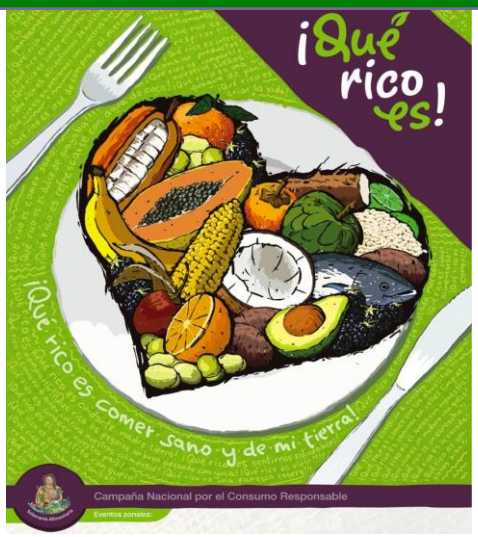
Understanding the city region (CRFS) food system: Planning for a more food secure and resilient city

City-region food systems
A literature review



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INTRODUCTION

The aim of this report is to briefly and concisely analyse and systematise the content, definitions and delimitations of the concept of City Region Food Systems on the basis of a review of literature, ongoing experiences and analysis of scientific and policy debates.

City Region Food Systems (CRFS) is a cutting-edge concept and related research methodology that is in the process of being more clearly refined[1]. RUAF Foundation, the FAO Food-for-the-Cities initiative and the Carasso Foundation are amongst the organisations that are at the forefront of this emerging field. As a new analytical lens it offers an integrated and multi-dimensional perspective on food's origins, how food is grown and the path it follows to our plates and beyond.

However, to valorise the potential of the city region food system approach and ensure that it obtains a place on policy agendas in the coming years, there is an urgent need to better systematise and operationalize the concept.

In order to understand both the scope and depth that this new approach offers, as well as the elaborate a further methodological document for the on-going CityFoodTools/Framework for City Region Food Systems Assessment, a literature review on city region food systems (or closely related concepts and methodologies) was undertaken.

As part of this process, it helps to understand that the CRFS-perspective is broad in scope in two ways. The first part of the framing is **spatial** in that the 'city region' actively challenges us to bridge the urban-rural spatial divide and connect the places where food is grown to the proximate places where food is consumed. It thus provides a territorial approach to food systems, linking a geographic space of analysis to a relevant geographic space of action for food related, but also other land use, resource management and climate change policies for example.

Second, an integrated **food system** lens is used covering all stages of food provisioning (production, harvesting, processing and distribution through to the point of retail, consumption, and food waste disposal) as well as different dimensions (social, economic, environmental, nutritional) of food systems in urban areas.

[1] FAO and partners (2014) City region food systems and sustainable urbanisation: a call for action; Conference at City Region Food systems and sustainable urbanization at the World Urban Forum, Medellin, Colombia http://www.fao.org/fileadmin/templates/FCIT/Meetings/WUF_7_City_Region_Food_Systems_2014_05_09_Call_to_Action.pdf

Combined, the challenge is to operationalize the complexity of a CRFS in a way that is feasible on the ground as we seek to gather and interpret data. Accepting the complex nature of this challenge, the CRFS concept is valuable as it has emerged at the nexus of both practice and theory. In this way it is evolving with input from both people on the ground working in community food initiatives as well as with input from policy-makers, regulators and academic researchers.

In the following literature review, a selected set of existing literature on research and experiences with city region food system assessment, scenario building and strategy development has been analysed. Similarly, an analysis is made on implemented scenario studies and methods used. Several underlying ideas and actions that underpin CRFS are reviewed briefly in the next section of this report. This review is followed by an overview and associated set of references that captures the diversity of reports related to CRFS work.

Apart from the reviewed literature, this report is also informed by the contributions of the International Expert Consultation Meeting for the project on *"Conceptualization and discussion on methodological approaches, data & information and tools",* that was held on 2-3 March 2015 in the FAO Headquarters in Rome. A separate meeting report is available, but when contributions from the expert consultation meeting are relevant for conceptual and methodological debates that emerge from the literature review these are taken into account in this report.

This on-going literature review was already used in elaboration of the following publications:

- The CRFS narrative, that was developed for the CityFoodTools project and the FAO "Framework for City-Region Food Systems Assessment" project, presents the CRFS concept in a short and accessible way. This narrative is now also available as booklet *entitled "City Region Food Systems - Building sustainable and resilient city-regions"* (2015, in English and soon in Spanish):
  http://www.fao.org/fileadmin/templates/agphome/documents/horticulture/crfs/UC_Booklet_Final_color_low.pdf

- The report *"Food in an urbanized world. The role of city-region food systems in resilience and sustainable development"* (2015), commissioned by the International Sustainability Unit of the Prince of Wales' Charitable Foundation and coordinated by 3Keel, to which RUAF and FAO-for-for-Cities made substantial contributions:
  http://www.fao.org/fileadmin/templates/agphome/documents/horticulture/crfs/foodurbanized.pdf

- Two issues of RUAF's Urban Agriculture Magazine, no.29 explicitly on *"City-Region Food Systems"* and no. 30 on *"Rural-urban linkages":*
  http://www.ruaf.org/sites/default/files/UAM29.pdf
  http://www.ruaf.org/sites/default/files/UAM30.pdf

The review will furthermore inform the development of a methodological guide on CRFS assessment that is currently being elaborated by the project team.

CITY REGION FOOD SYSTEM LITERATURE REVIEW

In the academic literature, forerunners to the City Region Food System approach have previously framed questions about how to consider food systems within some kind of regional context from several entry points. These include:

1. The foodshed
2. The bioregion, and
3. Place-making

The **foodshed** is a useful concept in considering the CRFS as it begins from the premise that the land and what it can grow defines the perimeters of a food region. This is helpful as it puts food at the centre of identifying what is possible and moves us away from the market considerations that dominate mainstream debates around food sourcing and supply chains. In essence it shifts us from value to values chains. Building on the work by Hedden from the 1920s and Getz in the early 1990s (Hedden, 1929; Getz, 1991), Kloppenberg describes a foodshed as *"streams of foodstuffs running into a particular locality, their flow mediated by the features of both natural and social geography"* (1996, p. 12). The concept of material flows between different places negotiated by both the physical world as well as by people and their cultures is central to the CRFS approach. Kloppenberg begins with Getz's simple question of *"Where is our food coming from and how is it getting to us?"* (1991: 26), but elaborates from there to include considerations of:

A. The moral economy and the need to embed food in human needs and ecologies and not the economy
B. Building community commensality so that social networks are revived and valued, and
C. Valuing place (see also work by Marsden et al. below).

The **bioregion** offers another entry point into how we could consider the CRFS. It is interesting to note that, to date, the bioregion concept has been applied in a fragmented way. So while it does not represent a dominant perspective in the larger literatures on food systems, it does offer an interpretation that is grounded in the physical landscapes in which people live. In the late 1970s Berg and Damsann (1977) described the bioregion as *referring "both to geographical terrain and a terrain of consciousness – to a place and the ideas that have developed about how to live in that place. Within a bioregion the conditions that influence life are similar and these in turn have influenced human occupancy."* (1977: 399) They go on to explain that the biophysical conditions include climate, physical landscape, flora and fauna and that these are a starting point to understanding the bioregion. However, within this biophysical realm the final boundaries *"are best described by the people who have long lived within it, through human recognition of the realities of living-in-place."* (1977:399)

In linking food to these analyses, Friedmann identified the bioregion as, *"…including the needs and capacities of the people who dwell there. In other words, food to nourish people and communities can only be linked to agriculture in harmony with nature, by means of chains of commerce and transformation located as much as possible within regions. A democratic food policy can reconstruct the diversity destroyed by the mono-cultural regions and transnational integration of the food regime. It is also about employment, land use, and cultural expression."* (1993: 55-56) This then stretches how we conceive of food and where it comes from through an integration of social, ecological, political and ecological factors.

Place-making is another key consideration in CRFS as it underscores the importance of particular characteristics of the places in which food systems are evolving. Consistent with the literature on the social economy and community economic development, we know that each place has its own unique set of assets to leverage and challenges to address as it evolves. Marsden (2012, 2013) points to specific considerations in this regard including: networks of actors and their markets, the ways in which spaces of accumulation and associated power are constituted, social capital and associated capacity for institutional innovation, strength of supportive policies at all scales for sustainable food systems (including waste management and associated green energy opportunities), and the capacity for scaling up.

These old conversations on concepts preceding CRFS are in recent years converging to be framed in new, more specific ways, particularly at the intersection of theory and practice. Sonnino, for example, describes the potential for planning, physical infrastructure such as food hubs, and governance models such as food policy councils to provide the needed physical and relational connections to transform regional food systems (Sonnino, 2014). The article by Forster et all. in RUAF Foundation (2015) underscores the relevance of a territorial approach to food systems by stating that " *In this context, a city region food system (CRFS) approach creates a critical lens for analysis, while at the same time supporting on the ground policy transformation and implementation. Urban and rural areas are often treated as separate sectors at a national and local level, and within different agencies on the international level. However, this distinction does not reflect realities on the ground where flows between rural and urban areas are constant and changing rapidly. Nor will this false dichotomy enable the needs of sustainable urbanisation and rural transformation to be met*".

The City Region Food System approach stands to make an important contribution towards enhancing food system resilience and sustainability as it takes what to date has been relatively scattered research and coheres these around a specific, but at the same time, flexible, research method. What follows next is an overview and annotation of various related research projects that are relevant from this perspective.

CITY REGION FOOD SYSTEM APPROACHES REVIEW

There are several different approaches that are relevant to understand the CRFS context. We have divided these into four categories: 1. Food system assessment; 2. Food planning approach; 3. Issues based approach; and, 4. Assessment tools. Each of these are described in turn below and followed by a list of relevant resources. While most of these reports could easily be attributed to more than one of the categories, they have been assigned to the most relevant section.

1) Food system assessment

When starting from a "food system assessment", there is the tendency to identify a wide range of different aspects of regional food systems and collect/analyze data for all of these. As Edwards-Jones and colleagues point out, a robust food system analysis depends on the analytical parameters and boundaries. On the basis of single indicators, for example GHG emissions, they suggest a comprehensive life-cycle analysis that allows for comparisons between local/regional food systems and global trade. However, they also acknowledge that other factors, including food quality and impacts on human health need to be integrated into the analysis.

An interesting example of this approach is the analysis that was conducted in the Greater Philadelphia area that applies a more regional, 100 mile food shed approach. See:

- DPVRC (2010) Greater Philadelphia Food System Assessment Study, Delaware Valley Regional Planning Commission, Philadelphia
- Kremer, P. and DeLiberty, T.L. (2011) Local food practices and growing potential: Mapping the case of Philadelphia, *Journal of Applied Geography* 1-10)

Other selected resources in this category include:

- Best Food Forward Ltd. (September 2012). City Limits: a resource flow and ecological footprint analysis of Greater London. Chartered Institute of Wastes Management Environmental Body. E-publication: www.citylimitslondon.com
- Blay-Palmer, A., Turner, J., & Korelsen, S. (2011). Quantifying food systems: Assessing sustainability in the Canadian context. In M. K. Editor, J. S. Editor & T. W. Editor (Eds.), *Critical perspectives in food studies* (pp. 337 - 358). Canada: Oxford University Press.
- Conner, D. S., Knudson, W. A., Hamm, M. W. and Peterson, H.C. (2008) The food system as an economic driver: Strategies and applications for Michigan, *Journal of Hunger and Environmental Nutrition* 3(4), 371-383
- Denny, G. M. (2012) Urban agriculture and seasonal food prints; an LCA study of tomato production and consumption in the UK, in: André Viljoen en Johannes S.C. Wiskerke, *Sustainable Food Planning; Evolving theory and practice*, Wageningen Academic Publishers, the Netherlands
- Drechsel, P., Graefe, S. and Fink, M. (2007) Rural-urban food, nutrient and virtual water flows in selected West African cities, IWMI research report 115, Colombo

- Enshayan, K. (2008). Community economic impact assessment for a multi-county local food system in Northeast Iowa. Leopold Center for Sustainable Agriculture. Iowa State University
- Gómez-Baggethun E. and Barton, D. (2013) Classifying and valuing ecosystem services for urban planning, *Ecological Economy 86,* 235-245
- Govender S. et al. (September 2006). Richmond food system assessment- Environmental scan and action plan. Coyne and associates Ltd. USA
- HCA-Harry Cummins and Associates Inc. (November 2005). Region of Waterloo food flow analysis study. Region of Waterloo Public Health.
- Hu, G., Boeckenstedt R., Wang L. and Wohlsdorft-Arendt, S. (2012) Mapping potential foodsheds in Iowa: A systems optimization modeling approach. Leopold Center for Sustainable Agriculture Ames, IA
- Low Carbon Oxford and Landshare (No date). Foodprinting Oxford-How to feed a city. City of Oxford, UK
- Lundy M., Gottret, M.V., Ostertag, C., Best, R., and Fertris, S. (2007) Participatory market chain analysis for smallholder producers, CIAT, Cali, Colombia
- Moragues, A., Morgan, K., Moschitz, H., Neimane, I., Nilsson, H., Pinto, M., Rohracher, H., Ruiz, R., Thuswald, M., Tisenkopfs, T., and Halliday, J. (2013) Urban Food Strategies: the rough guide to sustainable food systems. FP7-FOODLINKS project. Available at: http://www.foodlinkscommunity.net/fileadmin/documents_organicresearch/foodlinks/publications/Urban_food_strategies.pdf
- Peters, C.J., Bills, N.L., Lembo, A.J., Wilkins, J.L., and Fick, G.W. (2013) Mapping potential foodsheds in New York State by food group: An approach for prioritizing which foods to grow locally, *Renewable Agriculture and Food Systems* 27(2): 125-137.
- Pirog, R. and O'Hara J. (2013) Economic analysis of local and regional food systems; taking stock and looking ahead, MSU Centre for Regional Food Systems. Available at: http://foodsystems.msu.edu/uploads/files/econ-analysis-brief.pdf
- Region of Waterloo Public Health (2013). The economic development potential of the local food sector in Waterloo Region.
- Swenson, D. (2009) Investigating the Potential Economic Impacts of Local Foods for Southeast Iowa. Ames, IA: Leopold Center for Sustainable Agriculture
- Vermeulen, P. (2010) Towards an Amsterdam Food Strategy, Presentation held at Eating City Workshop, April 13, Rome, Italy. Available at: http://www.ecomeal.info/documents/eating_city_Amsterdam.pdf
- Xuerub M. (November 2005). Food miles: Environmental implications of food imports to Waterloo region. Region of Waterloo Public Health

2) Food planning approach

This approach is driven more by policy priorities, in particular planning, with a view to a healthier and increasingly sustainable development. Grounding policy based on participatory problem identification and choice of objectives and strategies has the advantage/disadvantage of little scientific research previous to planning making this approach more amenable to implementation by smaller and poorer cities. If indicators are

then selected for objective and easy measurement methods, it is possible to collect data for a time-series of years and adjust policies and strategies accordingly.

Some examples of how this translates into on-the-ground research include:

- **San Diego** In this case, objectives for a desirable urban food system were established, indicators determined based on the objectives, and then used to evaluate the existing situation. A key advantage of this method is that from the start there is a baseline and basis for monitoring of effects of formulated policies.
  - Ellsworth S. and G. Feenstra (2010). Assessing the San Diego County Food System: Indicators for a More Food Secure Future. http://asi.ucdavis.edu/resources/publications/sandiegoreport.pdf
- **Erie Country** This report has a methodological annex with explanation of methods per element of the analysis: production, consumption, distribution, waste management etcetera. Calgary eats follows the same methodology.
  - Conly B. et all (Fall 2011). Room at the Table-Food system assessment of Erie County. University at Buffalo-Department of Urban and Regional Planning, USA
  - City of Calgary (2012) Calgary Eats! A Food System Assessment and Action Plan for Calgary. http://www.calgary.ca/CA/cmo/Documents/CalgaryEATS!%20FULL%20Food%20System%20Assessment%20%20Action%20Plan%20for%20Calgary%20May2012.pdf
- **Manchester** This assessment starts from planning: the global situation is explored directly according to: which objectives/ criteria, identification of possible strategies (best practices) to realize objectives; ex ante assessment of these practices in relation to each criteria; recommendations for policy.
  - Small World Consulting (2013). Sustainable food in Manchester. Final Report. Lancaster University, UK

Other selected resources in this category:

- Calori A. et al (2015) Le 10 questioni della Food Policy di Milano. Estratto dall'analisi per la Consultazione Pubblica. Economia e Sostenibilità http://www.foodpolicymilano.org/wp-content/uploads/2015/04/10-QUESTIONI-DELLA-FOOD-POLICY-MILANO.pdf
- Carey J (2011). Who feeds Bristol? Towards a resilient food plan. Bristol City Council, UK, http://www.bristol.gov.uk/sites/default/files/documents/environment/environmental_health/Who-feeds-Bristol-report.pdf
- Christy E. et al. (2013). Local food systems in North America- A review of literature. Report prepared for the Ontario Ministry of Agriculture and Food
- Freedgood, J., Pierce-Quiñonez, M. and Meter, K.A. (2011) Emerging assessment tools to inform food system planning *Journal of Agriculture, Food Systems, and Community Development* 2(1), 83-104.
- Morgan, K. (2009) Feeding the City: The Challenge of Urban Food Planning *International Planning Studies,* 14, (4)

- Raja, S., Born, B., and Russell, J. (2007) A planners guide to Community and Regional Food Planning; Transforming Food Environments, Facilitating Healthy Eating, American Planning Association, Washington
- Reynolds, B. (2009) Feeding a world city: the London Food Strategy, *Intl Jnl of Planning Studies* 14 (4): 417-424
- White, H., and Natelson, S. (2011) Good planning for good food; How the planning system in England can support healthy and sustainable food, Sustain, London, UK http://www.sustainweb.org/publications/?id=192

3) Issues Based Approach

Issues based approaches include, for example, work on food access, food security and/or alternative food system research in both a local and regional contexts. These approaches can be distinguished by the scale of analysis as either community focused or local/regional assessments.

❖ **Community food assessments:**

These studies (sometimes also referred to as local food system assessments) take place at the neighbourhood level. Though often called 'integrated', in practice the main focus is in most cases on access to food (especially distribution of retail points), household food security/ poverty and/or local small-scale gardening such as community gardens. Different guidelines often overlap to a considerable degree, but also incrementally add new topics. Many of these studies are often much more difficult to apply at larger scale. In large metropoles (e.g London, New York) we can observe that metropolitan authorities: a. develop guidelines with which local municipalities or counties/neighbourhoods develop local studies/plans; b. complement these with global city-regional studies (sometimes previous to local studies/plans, sometimes as follow-up).

Selected resources in this category include:

- Battersby et al. (June 2014). Food System and Food Security Study for the City of Cape Town. City of Cape Town.
- Food and Health Network of South Central New York (2012). 2012 Regional food system assessment for South Central New York.
- Hugh, J. (Ed.) (1997) Community Food Security: a quick guide to concept design and implementation, Community Food Security Coalition, Venice CA
- Isles Inc. (2005) Trenton Community Food Assessment, Rutgers Community Development Studio, New Jersey
- Koliba, C., Campbell, E. and Davis, H. (2011) Regional Food Systems Planning: A Case Study from Vermont's Northeast Kingdom, Opportunities for Agriculture Working Paper Series 2 (2), University of Vermont Centre for Rural Studies, Vermont.
- Zahilay, G. (2010) Bedford-Stuyvesant Community Food assessment. City Harvest, New York.

❖ **Local and/or regional food system analysis/assessment**

In these cases the emphasis is often on studying (the impacts of) what might be called 'alternative' agricultural and food practices in and around the city (production, processing, distribution practices especially operated by citizens groups and urban/peri-urban farmers) that mainly commercialize through 'alternative" channels. Everything that has to do with conventional food production in and around the city (which also may include organic production when this is sold through mainstream traders and supermarkets) and imports from elsewhere fall outside the analysis. Often this is not very clear as these studies can talk of economic and other effects of local production, but then only refer to alternative circuits. In the case of regional food systems analysis, by contrast, these sometimes concern conventional agriculture in the region and other forms of urban agriculture are not taken into account. In other cases again these studies also focus mainly on alternative sector.

Selected resources in this category include:

- Barbolet H. et al. (2005). Vancouver food system assessment. E-publication: https://www.sfu.ca/content/dam/sfu/cscd/PDFs/researchprojects_food_security_vancouver_food_assessment%20(short).pdf
- MacRae, R. and Donahue, K. (2013) Municipal food policy entrepreneurs: a preliminary analysis of how Canadian cities and regional districts are involved in food system change, Canadian Agri-Food Policy Agency, n.p.

4) Assessment tools

In some cases generic tools have been developed so that they can be applied to more than one community or region.

Selected resources in this category include:

- Cohen, B. (2002) USDA Community Food Security Assessment Toolkit, USDA Food Assistance and Nutrition Programme, E-publication: http://ers.usda.gov/media/327699/efan02013_1.pdf
- Siedenberg, K., and Pothukuchi, K. (Eds.) (2002) What's Cooking in Your Food System? A Guide to Community Food Assessment, Community Food Security Coalition, Venice CA

LIMITATIONS OF METHODS AND DATA

Clearly a City Region Food System analysis offers the potential to broaden the scope of analysis, while at the same time offering a method to assess food systems in more profound ways. That said, there are several limitations that need to be further explored and resolved. Specifically, access to data and data fragmentation, translating the complexity of food systems into actionable research methods (also considering staff, data and resource requirements that should allow for wider application in different parts of the world), and issues related to boundaries, scale and scope of the research all need to be addressed.

(1) The first limitation to consider relates to **data source accessibility and costs**. This includes: 1) the extent to which data sources exist; 2) where data has been collected how accessible they are. In some cases data may have been collected but are very costly to access or are only available to select groups due to proprietary issues; 3) if data is available how robust the data sources are in terms of coverage in both space and time (Drechsel, 2007). And 4) if secondary data do not exist, what are costs and tools that can be applied for collecting primary data? In many cases existing data are not available on a regular, consistent basis or in a format that allows comparison over time and across different jurisdictions. For example, for international comparative research work, different type and formats of data may be available from one country to another, or from one part of the world to another (e.g. Global South/North comparison). In many cities in the Global South, basic primary data on food flows and sources are not captured in food, market or other statistics, thus limiting analysis or requiring a larger additional investment in data collection.

(2) Food system complexity makes it challenging to **translate research goals into actionable research questions and methodologies.** This is especially complicated in the context of comparative research projects where several study sites are involved as each site is different. The complexity increases with the extent of food processing, so that it is for example relatively easier to track the sources of onions, than bread and these are both easier to track than highly processed foods where ingredients likely come from around the globe. For this reason, many studies focus on unprocessed food, such as fresh fruits and vegetables or lightly processed food. Other complicating factors include: the number of points of sale; the willingness of actors along the food chain to share information about their product sources, pricing and other information that could compromise their competiveness; various categories of products such as organic or numerous varieties (for example, the case of apples); and, the availability of produce based on seasonality.

(3) Finally, there are several gaps in the literature that need to be acknowledged. First, in commenting on the usefulness of food systems as a framing for analysis, Hinrichs (2010) offers important insights. Who sets the **boundaries** needs to be considered as power imbalances can be introduced into the research and influence decisions about how a food system is bounded and then studied. These decisions can privilege/disadvantage a range of people including people living in urban or rural places, lower income groups, women, youth and/or indigenous and ethnic communities. While it is impossible to not set boundaries for

a food system, it is important to be explicit about who has been consulted and how decisions were made to avoid exclusion.

There are also practical considerations regarding the **scope and scale** of the food system being considered. If the area is too large, detail will be compromised, if too small, one risks overlooking important dynamics and participants. As Born and Purcell (2006) point out, whichever scale is used will impact research results. They also underscore that it is important to ensure that uncritical assumptions such as 'local is better' are not adopted in developing a research methodology (see also Truninger et al, 2008). Finally, Sonnino (2014) points to the need to focus on the places where **food exchanges** occur as evidence of the connectivity within a food system, while also attending to the **sites of coordination** across the food system. Accordingly, there is a need to move from case study approach to relational one to help shift the focus from either the consumer or producer end of the food chain to the connections in between and to make explicit the relationships and webs of interaction between different involved stakeholders**.**

CONCLUDING COMMENTS

Given this context, the following recommendations are made for the development of a CRFS assessment methodology that could be applied in different cities around the world. A combined and stepwise process from assessment to strategy planning research methods is preferred. This will include a two-pronged approach to activate an informed City Food System Research methodology.

First, research questions that frame categories for each CRFS are provided to guide research foci. These categories cross the entire food chain from food production through distribution and wholesale, processing, and point of sale including markets, sales and retail to the consumer ending with waste disposal and traverse spatial boundaries to include urban, peri-urban and rural communities. This will permit comparative work across city regions as it is anticipated that each region will address several categories.

The research questions will first guide a more rapid and global assessment of the specific city region food system (food system assessment approach). During such first analysis, specific data gaps or key issue of relevance to specific locations can be identified that can be researched in a second stage (issue-based approach). In a third stage, a planning approach will be used, to guide additional research and scenario development based on better informed (by applying the first 2 approaches) policy interests and objectives.

Data will be collected in all stages, following a set of common metrics and indicators that is being built using examples and references from the analysed literature. Selection will be oriented by data source availability and the potential applicabilityof data collection and analysis tools.

Beyond this overarching framing, given the place-based and complex nature of food systems that includes dimensions related to the people and the biophysical environment (conceived as bioregion) and the particular nature of various food production systems (conceived as foodshed), the actual boundaries of each CRFS are to be determined based on their unique characteristics. Accordingly, a CRFS may be framed through practical considerations including political boundaries and/or more food or biophysical starting points.

This is the case for the nature of regions and their delimitations - including ecological, watersheds, orography, cultural history, juridical boundaries - but also on what is that range and dimension used for. For example, practically ranges and dimensions of CRFS on the basis of analysed studies can vary from 50 to 150 miles (in most US/Canadian studies), and in the case of a city-region like Beijing might be 400 km based on the provincial boundaries. The determination of each CRFS perimeter will be an important contribution of this project as it will shed light on what constitutes a functioning CRFS.

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