define place-based challenges, identify solutions, and build capacity (Blay-Palmer et al., 2018).

The assessments helped city stakeholders to recognize the interconnections between food and agriculture and several other sectors, such as transport (as a large part of city transport is food-related), health (malnutrition, obesity, school feeding), education (awareness on sustainable diets through curricula), land-use planning for agricultural and food (land allocation for food and green infrastructure, food market relocation), community development and revitalization, employment generation (in food production, processing and retail, food waste management), and waste management (productive use of waste and waste water, management of food waste) (Tacoli, 2006). In addition, a CRFS approach helped cities such as Medellin and Quito to understand the potential and opportunity to shorten the supply and value chains of key foods by localizing production and reinforcing existing local initiatives. The process also helped evaluate the extent to which urban food security is dependent on rural production areas and how the food system impacts both urban and rural populations in the city region. This understanding helps city governments to start seeing food as a driver for other sustainable urbanization policies (Dubbeling & Santini, 2018).

The process also encountered significant challenges and obstacles in operationalizing the CRFS concepts. Some of the hurdles were common in most of the city regions and can be summarized as: (a) limited data availability;

(b) challenges in building political buy-in and stakeholder engagement; and (c) limited governance and regulatory instruments for food planning at the city region level. The CRFS assessment illustrated the significant challenges arising from the scarcity of data and empirical information at the subnational level on food systems. In some cases where data were available, information at the city region level did not match jurisdictional boundaries. In addition, some data were sensitive or subject to copyright. To tackle these challenges, a combination of secondary and primary research, coupled with expert knowledge, was used to complement missing data (Miller & Blay-Palmer, 2018). Addressing data gaps requires identifying innovative and efficient methods to combine secondary information, primary data, and expert opinions and analyse this data in systematic and consistent ways to produce the information required for local decision-making.

As with other approaches, multi-stakeholder dialogue is a crucial element in the process to enable transparent and inclusive participation. Through this, decision makers and organizational representatives have the opportunity to guide implementation and discuss findings and implications for local strategies (Hemmati, 2012). However, any multi-stakeholder dialogue process comes at the cost of a high degree of engagement across as many sectors and stakeholders as possible. Engagement requires time and resources that can be challenging for many stakeholders to commit. In many cases, engaging with key stakeholders may be difficult due to other reasons – for example, lack of institutional versus individual engagement, conflicting agendas, no history of collaboration, and/or no clear outputs from the start of the process. The identification of a political champion (a recognized and respected policymaker from a key institution involved in the CRFS) from the very beginning of the process can be a successful driver to ensure the engagement of key stakeholders and political buy-in (Bagdonis et al., 2009; Kania & Kramer, 2015). The involvement of key stakeholders throughout the process can also ensure ownership and commitment as the policy or action plan will be shaped – as much as possible – according to the needs, demands, and contributions of all the stakeholders involved (Vervoort et al., 2014).

In most of the city regions involved in the pilot programme, appropriate governance structures and regulatory instruments often do not exist that allow for multidimensional and multi-sector food systems planning or facilitate the realization of policies and investments to reinforce the CRFS. In most cases, food policy, if it does exist, is segmented by particular areas of interest, for example public health or farming, and does not have a strong cross-sectoral mandate (Jenning et al., 2015). As revealed in the CRFS pilot process, and consistent with other multi-stakeholder initiatives (Rivera-Lirio & Muñoz-Torres, 2010; de Zeeuw & Dreschel, 2015), governance arrangements are the key to promoting and operationalizing the CRFS concepts – putting the right structures in place to drive and facilitate the creation of new kinds of rural–urban linkages. Accordingly, a critical challenge is creating more inclusive territorial governance structures in

which cities, regions, and other levels of government can work constructively together towards complementary, beneficial outcomes (Jenning et al., 2015). Interaction, coordination, and joint planning are necessary between different institutions and levels of governments involved in the CRFS (urban and rural entities, larger and smaller cities in the city region, city and provincial/national government). While there is value in integrating across different sites of food production to include rural, peri-urban, and urban agriculture in a more linked up manner (Neilson & Rickards, 2017; Clancy & Ruhf, 2018) typically, such institutions, urban and rural authorities, or city level versus provincial authorities, do not often have the institutional capacity for engaging in joint policy and planning, due to the limitation of their jurisdictional mandate or when different political orientations are at play. As elaborated in the toolkit, task forces and institutional focal points were key enablers to realizing improved linkages and more effective policy and programmes. This, in turn, can foster more sustainable, resilient food systems. This applies to all city region food systems – ones that exist, are being revitalized or are in their beginnings. Building resilient and sustainable CRFS requires opening space for democratic participation from all spheres of society, fostering a multi-stakeholder dialogue process so that citizens can play a stronger role in the policy development process. In future work, it will be essential to include medium and smaller cities and their regions as this is where the most people in the world live and so would have the most potential for impact (Berdegué et al., 2015) and to broaden the scope of the toolkit to include considerations such as climate resilience and migration issues. Using the toolkit's CRFS approach, five pilot communities were able to gain new insights, but also discover important limitations. The toolkit provides a suite of tools from visioning, assessment, and policy creation so that city regions can activate to enable sustainable food system change.

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10 Assessing responsible food consumption in three Ecuadorian city regions

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Introduction

Most examinations of sustainability of agrifood flows in Latin America have tended to focus on production, distribution, and consumption as separate processes (Gustafson et al., 2016). Such a disarticulated view inhibits the understanding of complex phenomena related to agrifood systems, such as the nutritional transition and the epidemic of obesity in Latin American countries. A more holistic vision of food consumption requires identifying patterns in which the origin of foods, demands of food consumers, and the ways in which provisioning occur are all woven together (Blay-Palmer, 2006; Sonnino, 2009; Csutora & Vetöné, 2014; see also Chapters 3, 4, 6, 9, & 11, this volume).

Social, economic, and political pressures reinforce industrialized food systems (Dixon, 2009; Guthman, 2014). On the other hand, food environment characteristics, such as the availability of agroecological spaces, can influence food consumption practices (Brug, 2008). Further, consumers are not homogeneous, either because of limitations in resources or because of active choices. Some individuals, households, and organized groups search out lifestyles and provisioning approaches which are more sustainable, based on differing values and meanings (Stern & Dietz, 1994; Ozçaglar-Toulouse, 2009; Inglehart, 2015). They go beyond simple market transactions towards concerns about health (Gould, 1988; Moorman & Matulich, 1993), ecology and environment (Kinnear et al., 1974; Zimmer et al., 1994), corporate social responsibility (Ottman & Reilly, 1998; Pivato et al., 2008; Feldman & Reficco, 2015; Tsai et al., 2015; Frynas & Yamahaki, 2016), ethics (Newholm & Shaw, 2007; Linders, 2014), and individual social responsibility (Berkowitz & Lutterman, 1968; Anderson & Cunningham, 1972). They engage in what we denote here as 'responsible consumption' (Webster, 1975; Antil, 1984; Dueñas Ocampo et al., 2014).

Although qualitative approaches have been used to understand the motivations of individuals or household members in making decisions to be responsible consumers (see, for instance, Guerrón-Montero & Moreno-Black, 2001; Piñeiro & Díaz, 2012; López et al., 2017), limited quantitative research has characterized the extent to which entire populations engage in responsible consumption. Key questions remain: how can one define and measure responsible food consumption among consumers in city region agri-food systems? (see also Chapters 2 and 9, this volume.), and what relationships might consumption have with healthy eating practices? (see Chapter 7, this volume).

This chapter starts with the context in which we worked, the conceptualization of dimensions of responsible food consumption, and the empirical approach that we took to assessment. We then share our initial results of measurement of the dimensions and the overall Responsible Consumption Index (RCI) and its relation to healthy eating indicators. We discuss the implications of our work and conclude with potential directions for research and application.

Context

In Ecuador, 62 per cent of the population between 19 and 60 years of age are overweight or obese (Freire et al., 2014). Closely related is the burden of chronic diseases (GBD, 2017), which in Ecuador have been estimated to cost society €1.5 billion annually (MIES et al., 2017), approximately 1.5 per cent of GDP. While these chronic diseases are often denoted as non-communicable, they can nevertheless be socially transmitted conditions, being shared among populations and fostered by industrialized agrifood systems that promote highly processed foods (Allen & Feigl, 2017).

Ecuador has great potential for resolving both obesity and chronic diseases, as the vast majority of foods consumed are produced in the country, and 60 per cent of these are produced on diversified, family farms (MAGAP, 2016). However, market chains usually involve multiple intermediaries, leaving farm families with insufficient recompense for their production efforts, pushing them to expand the production area devoted to more marketable crops and reduce the area for vegetables, fruits, pulses, and oilseeds for home consumption (Carrión & Herrera, 2012). Further, diets are predominantly composed of tubers and grains, with low intakes of vegetables and fruits (Freire et al., 2013). In 2008, the government of Ecuador included food sovereignty in its constitution, as one way to reduce or eliminate undernutrition and malnutrition. Its mandate was to promote nutritious food, with a preference for agroecological and organic production, which comes from micro-, small-, and middle-sized peasant production and artisanal fisheries, as well as to foster popular economic organizations (Government of Ecuador, 2010).

The Ekomer research team, a multidisciplinary team of Ecuadorian and international universities and civil society organizations, arose out of both a

concern for chronic diseases and a recognition of the potential that Ecuador offers for addressing this problem. The team has carried out research to understand the conditions in which social movement campaigns promote responsible consumption and public policies that support it. One challenge was to develop and implement a method to elucidate different 'responsible (food) consumption' patterns in three counties (*cantones*) centred in city regions (including urban and rural areas) where a citizen campaign for responsible consumption has been particularly active: Ibarra, Quito, and Riobamba in the provinces of Imbabura, Pichincha, and Chimborazo respectively, all in the central Sierra of Ecuador.

Quito's population of 2.2 million is ten times that of Riobamba and twelve times that of Ibarra (INEC, 2010). Of the three provinces, the prevalence of undernutrition, as assessed by stunting (low height for age in 0–5-year-olds), is greatest in Chimborazo (49 per cent), followed by Imbabura (35 per cent) and Pichincha (29 per cent) – national average is 25.3 per cent (ENSANUT-ECU, 2012). On the other hand, overweight ($25 \leq BMI^1 < 30$) and obesity ($BMI \geq 30$) prevalence among adults 20–59 years of age is highest in Imbabura (62 per cent), followed by Pichincha (55 per cent) and Chimborazo (53 per cent), whereas the national average is 62.8 per cent (ENSANUT-ECU, 2012). Among adolescents, a study that included Quito found that the condition of being overweight was associated with inactivity due to >28 hours weekly watching television and high consumption of processed foods (Yépez et al., 2008).

In a national survey of household incomes and expenses (ENIGHUR-INEC, 2013), neighbourhood stores were the most common location for food purchases but the least common location for purchase of less processed foods. In contrast, fairs (open air markets), where the greatest purchase of non- or minimally processed foods occurred (Muzo et al., 2017, p. 28), were the second most common location for food purchases. At the same time, in the three study counties, the majority of agricultural production is dedicated to consumption within the country, rather than export (INEC-ESPAC, 2017), opening up the possibility of greater self-sufficiency in food production in the food-sheds of the selected counties.

Dimensions of responsible consumption

Dueñas Ocampo and colleagues (2014) reviewed the history of socially responsible consumption as a concept, from a personal psychological attribute to a collective behaviour that encompasses environmental, ethical, and social concerns linked with purchasing considerations beyond price. They defined a socially responsible consumer as 'one who sees in their consumption the opportunity to conserve the environment and the quality of life in society in a particular, local context' (p. 289). They noted that most studies are strongly influenced by an economic perspective, centred on demand and terms of exchange in the purchasing of products and services.

In taking a more social perspective on consumption, we have adapted our responsible food consumption concept from Alan Warde's (2005) definition of consumption. Thus, responsible food consumers consciously appreciate and appropriate patterns of production, distribution, use, and recycling of food goods and services, which they render more sustainable. Such responsible consumers are interested in knowing where food comes from, the way in which it was produced, the working relationships involved, and the political and environmental implications of their form of consumption in society at large (Antil, 1984; Newholm & Shaw, 2007; Dueñas et al., 2014). Here, we add the efforts of consumers to self-organize around ethical values and morals of consumption, and to exert political influence at any stage of the process. Such is the notion of 'co-producer', 'a consumer who knows and understands problems of food production' (Carlos Petrini in Beccaria, 2016).

Focusing on responsible consumption in food systems, Heinisch (2016) emphasizes the importance of considering sustainability in the entire set of relationships across the life cycle of food. A food system consists of all the elements (environment, people, inputs, processes, infrastructures, institutions, etc.) and activities that relate to the production, processing, distribution, preparation and consumption of food, disposal of food waste, and the outcomes of these activities, namely nutrition and health status, socio-economic growth, and equity and environmental sustainability (HLPE, 2014). Research on responsible food consumption is scarce, but 'responsible' is often used interchangeably with 'sustainable' when studying food consumption from this perspective. Sustainable diets, as they have been defined and studied, mainly explore the relationships between eating behaviours, health, and environmental impact indicators (Mertens et al., 2016). In normative terms, sustainable diets are protective and respectful of biodiversity and ecosystems; culturally acceptable and accessible; economically fair and affordable; nutritionally adequate, safe, and healthy; while optimizing use of natural and human resources (Burlingame & Dernini, 2012). Agroecological production refers to limited use of external inputs, natural resources conservation, equity and social justice, limited geographic distances (local), appropriate to seasonal availability, and healthy for people and ecosystems (Blay-Palmer, 2006; FAO, 2010, 2018; Lang & Heasman, 2015). Responsible consumption should be oriented towards the broader goal of satisfying the food needs of the entire population of a region in an equitable way, one which maintains the ecological integrity of agroecosystems and the health of the population (Fraňková & Haas, 2017).

The complexity of the concept of responsible consumption has meant that different researchers have included different dimensions in quantitative instruments. In practice, any one approach to measurement cannot capture all relevant aspects of responsible consumption (Lecompte, 2005), rather there should be efforts to adapt them to particular contexts and needs. In the geographic and cultural context of Ecuador, and according to exploratory

ethnographic studies with families in Quito (Maas, 2017), we decided to include three dimensions:

1) Direct purchase from producers, as an indicator of contribution to the local community and to smallholder farmers' economy.
2) Preference for agroecological products, as an indicator of a preference for more sustainable ways of food production.
3) Consumption of Andean grains, as an indicator of appreciation of local gastronomic culture.

Dimension One: direct purchase from producers

For the direct purchase from producers, we consider the locations and forms of procuring foods. As smallholder farmers are the most common type of farmers in Ecuador and they primarily produce diverse products for national consumption (MAGAP, 2016), responsible food consumption must consider the sustainability of their livelihoods. Unfortunately, large chains of intermediaries impact smallholders' livelihoods (Chauveau & Taipe, 2012), hence direct purchase from producers demonstrates a sense of co-responsibility for smallholders' well-being among consumers. Face-to-face meeting of producers and consumers generates a greater sense of solidarity, based on fair prices, increasing the incomes of smallholder producers. Acquiring foods directly promotes virtuous spirals of relationships that have been well documented as short circuits of food commercialization (González et al., 2012; CEPAL, 2014; Craviotti & Soleno Wilches, 2015; Contreras et al., 2018), alternative circuits of commercialization (Chauveau & Taipe, 2012), or local agrifood systems (Cerdán, 2014). Hence, various forms of consumer food procurement can bolster community economies: through direct purchase from farmers, at farmers' markets or fairs; through food baskets, as in community supported agriculture; or via meals in restaurants which buy directly from smallholder producers.

Dimension Two: preference for agroecological products

Dimension Two reflects concern about the way foods are produced. In Ecuador, agrarian reform and agricultural modernization efforts in the 1970s undermined existing knowledge and diverse production practices through the intense promotion of mechanization and synthetic agrochemical inputs and fewer crop varieties (Suquilanda, 2006) leading to erosion, declines in soil quality, and adverse human health impacts (Cole et al., 2007; Sherwood, 2009; Paredes, 2010). To address these challenges, more ecological production practices have been promoted (Fundación Heifer, 2014), including agroecology. Agroecology is based on ecological principles such as the conservation of spatial and temporal biodiversity, sustainable management of soils, recycling of nutrients, use of sustainable energy inputs,

and biological control of pest populations (Altieri, 1999; Gliessman, 2007; Sarandón & Flores, 2014). Purchase of agroecological foods fosters both sustainable agrifood systems and environmental balance (FAO, 2018). Hence, consumer purchases of agroecological products is valued in this dimension.

Dimension Three: consumption of Andean grains

Dimension Three is represented by an indicator of consumption of three highly nutritious Andean grains: quinoa (*Chenopodium quinoa*), amaranth (*Amaranthus caudatus*), and chocho (*Lupinus mutabilis*). These three crops have been cultivated for millennia in the Andes with several varieties adapted to zones with depleted soils and limited water availability (Peralta et al., 2012). Quinoa and amaranth have higher protein and lower carbohydrate content than grains such as rice and wheat, which have become more common in the Ecuadorian diet (Jacobsen & Sherwood, 2002; Freire et al., 2013). Chocho provides essential fatty acids, approximately 22 per cent by dry weight (Villacrés et al., 2010). Hence, all three grains can contribute to healthy diets and address both under- and over-nutrition in the Ecuadorian population, support production by smallholder farm families, avoid their disappearance in local production, and promote cultural heritage and traditional cuisine (Unigarro Solarte, 2010; Ministerio de Cultura y Patrimonio, 2013).

Empirical approach

Questionnaire design and surveying

We designed a household questionnaire to capture the different dimensions of responsible consumption described above. Exploratory ethnographic work provided an opportunity to adapt the questions to the understandings and context of households in Quito (Maas, 2017; see also Chapter 7, this volume). The questionnaire as a whole consisted of 78 questions, which also addressed topics other than responsible consumption: ten questions about general household characteristics, 22 questions about household food acquisition practices, and 36 questions about individual dietary practices and knowledge. Interviewers were trained by the lead authors in two-day workshops, followed by one day of practice interviews. The training included how to select the respondents within the selected households, how to ask each question, and how to record the data on Android tablets. For all data collection, interviewers used Android tablets with a pre-coded interview guide that was constructed using ODK (https://opendatakit.org/). The latter obviates a separate data entry step and permits daily monitoring of incoming data as soon as data are uploaded to a cloud-based server.

In each of the three study counties, a two-staged, random sample of households was selected to represent both urban (64–74 per cent) and rural (26–36 per cent) populations. First, census sectors, subdivisions of counties defined by the Ecuadorian National Institute of Statistics and Censuses (INEC), were selected randomly. Within each *manzana* (roughly translates to 'neighbourhood') of the chosen census sector, ten dwellings were chosen randomly. As necessary in multi-household dwellings, one household was chosen randomly within that dwelling. Within each household, we explained the project objectives, sought written consent (authorized by the Bioethics Committee of the San Francisco University of Quito), and interviewed two people: a principal adult respondent who answered questions on food provision in the household, and a second adult respondent of the opposite sex. When there was more than one eligible principal or second adult, we randomized by selecting the one with the most recent birthday. Response proportions were high: Ibarra (1282/1475, 87 per cent), Quito (775/860, 90 per cent), Riobamba (858/896, 96 per cent).

For surveys in agroecological locations, the same team of interviewers visited agroecological fairs, markets, stores, and food basket distribution points. Interviewers approached shoppers as they were exiting after their purchases. They explained the study and, when consent was obtained, conducted the interview immediately, except for a few cases where arrangements were made to visit the shopper later in their homes. After the completion of a survey, the interviewers would repeat the process, approaching the next shopper who had completed shopping. The number of agroecological locations was greater in Quito (37) and Riobamba (11) than in Ibarra (6), resulting in larger numbers of respondents in the first two counties (551, 299, and 48 respectively).

Variable and index construction

For each variable, more points are indicative of responses more positively reflective of that dimension (see Table 10.1).

For each household, the scores for each dimension's variable were reduced to the same range of 0 to 3. The variables that make up the dimensions are on an ordinal scale, going from the absence of the characteristic to a significant presence (for example, zero consumption of Andean grains, to at least seven times per month). The determination of scales from 0 to 3 was carried out through a validation in an expert consultation (consensual validity) (Kaplan et al., 1976; Roberts et al., 2006). Developing a common four-point scale across the three dimensions allowed us to standardize the value of the indicators and compare the dimensions for each population subgroup directly (as recommended by Sarandón & Flores, 2014).

The three dimensions were combined into the RCI with different weightings. Our assignation of weights was guided by both the Ecuadorian Andean context and prevalence observed in our surveyed population. As

Table 10.1 Component dimensions of the Responsible Consumption Index (RCI): variables and scoring system

Dimension	*Variable*	*Responses considered part of Responsible Consumption*	*Scoring system*	
			Options	*Score*
1. Direct purchase from producers	Places of food procurement	Direct purchase from producer, purchase at farmers' market, fair, or food basket, grows own, or purchases at agroecological restaurant	If these procurement options are:	
			Important	3
			moderate	2
			minor	1
			rarely or never	0
2. Preference for agroecological produce	Production approach for foods procured	Procured foods produced using agroecological methods	If the procured foods were produced using agroecology methods:	
			Important	3
			moderate	2
			minor	1
			rarely or never	0
3. Consumption of Andean grains	Consumption of Andean grains	Consumption of each of quinoa, amaranth, and chocho	Times per month	
			≥7	3
			5–6	2
			2–4	1
			≤1	0

smallholder family farms provide the majority of national production, but links between urban and rural areas need strengthening in order to promote both food security and access to healthier foods, we allocated the greatest weight to Dimension One (42 per cent). Given the impact of agroecological food production on the environment, as well as on human health, we assigned the second largest weight to Dimension Two (33 per cent). Only 19 per cent of respondents consumed Andean grains more than three times per month, so we assigned a lower weight of 25 per cent for Dimension Three. A household's RCI was then calculated as:

RCI = Dimension 1 score x 0.42 + Dimension 2 score x 0.33 + Dimension 3 score x 0.25

Given skewed distributions, rank correlations were calculated among dimensions and the RCI.

RCI relationships with nutrition relevant practice indicators

Fruit and vegetable consumption was dichotomized into daily versus not. For active control of table salt in the diet, a score was constructed by allocating one point to each control strategy among: (1) minimize consumption of processed foods; (2) and (3) examine food labels for table salt; (4) do not add salt at the table; (5) and (6) buy foods low in table salt; (7) and (8) add little/no salt when cooking; (9) use other spices instead of salt when cooking; and (10) avoid eating away from home. Summed, the salt control practices score could range between 0 and 10.

Comparisons of measures of central tendency of the RCI and of these nutrition-relevant practice indicators were carried out across samples and counties using non-parametric tests of inference: Wilcoxon-Mann-Whitney test for the dichotomous fruit and vegetable consumption; and Spearman correlations for RCI and salt control.

Results

Dimension distribution across different counties and samples

The descriptive statistics on the dimensions are set out in Table 10.2. Direct purchase from producers (Dimension One) and preference for agroecological produce (Dimension Two) have significantly higher scores for consumers from agroecological fairs than in the general population. For both dimensions, Quito has the highest score among consumers of agroecological fairs, while Riobamba has the highest score among consumers of the general population.

For each dimension and for RCI: lower case superscripts with same letter indicate equivalence across the three counties, within the same sample type (random sample of households and fair sample); UPPER CASE superscripts with same letter indicate equivalence across sample type (random sample of households and fair sample), within the same canton.

For consumption of Andean grains (Dimension Three), the population attending agroecological fairs also had a higher average consumption of traditional Andean foods than the randomly selected general population. Quito had the highest score among consumers of agroecological fairs, while Ibarra had the highest score among consumers of the general population.

Table 10.3 presents the rank correlations between the RCI and the three dimensions that make up the index, differentiated by sample. All correlations are significant ($p<.0001$) with the exception of Dimension One (D1) versus Dimension Three (D3) in the fairs sample ($p=0.51$). This is expected since Dimension Two (D2), purchases in agroecological fairs, is usually linked to direct purchasing from farmers (D1), while Andean grain consumption (D3) is not necessarily conditioned on direct or agroecological purchases.

Table 10.2 Descriptive statistics of three dimensions* and overall RCI, by sample type and county

Dimension		*Random*			*Agroecological Fairs*		
		Ibarra (n=1284)	*Quito (n=769)*	*Riobamba (n=861)*	*Ibarra (n=48)*	*Quito (n=551)*	*Riobamba (n=299)*
1– Direct purchase from producers	Mean (SD)	1.26 (0.17)^{aA}	1.08 (0.19)^{bA}	1.27 (0.28)^{cA}	1.42 (0.21)^{aB}	1.52 (0.29)^{bB}	1.42 (0.20)^{aB}
	Median	1.24	1.06	1.29	1.47	1.53	1.41
	(Min–Max)	(0.65–1.76)	(0.47–2.06)	(0.35–2.18)	(1.06–2.12)	(0.82–2.53)	(0.76–2.00)
2 – Preference for agroecological produce	Mean (SD)	0.13 (0.46)^{aA}	0.18 (0.60)^{aA}	0.30 (0.81)^{bA}	1.81 (1.02)^{aB}	2.34 (0.86)^{bB}	2.24 (0.92)^{bB}
	Median	0.00	0.00	0.00	2.00	3.00	2.00
	(Min–Max)	(0.00–3.00)	(0.00–3.00)	(0.00–3.00)	(0.00–3.00)	(0.00–3.00)	(0.00–3.00)
3 – Consumption of Andean grains	Mean (SD)	0.70 (0.50)^{aA}	0.55 (0.45)^{bA}	0.47 (0.29)^{cA}	0.86 (0.57)^{aB}	1.15 (0.73)^{bB}	0.57 (0.28)^{cB}
	Median	0.75	0.50	0.50	0.75	1.00	0.50
	(Min–Max)	(0.00–2.75)	(0.00–2.75)	(0.00–2.00)	(0.25–3.00)	(0.00–3.00)	(0.00–2.25)
Responsible Consumption Index (RCI)	Mean (SD)	0.75 (0.22)^{aA}	0.65 (0.28)^{bA}	0.75 (0.33)^{cA}	1.41 (0.42)^{aB}	1.70 (0.46)^{bB}	1.48 (0.33)^{aB}
	Median	0.71	0.58	0.67	1.41	1.78	1.56
	(Min-Max)	(0.37–2.03)	(0.25–2.01)	(0.17–1.94)	(0.59–2.38)	(0.43–2.53)	(0.51–2.12)

*standardized across different dimensions to a range of 0 (low) to 3 (high), but not according to sampling weights.

Table 10.3 The Rank correlation between the RCI and the three dimensions that make up the index

Spearman correlation coefficients				
	RCI	*D1*	*D2*	*D3*
RCI		*0.67*	*0.80*	*0.59*
D1 (Direct purchase)	*0.61*		*0.44*	*0.16*
D2 (Agroecological preference)	*0.52*	*0.15*		*0.25*
D3 (Andean grains)	*0.63*	*0.01*	*0.075*	

Note: The values above the diagonal are for the random household sample (n=2914). The values below the diagonal are for the sample recruited at agroecological fairs (n=898). All correlations are significant (p<.0001) with the exception of D1 vs D3 in the fairs sample (p=0.51).

Given the correlations, a similar pattern was observed, with distributions in all three cities further to the right (higher) among those attending agroecological fairs than the general population (see Figure 10.1).

RCI relationships with nutrition relevant practices

Marked heterogeneity was observed in fruit and vegetable consumption across counties and samples (see column cell percentages in Table 10.4). Those buying food at agroecological fairs on average were more likely to report daily consumption of fruits and vegetables compared to the randomly selected population (higher column percentages in lower row). Although generally those households reporting daily fruit and vegetable consumption had higher RCI scores, exceptions occurred (e.g. Ibarra agroecological fairs' sample). (Within each column † versus ‡ indicates different values across Fruit & Vegetable strata (No vs Yes, within columns). Within each Fruit & Vegetable strata (No row and Yes row): lower case superscripts with same letter indicate equivalence across the three counties, within the same sample type (random sample of households and fair sample); UPPER CASE superscripts with same letter indicate equivalence across sample type (random sample of households and fair sample), within the same canton. All comparisons were made with the non-parametric Wilcoxon-Mann-Whitney test.)

All counties and samples presented very low mean and median scores (less than 1 out of 10) on active control of table salt in the diet. While there were some significant differences (see Table 10.5), the scores were very low in both random and fair samples. The correlation between regular active control over table salt with the RCI scores was also low (from 0.07 to 0.19). The scores for actively control table salt in the diet are between 0 to 10 according to control strategies: (1) minimize consumption of processed

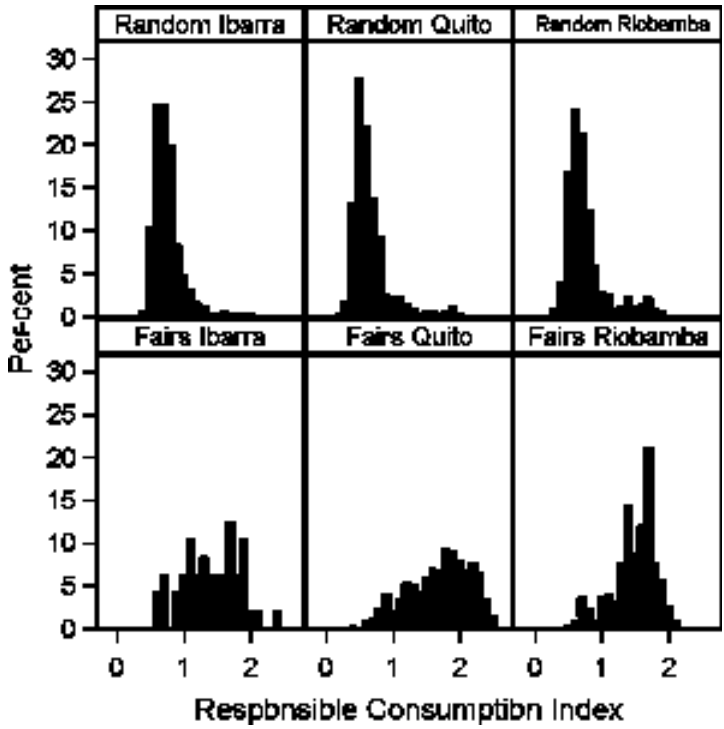

Figure 10.1 Distributions* of RCI by sample type (rows) and county (columns).
* Per cent of sample used to take into account weighting for random samples of households.

foods, (2) and (3) examine food labels for salt/sodium, (4) do not add salt at the table, (5) and (6) buy foods low in salt/sodium, (7) and (8) add little/no salt when cooking, (9) use other spices instead of salt when cooking, (10) avoid eating away from home. (Within the same sample type (random sample of households or fair sample) lower case superscripts with same letter indicate equivalence across the three counties; UPPER CASE superscripts with same letter indicate equivalence across sample type (random sample of households and fair sample), within the same county. All comparisons were made with the non-parametric Wilcoxon-Mann-Whitney test.)

Discussion and implications

Overall, the results show that food environments of each county have influenced engagement in responsible consumption and decisions on healthy

Table 10.4 RCI distributions* by fruit and vegetable consumption category, sample and county

		Random			*Agroecological Fairs*		
Fruit & Vegetables Daily		*Ibarra (n=1284)*	*Quito (n=769)*	*Riobamba (n=861)*	*Ibarra (n=48)*	*Quito (n=551)*	*Riobamba (n=299)*
No	Mean (SD)	0.72 (0.20)^{aA†}	0.61 (0.24)^{bA†}	0.73 (0.32)^{cA†}	1.54 (0.38)^{aB†}	1.62 (0.47)^{aB†}	1.48 (0.31)^{abB†}
	Median	0.68	0.57	0.66	1.61	1.71	1.56
	(Min-Max)	(0.37–1.91)	(0.25–1.92)	(0.17–1.94)	(0.74–2.07)	(0.66–2.43)	(0.51–2.08)
	% of column	56.5	46.7	83.8	37.5	22.1	80.6
Yes	Mean (SD)	0.79 (0.29)^{aA‡}	0.69 (0.30)^{bA‡}	0.87 (0.63)^{aA‡}	1.34 (0.43)^{aB†}	1.72 (0.45)^{bB‡}	1.49 (0.39)^{aB†}
	Median	0.74	0.61	0.78	1.25	1.80	1.56
	(Min-Max)	(0.40–2.03)	(0.25–2.01)	(0.42–1.85)	(0.59–2.38)	(0.43–2.53)	(0.71–2.12)
	% of column	43.5	53.3	16.2	62.5	77.9	19.4

* adjusted according to sampling weights.

Table 10.5 Summary statistics* of table salt control practice scores by sample and county, and correlations between table salt scores and RCI

	Random			*Agroecological fairs*		
	Ibarra	*Quito*	*Riobamba*	*Ibarra*	*Quito*	*Riobamba*
Salt control practices						
Mean (Std)	0.32 (0.62)^{aA}	0.68 (0.91)^{bA}	0.59 (1.23)^{aA}	0.46 (0.65)^{aA}	0.74 (0.98)^{aA}	0.87 (1.40)^{aB}
Median	0.00	0.00	0.00	0.00	0.00	0.00
(Min–Max)	(0–3)	(0–6)	(0–6)	(0–2)	(0–5)	(0–6)
Correlation between salt control practices and RCI						
Spearman correlation	0.07	0.15	0.07	0.13	0.14	0.19
p	0.008	<.0001	0.04	0.39	0.001	0.001
n	1284	769	861	48	551	299

*adjusted according to sampling weights.

food among their population. Here we explore some of the potential reasons for this heterogeneity across counties.

The higher RCI scores for households in Riobamba were driven by the higher scores for Dimensions One (direct purchase from producers) and Two (preference for agroecological produce). The higher value for Dimension Two in Riobamba is consistent with the higher proportion of open markets per capita in Riobamba, where there is 1 open market space per 5,641 families, compared to 1 per 8,111 in Ibarra, and 1 per 19,417 in Quito (Ekomer, 2017).

However, in the group sampled at agroecological fairs, Quito had the highest value for the three dimensions. This likely reflects the strong awareness-raising process of the '250 thousand families', a citizens' campaign (www.quericoes.org) which promotes practices of responsible food consumption, focussing on populations involved in agroecological production and direct markets. This might also explain why a higher percentage of consumers in fairs in Quito also consume fruits and vegetables.

Some of the differences observed between the random sample and the fairs sample are due to the nature of the variables considered for Dimensions One and Two. Indeed, as direct and agroecological purchasing sites are often the same, it is expected that consumers sampled in agroecological fairs would obtain a higher score for these dimensions and that they should be more highly correlated. That this is the case is partial validation of the dimensions and RCI.

For Dimension Three, on Andean grains, the Ibarra random sample had a higher score than the other counties. This finding is consistent with Ibarra being a centre of quinoa (Subsecretaría de Agricultura, 2015) and chocho (Peralta, 2016) production, likely influencing consumption among the general population. Nevertheless, agroecological fairs seem to be an effective way of influencing Andean grains consumption, as shown by the high score found in the Quito fairs sample.

Practices aimed at regularly and actively controlling table salt in the diet were uncommon in all counties and both samples, making this potential link between responsible consumption and a nutritionally relevant practice hard to make (with low rank correlations). The positive association between responsible food consumption and (some aspects of) the quality of the diet (that is, fruit and vegetable consumption, but not salt control) is intriguing. Does practising responsible consumption lead to greater fruit and vegetable consumption (perhaps by directing the shoppers to markets where fruits and vegetables are sold)? Or do health concerns increase the pursuit of fruit and vegetables and lead consumers to agroecological markets, which increases the RCI? Whatever the nature of the relationship, it may be expected that if food consumption in Ecuador becomes more 'responsible', it would also become consistent with public health promotion of fruit and vegetable consumption.

Conclusions and further research

The RCI represents a valuable tool for characterizing different city region populations and their food procurement and consumption patterns (see also Chapters 9 & 11, this volume). The RCI was also useful for establishing a concrete relationship between a more general consumption pattern and some specific behaviour in another domain, such as the consumption of fruits and vegetables. From a methodological perspective, despite the limitations of the RCI, its potential to compare patterns of food consumption with other environmental, economic, social, health, demographic, or other variables opens up a range of possibilities for the study of responsible consumption. The RCI represents both a relatively quick assessment tool and a starting point for further quantitative and qualitative research.

On the other hand, the nature of the quantitative data did not tap into consumer's intentions behind their responsible consumption practices. It may be that a consumer intends to consume responsibly, but does not demonstrate practices that contribute to a sustainable food system. Several barriers (e.g. physical, economic, temporal or cognitive) can explain this gap between intentions and behaviours, including the role of accepted sets of practices, termed by Lahlou (2018) as 'installations'. Conversely, a consumer who contributes to a sustainable food system through his practices may not necessarily be intentional, where the concept of responsible consumption implies a certain awareness, and active choices. Food consumption patterns are motivated by multiple factors and the intention to consume responsibly may not be the one that has motivated a practice that contributes to a sustainable food system. It may be because of the organoleptic qualities of food, the proximity of markets, the incentives of a given public policy, or other reasons. Studies evaluating consumer intentions or combining questions about intentions with observations on actual practices would help to inform the conceptualization and operationalization of responsible food consumption.

The RCI could be useful for testing how the food environment influences food consumption patterns. Shoppers at agroecological fairs tended to have higher responsible consumption indexes. In terms of public policy, this suggests that agroecological markets should be promoted and supported to give more consumers the opportunity to choose responsibly for their food system. Citizens can influence their food environment through campaigns and organizations that promote the creation of neighbourhood, open and agroecological markets, as was shown by the data on Quito. Further applications of the RCI in different contexts may elucidate other patterns and explore different opportunities to understand responsible consumption's contribution to sustainable food systems and better health.

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Note

1 BMI, Body Mass Index, is calculated as weight (in kg) divided by the square of height (in m). A BMI of 25 to 30 is considered overweight, and a BMI over 30 is considered obese. Available at: http://www.who.int/en/news-room/fact-sheets/detail/obesity-and-overweight. Accessed 22 October 2018.

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11 Integrating upstream determinants and downstream food metrics

Nevin Cohen

Introduction

Planners acknowledge that urban food systems should be measured and managed as complex, adaptive systems, interconnected sets of dynamic social, physical, economic, and cultural phenomena (Meter, 2010; see also Chapters 1, 4, & 12, this volume). A recent review identified 260 distinct food system indicators included in the food strategies and plans of five North American cities: New York, Philadelphia, Los Angeles, Chicago, and Toronto (Coppo et al., 2017; Ilieva, 2017). NGOs and governments have also developed multidimensional indicators to track food system governance, diet-related public health outcomes, and the environmental impacts of urban food systems (Prosperi et al., 2015; Milan Urban Food Policy Pact, 2017; see also Chapter 7, this volume). Despite efforts to incorporate food metrics that measure the root causes of downstream food system outcomes in food plans, such as poverty and discrimination, development pressures, or labour exploitation, these remain exceptions, not the norm. More typically, cities collect a narrower range of metrics to manage their food systems that are oriented to downstream outcomes. Variables like food infrastructure (e.g., the distribution of food retailers), programme outputs (e.g., participation in public feeding programmes), population dietary practices (e.g., fruit and vegetable consumption and obesity prevalence), agency adherence to food policies (e.g., compliance with nutritional standards) are commonly tracked.

The disconnect between upstream determinants of the food system and downstream policies and programmes is certainly not unique to food policy. In the field of public health, for example, practitioners typically design interventions to change individual behaviours rather than addressing the upstream social determinants of those behaviours, like poverty, housing affordability, education, or environmental conditions (Freudenberg et al., 2015). The obstacles to integrating the upstream and downstream in food planning are conceptual, pragmatic, and political. The causal links between upstream determinants and downstream outcomes of the food system are long and complex, involving multiple intervening and interacting

factors, making indicator development difficult (Braveman et al., 2011). Emphasizing the complexities of the food system can make it seem more difficult to frame solutions, and thus harder to rally support behind new initiatives, though Meter (Chapter 4, this volume) argues that taking complexity into account can actually facilitate consensus. The lack of adequate resources is a pragmatic constraint that prevents cities from tracking data on the social and economic variables that affect the food system, especially if there is only a modest budget for food systems planning and no mandate for city agencies to track these metrics. Other pragmatic factors include: professional traditions in fields like health and planning that focus staff on downstream interventions; the demand for short-term, measurable changes by administrations that favour quick results; silos among government officials, advocates, researchers, and funders that make data sharing difficult; and what Libman (2015) describes as a 'local trap' that emphasizes interventions within smaller rather than larger geographies. City officials may also be reluctant to draw attention to the politically fraught, 'wicked' problems (Rittel & Webber, 1973) of racial, class, or gender oppression, preferring to measure more discrete intervention outcomes, preferably those that demonstrate success, not failure. Finally, though food can be an effective way to teach about and address systemic inequities (Reynolds & Cohen, 2016), NGOs grappling with issues like immigrant rights, housing access, or fair labour practices may not recognize the potential benefits of framing their political strategies in the context of food.

Failing to integrate upstream determinants of food systems in the indicators used to manage urban food systems can affect food planning and policy development in several ways. As socially constructed representations of reality, metrics drive decision-making by their ability to frame problems, privilege certain analytical methods, and thus exclude potential solutions (Barrett, 2010; Sébastien & Bauler, 2013). They shape policies by reinforcing or contradicting established positions, suggesting positive or negative trends, and motivating or discouraging stakeholder involvement in policymaking (Hezri & Dovers, 2006). The process of identifying appropriate metrics and analysing their meanings can therefore facilitate shared understandings of problems and desired changes by engaging different actors, or present a limited or distorted view of reality, thus excluding stakeholders by constraining measurement to specific outcomes (Innes, 1990). Omitting upstream indicators like poverty or discrimination from food planning also elevates the importance of measured downstream interventions, like supermarket density, potentially diverting attention from, and quelling demands for, more radical social and political reforms like raising the minimum wage or capping commercial rents (Rosenberg & Cohen, 2017). Tracking only the downstream outputs of food programmes, like the number and productivity of urban farms, can mask the roles such programmes play in addressing upstream issues like governance within the food system, and by doing so minimize their transformative potential and dampen political and financial

support for these projects (Reynolds & Cohen, 2016). Documenting food policy outcomes that address upstream determinants, like poverty reduction or increased social cohesion, can strengthen the case for such policies.

This chapter discusses the benefits of integrating upstream and downstream food metrics by illustrating how integration can focus policymaking on the root causes of three politically salient food policy problems in New York City: food insecurity among immigrants, unhealthy neighbourhood food environments, and poor labour conditions faced by food workers. Following a brief review of food metrics development in New York City, the chapter discusses how measuring upstream determinants of each issue can facilitate the design of more effective food policies and better equip food advocates with an understanding of the structural problems they need to solve. The chapter concludes with strategies that planners can use to more effectively and efficiently collect upstream metrics and integrate them into food planning (see Chapter 12, this volume).

The emergence of NYC food metrics

Cities in the Global North have collected data on food production and distribution since their founding, but surveillance of the food system, from adulteration and safety to food distribution infrastructure mapping, increased with the emergence of municipal planning and public health departments at the turn of the last century (Vitiello & Brinkley, 2014). But until the past few decades, and the proliferation of distinct food system plans, municipal agencies had not developed and collected urban food metrics systematically (Coppo et al., 2017; Ilieva, 2017). In New York City, for example, food metrics had not been aggregated and presented cohesively until the start of annual food metrics reporting in 2011 (Freudenberg et al., 2018). City agencies in charge of Health, Sanitation, Parks, Economic Development, and other agencies had published data for many years about the food programmes under their jurisdictions, such as the quantity of discarded organic material disposed of by the Sanitation Department, yet those metrics had never been compiled as food system indicators until food gained recognition as an urban system in need of planning, measuring, and managing.

The New York City Council's 2010 release of FoodWorks, a comprehensive food systems strategy, provided the impetus for tracking food metrics, as it was followed by the enactment of three local laws to require the city to collect and report food system data (Cohen, 2011). The metrics mandated by the City Council reflected food planning objectives of different advocates. One bill required the agency in charge of city property to publish a list of all city-owned vacant parcels with an assessment of their suitability to grow food, responding to urban agriculture proponents who wanted to expand food production.[1] Advocates for using the city's food purchasing power to support regional agriculture enabled enactment of a second bill requiring an annual report of New York State-produced food procured by city agencies.[2]

The third food metrics bill was designed to measure progress towards multiple objectives in the City Council's FoodWorks plan, requiring reporting of 37 indicators (subsequently amended to add food insecurity metrics) of food-related activities under the jurisdiction of different city agencies (New York City Council, 2013).[3] In determining the scope of the food metrics legislation, the Administration and City Council negotiated which data was deemed useful for food planning and feasible for existing staff to collect without significant additional resources (Campbell, 2016). The Office of Food Policy compiles metrics from different agencies and publishes them in an annual report.

The food metrics mostly (21 of 37 metrics) measure nutritional health, which was the focus of the Bloomberg administration and an area fully within the purview of the Department of Health and Mental Hygiene (DOHMH). The remaining metrics report on food insecurity (n=4), food-related economic development (n=3), food system environmental impacts (n=8), and the number of food workers trained by the city (n=1) (Freudenberg et al., 2018). An analysis of the values of each metric between the first food metrics report issued in 2012 and the report issued in 2017 showed varied changes in indicator outcomes. Between 2012 and 2017, 19 indicators showed improvements, 15 showed declines, one didn't change, and two were not able to be assessed. For example, the percentage of New York City residents reporting food insecurity fell by 14 per cent during this period, while the number of permits for Green Cart vendors who sell produce from mobile carts in low-income neighbourhoods declined by 37 per cent (Freudenberg et al., 2018; Freudenberg et al., 2018a).

In addition to the metrics published in the city's annual food metrics reports, many other New York City agencies collect and report data on the food system that are relevant to their missions, but these are disseminated through multiple agency websites and documents. For example, the DOHMH tracks prevalence of non-communicable diet-related diseases and publishes the results of restaurant and school cafeteria inspections. The Human Resources Administration estimates the percentage of those eligible who participate in the federal Supplemental Nutrition Assistance Program (SNAP), which provides supplemental money to buy food. The Department of Sanitation collects and reports on food waste management. Still other agencies that address land use (e.g., Department of City Planning), economic development (e.g., Economic Development Corporation), and neighbourhood redevelopment (e.g., Housing Preservation and Development) monitor and prepare reports on food distribution, manufacturing, and retail.

Moving upstream

The data presented in the city's annual food metrics report, along with the additional food system metrics compiled by independent agencies, address downstream outcomes of the food system, like dietary changes or

programme results such as the value of New York food products procured by city agencies. Integrating upstream and downstream factors can provide a more complete picture of the factors influencing food policies and their outcomes, as illustrated by three examples from New York City: the effects of federal immigration policies on participation in SNAP within immigrant communities; real estate development pressures and neighbourhood food environments; and labour policies that affect the well-being of food workers.

Food insecurity among immigrant communities

To track progress in addressing food insecurity, New York City reports the number of people who indicate that in the previous year they faced insufficient access to food for an active, healthy life. In 2016, 1.22 million New Yorkers, 14.4 per cent of the population, reported being food insecure. The city also reports a related metric, an estimated annual 'meal gap' that indicates the number of meals foregone by households because of insufficient income. In 2016, New York City residents missed 207.7 million meals due to their inability to afford adequate food (New York City Mayor's Office of Food Policy, 2018). Reducing the percentage of city residents reporting food insecurity and the size of the meal gap are important policy goals. One strategy is ensuring that eligible New Yorkers participate in SNAP. The number of people participating in SNAP is an indicator of both the need for food assistance due to poverty and the help that New Yorkers receive through the programme to feed their households. The food metrics report presents the number of SNAP participants for the city, by Borough, and among older adults (New York City Mayor's Office of Food Policy, 2018).

Between 2012 and 2016, the annual SNAP participation rate declined by 7.3 per cent, although nearly 20 per cent of the city's population still receive SNAP benefits (Hunger Free America & CUNY Urban Food Policy Institute, 2018). The overall decline is primarily correlated with the city's economic recovery from the Great Recession of 2007–2008 and a reduction in poverty and unemployment, but also reflects decisions by those eligible for SNAP not to apply or to leave the programme. In addition to understanding the upstream factors that cause a large percentage of New York City's population to be poor enough to qualify for SNAP, understanding the factors that inhibit or encourage people to apply for SNAP is key to designing interventions that increase participation and thus improve food security among those in need of supplemental financial support.

A study of SNAP caseload data during this period of decreasing participation found significant variation in total and per capita SNAP participation from neighbourhood to neighbourhood, with participation in some communities dropping by 28 per cent and others growing by 8 per cent (Hunger Free America & CUNY Urban Food Policy Institute, 2018). These differences indicated the need for closer scrutiny of the upstream determinants that may