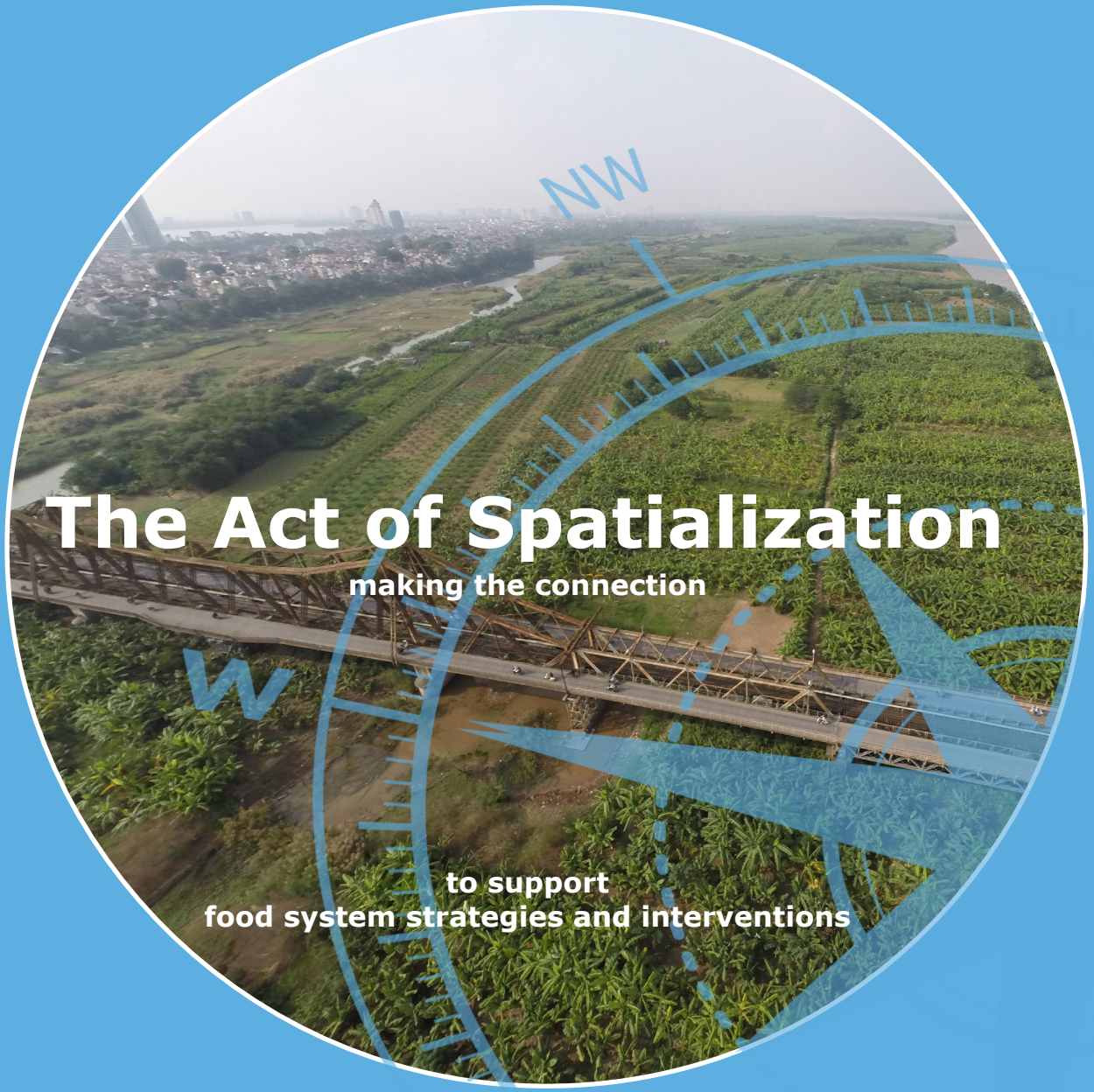
Feeding cities nd migration settlements
Programme Food Security and Valuing Water (KB-35-002-001)



The Act of Spatialization

making the connection

to support
food system strategies and interventions

WAGENINGEN
UNIVERSITY & RESEARCH

How to navigate through the world of our complex food systems?

The Act of Spatialization -making the connection to support food system strategies and interventions,
Rooij, L.L. de, Verweij, P., Agricola, H., Hu, X. (2022), Wageningen, Wageningen Environmental Research

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Spatial

1: **relating to, occupying, or having the character** of space
2: of, r**elating to, or involved in the perception of relationship**s
(as of objects) in space

source: Merriam-Webster dictionary

The food system and its spatial dimension

The world is rapidly urbanizing. It is estimated that by 2050 nearly two-third of the world population will be urban. Currently, already 57% of worlds population is urban (2018, UN).

Food is one of the most important basic amenities. However, urban society relies on complex food systems, often still poorly understood due its complexity and multifacetedness. These food systems are also reliant and intrinsically linked to other societal and environmental challenges like climate change and demographic changes.

The food system framework or food system approach has been widely embraced as an interdisciplinary, conceptual guidance to grasp the complexity of food systems, its different elements and relations. As FAO states: "A food systems approach is a way of thinking and doing that considers the food system in its totality, taking into account all the elements, their relationships and related effects".

In order to reach the development goals for sustainable cities and communities (SDG11) and zero hunger (SDG2), food systems should become more resilient, adaptive and just. *What is needed to reach these goals and how can we strategize food systems and properly intervene at the right place?*

The right place? Food systems with its food system activities and enabling environment undoubtedly have a spatial dimension. A spatial dimension that localizes and at the same time makes the connection to the conditions and challenges in that same location and to the people involved. Nonetheless, the food system approach has no implicit spatial (and temporal) dimension yet.

Food systems are defined as:
"*the aggregate of food-related activities and the environments (political, socio-economic and natural) within these activities occur*"

"Food systems comprises all the processes associated from food production to food utilization, but it is difficult to decide on a precise demarcation of food systems."

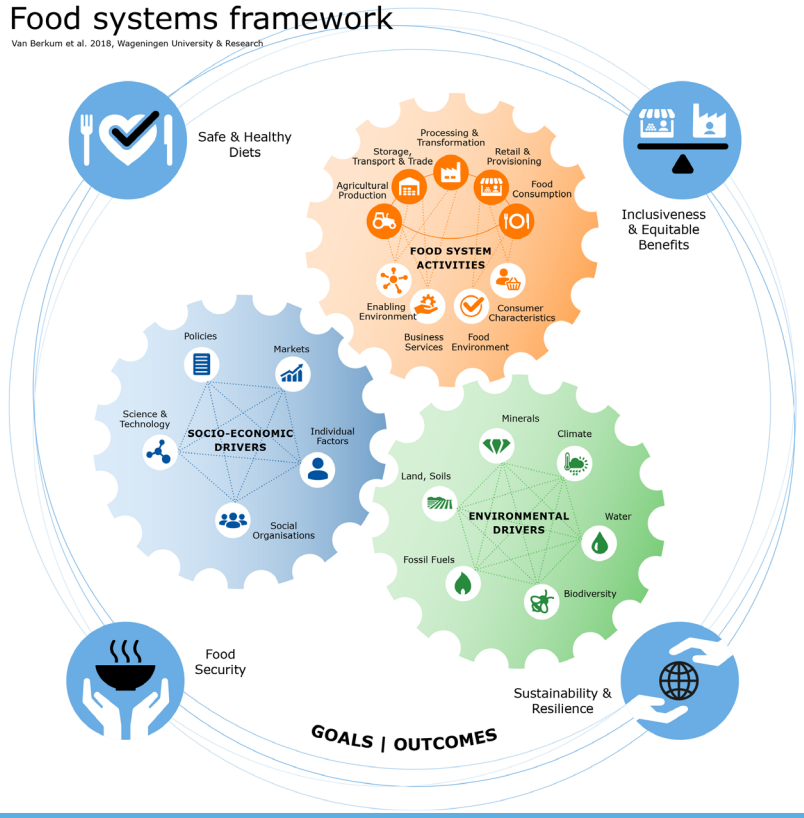
Van Berkum, 2018

Food systems

Food system approach

The Food system approach (Van Berkum, 2018) provides a helpful conceptual, interdisciplinary framework in which the relationships between food system activities and socio-economic and environmental driverse are emphasized.

It stresses the importance of system thinking and the different feedback loops inbetween. System thinking as a critical capacity for dealing with complexity and recognizing relationships, interdependencies and interactions (feedback loops). System think requires an holistic view: keeping the overall whole constantly in sight. Making a shift from studying designated parts separately with simplified relations, towards understanding these parts as part of a whole, influenced by non-linear processes, direct and indirect interdependencies and dynamic behavior.



As food systems are highly complex, so is the spatial dimension. Already 20 years ago, the conclusion was drawn that the food system is not commonly included in spatial planning. This is not only limited to spatial planning solemnly. Climate actions and the food system are still often seperate fields of discussion and action: "despite the importance of our food systems, there is a clear adaptation gap" (UNFCCC,2022). Just recently, at the COP '27 on Climate Change food is put explicitely on the table. In many other societal challenges the relation with the food system is also seldom made explicitly.

We are convinced that the act of spatialization will support the effectiveness and uptake of food system strategies and interventions, by strengthening these linkages and build a common understanding that is tangible, understandable and visible to all.

As mentioned, the food system is complex, the spatial dimension is complex, so the act of spatialization is an act that challenges you. It is not just about the results. It is especially the journey that counts. The act of spatialization will support you and all food system actors to better grasp the food system and better target strategies and solutions. A continuous process, in which spatialization helps to build a better common understanding of current food systems and strategizing future food systems in a broader perspective.

In this brochure we take you along a journey and hope to inspire you to improve the Act of Spatialization in your work. It's not an A to Z-guidance, but aims at initiating thoughts and actions.

What spatialization means

Spatialization can be defined as "the transformation of high-dimensional data into lower-dimensional, geometric representations on the basis of computational methods and spatial metaphors.

"Its aim is to enable people to discover patterns and relationships within complex n-dimensional data while leveraging existing perceptual and cognitive abilities"

(Skupin, 2007)

The power of spatialization lies in the ability to analyse and combine spatial information to understand and to make spatial patterns visible to serve as information for 'evidence based' interventions and strategies.

Sometimes spatialization is used as synonym for spatial analysis. Spatial analysis is a variety of techniques, that often is part of the act of spatialization. Nonetheless, spatialization itself is a much broader approach. An methodological holistic approach for assessing the food system in a broader context.

"to identify drivers and set screws in a methodological approach to adapt or transform (parts of) the food system in the long term towards improved working food system's that are more integrated, interactive and resilient."

(Kasper, 2017)

Why spatialization matters

The food system approach outlines the multidimensional aspects and complexity of the food system.

But how does this multidimensionally truly comes into effect in understanding and interventions? How could spatialization help to bring this multifaceted and multidimensional framework towards a broader understanding and more integrated assessments, solutions and strategies?

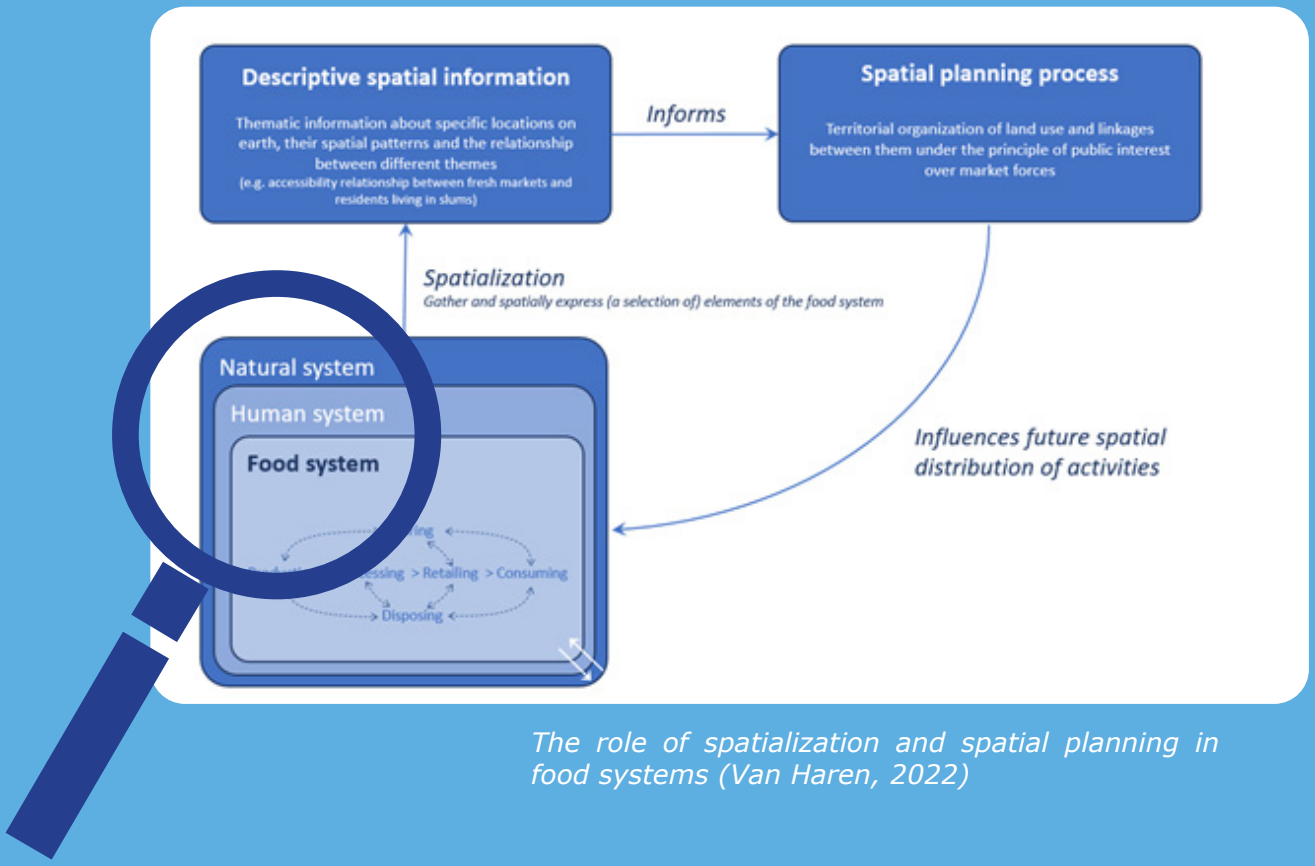
Humanity has been using maps to discover, explain and navigate through the world for millennia. The first (surviving) maps include cave paintings and etchings on stones, followed by paper in the Babylonian age and 3d constructs since the classical Greece. Maps are valuable, practical and appealing information carriers and are used day to day to share information about the world around us and the way to navigate around between different points of interest. Bringing together different maps on multiple themes also provides the opportunity to link and see spatial relationships. The first atlas was developed in 1565 by Mercator. This atlas was not merely a collection of maps, but Mercator envisioned it as a view on the creation and form of the whole universe.

Much more recently, digital sensory technologies and Geographic Information System (GIS) enable us to gather, analyse and visualise that information much faster than before. At the same time we are also in a time where data and information is widely available and abundant, which sets an even bigger need for finding our way through this abundant information towards insights.

A famous quote *"we are drowning in information, while starving for wisdom" (Naisbitt, 1982)*, seems likely to be in order, if we look at the all the big challenges the world is facing.

Spatialization serves as
"a lens for analyzing food as part of the urban metabolism with flows between components and interfaces with other relevant thematic fields of urban planning"

(Kasper, 2017)



The role of spatialization and spatial planning in food systems (Van Haren, 2022)

"The spatial component of work allows for more detailed, rather than general discussions"

(Blackett, 2021)

Spatialization goes beyond spatial analysis. Spatialization should be seen as a supportive tool, an act, instead of a goal by itself. Nonetheless, spatial analysis is of course helpful in spatialization .

The power of spatialization lies in the ability to analyse and combine spatial information. It helps in making the food system elements concrete, specific and placebased. At the same time spatialization can serve as a springboard towards specific place-based conditions and callenges, it makes it literally visible. The visual language is a common language, which makes the food system more concrete, and also has proven to be helpful in the process of participation: from sensemaking to co-creation and from understanding to action.

Although different studies and approaches make reference to the application of a spatial perspective, truly integrated spatialization remains rare.

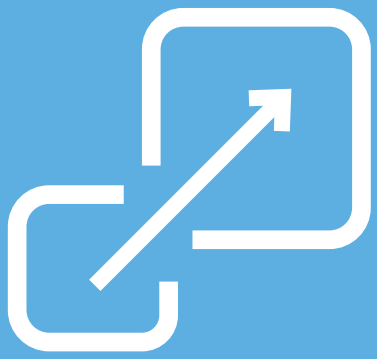
There are already many support tools available, that could be tailored or extended in the benefits of food systems. It is not about building new tools, but to build further on proven techniques and available portals and support systems. Spatialization is all about sense-making, narratives and making the connections that count.

Perhaps the most important connection spatialization can make is the connection to other thematic fields (climate, water, energy) and, most of all, spatial planning.

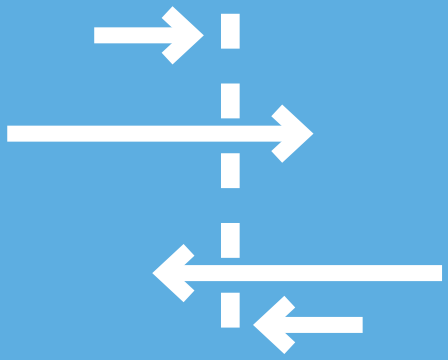
Twenty years ago, it was already concluded that the food system is not commonly included in spatial planning (Pothukuchi, 2000), but vis-à-vis in food system research and policies spatialization cannot be taken for granted, neither strategized. Just recently, different approaches are emerging that underline the importance. Nonetheless, the way spatialization is carried out and taken into account differs, as well the role it plays in processes and transitions. Perhaps not so strange, given the complex nature of food systems and its shifting boundaries.

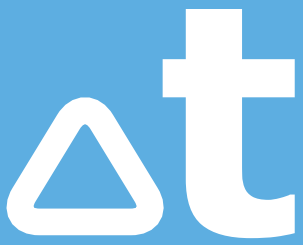
production

food chains



climate





FOOD

natural resources

planning

consumption

Beyond **boundaries**

Setting, crossing and stretching boundaries (thematical, spatial and temporal) should be taken into while diving in the food system. It's about considering multiple scales, zooming in and out and addressing linkages and potential trade-offs, synergies and feedback loops.

The spatial component to food systems brings in different dynamics. We are fully aware of the fact that these dynamics also comes with the risk of making projects and processes even more complex and a continious process of negotiating (Roo, 2021). One can argue whether it is a process of negotiating or a process of iteration. Nonetheless, this requires a practical approach in which constantly the consideration is being made which boundary applies. Taken into account these aspects that are perhaps not in the direct demarcated boundary or scope of the project or process, but are relevant to it, is defintely a challenge and surely has an added value. Opt-out would build in potential risks or missed opportunities for strategies and interventions.

The boundary of time is perhaps the most challenging one. Current projects are often strongly focused on how current food systems function and impacts other systems, as well as the supporting efforts in spatialization. If we envision desirable food systems what does that mean for spatialization? To what extend do we need to unravel current systems? What should it reveal to improve current systems or support a more fundamental transition?

This underlines the need for a revaluation of spatialization:
Spatialization as a constant act in an iterative process,
constantly setting, crossing and stretching boundaries.

In this brochure, we focus on the first act, providiing more specific and place-based insights in the current situation. In future research and actions, the focus will shift towards spatialization and envisioning.

Strategic narratives
are **conciously developed**

The power of **narratives**

Spatialization also requires a new set of skills. Besides system thinking, integrative capacities and storytelling are important skills.

The food system approach can help to build and structure clear narratives and guide spatialization of food systems. Most elements within the food system approach, even governance, can be spatially projected.

Spatialization should serve building strategic narratives that motivate, active and emphasize the connectivness. Narratives that are positive by nature. Addressing current issues and causal relations, but primarly also bridge towards opportunities. These narratives show understanding of and appeal to different motives, stakes and angels and sets a positive, appealing and activating message in the spotlight (Coninx, 2018; Coninx, 2020). In our view, this is crucial to create actual impact and initiate transformative change.

To build these narratives, it is highly recommendable to make the act of spatialization participatory. An initial narrative and preliminary mapping could initiate this process: raising questions, showing knowledge gaps, emphasizing connectivity and contextuality. These narratives also link spatial and non-spatial dimensions in a congruent way. Notice, we are talking about narratives in plural. There is an overarching narrative about a food system, but just like the food system consists of multiple dimensions, so does the number of narratives within. Highly divers narratives, linked to the system itself and narratives compiled to and for the different actors. The same story told in different ways. Language does matter. This also means that different (communication) techniques can be used: maps, text and visuals.

All narratives are strategic and purposeful, but strategic narratives are conciously developed to communicate, engage and activate along possible pathways and action perspectives (Riessman, 2008; Bushell, 2017). Spatialization and strategic narratives are part of a joint journey and an iterative process; they strengthen eachother.

The generic act of spatializing the food system

The generic act of spatialization of the food system is currently the most applied. As a start, all available data is gathered about food system elements and the food system environment (physical and social).This information is projected at the same scale and within a certain geographical boundary. Setting this boundary comes with benefits, like recognition and coupling to existing governance structures and boundaries. Nonetheless, as many food system activities have different boundaries, these projections needs a disclaimer.

Many of the current examples showcase an attempt to designate the food shed of a city (region), while others bring spatial information about a broader range of food system activities together.

The generic act of spatializing is depending on which (relevant) data is available. This can be presented in multiple ways, like an interactive Atlas or open-access portal. These kind of portals proof valuable in a better upreach and uptake.

It is highly recommended that any end-user has the opportunity to make a combination of the different layers that are presented. Most of all, these kind of data projections should be accompanied by clear narratives (story maps) and information about the info projected. This is essential for sensemaking and understanding what the data represents and its limitations.

Benefits
- Provides an instant overview
- Provides an opportunity for (interactive) explorative overlays
- Opportunity for multiple use in different processes and projects

Limitations
- Highly depending on available data and consistency (across scales)
- Boundary settings

Challenges
- Data gathering
- Data maintenance
- Data availability

How to perform the act of spatialization

The spatialization of the food system and related drivers, pressures and outcomes could bring in more specific insights in the spatial division and relations. The food system approach is helpful. However the food system is a highly complex system. This requires a flexible act of spatialization. It is never a strict guidance.

In this guidance we outline two different ways of spatialization of food systems:
the generic act of spatialization and the specific act of spatialization.

The specific act of spatializing the food system

The specific act of spatialization of the food system is issue-based and can start from a single issue. Via an iterative process and supported by a causal chain analysis spatial and non-spatial data can be gathered along the line of reasoning.

The act of spatialization start with the first spatial projection of a specific issue. By projecting the issue it becomes clear where it it, what the spatial division is and what else does potential relate to it. This could show immediate relations or bring new questions forward.

Based on the issue and the questions raised available data can be gathered across scales, also to make a comparison, both spatial and non-spatial data. This requires dedicated efforts, but highlights more specific information from the start than solemnly spatial projections. Sensemaking is part of the process from the start.

Just like in the generic act of spatialization data gathering is a challenge. However, due to its open character and no prefined boundaries, it is more flexibel to build narratives that go beyond borders and sectors. Due to its open character it is also easier to include non-formal data.

Benefits
- Provides an instant narrative
- Provides an opportunity for an iterative process of understanding
- Provides and opportunity for faster expanding to other issues
- Opportunity to include informal data

Limitations
- Limited value for other projects and processes

Challenges
- Data gathering
- Data availability
- Updating narratives and information

The generic act of spatializing the food system

Support for Modelling, Planning and Improving Dhaka's Food System

FAO/WUR, 2019-2023

Dhaka, the capital of Bangladesh, faces pressing problems in supplying its increasing population with affordable, safe and nutritious foods. Dhaka's population has grown rapidly to over 20 million. It will soon be the third largest metropolitan area in the world.

Together with the Food and Agricultural Organisation of the UN (FAO) and local stakeholders, WUR contributes to find integrated solutions to address Dhaka's present and future food needs. Strengthening food systems planning and governance is at the very basis of the approach. It is the glue of all other activities carried out. Spatialization has a significant place in the overarching work program.

Within the project an interactive GIS-tool is developed, and an Urban Food Print Analysis was carried out; all based on available formal data.

Insights were gained about the awareness of stakeholders about the potential role spatial planning and how food is currently being taken in consideration. Via semi-structured interviews, it became clear tat actors are lacking awareness of the food system and spatial information in general. Specific knowledge about spatial planning in the food system is limited. These interviews also highlighted the limited availability of (spatial explicit) information. Food and planning still seem to be steadily separeted domains (Van Haren, 2022).

The project has delivered an interesting portal, that is available to all.

The process of developing this portal and the narratives has proven to be most valuable, also for the key stakeholders. The information, insights and narratives challenged stakeholders and the team to extend their boundaries.

Screenshot compilation of the spatialization of Dhaks's food system elements with accompanying narratives

Check for more info:
https://dhakafoodsystems.wenr.wur.nl/

The specific act of spatializing the food system

Deep dive Kibera

WUR, 2021-2022

In close cooperation with Egerton University, Wageningen University and Research has carried out two household surveys in 2020 and 2021. These household surveys provide additional data and good insights of local food system activities and related issues.

The household surveys provides more in-depth information as a starting point, than other formal data available. The aim of the follow-up research was to reveal the spatial distribution and differences and to take a deep dive into the related environmental aspects, in regard to the food related activies.

The deep dive focused on climate, water and energy. The exploration aims at revealing the linkages between food system choices and outcomes and these environmental conditions and aspects.

Due to the complex nature of food systems, multi scale spatial analysis helps in understanding potential pressures and positive and negative feedback loops outside the direct area of interest. As such, spatial analysis in multiple scales can illustrate how food system activities across space and sectors impact food security.

Check for more info:
https://edepot.wur.nl/583337

Undoubtely, these linkages should be taken into account for specific interventions and the development of a sustainable and resilient food system.

In the deep dive a start was made at the local level, but soon moved to different spatial scales to put insights in perspective. Do the local insights match regional or national trends? How reliant and sustainble are current activities? The process was iterative and build upon curiosity and a critical attitude.

In doing so, three narratives were developed that build a better understanding between local food system actvities and choices in the perspective of regional and national trends. This information is valuable in future decisions and the design of policies and interventions.

Also in this research, it became clear that in day to day practices and interventions there seems limited notion or understanding of the reliance and the effects of the food system activities on the (broader) environment. A common understanding, a common narrative and common action truly are needed. This really builds towards integrative strategies and supports more sustainable interventions, in terms of environmental sustainability as well as resilience.

Data gathering in this kind of iterative research is just as tempting as harmonizing data for an comprehensive portal. Nonetheless, it seems easier to incorporate different kind of data sources as the output or outcome is not a fixed designated platform. Updating with new information is probably more time consuming in this kind of explorations than in the generic act of spatialization. However, it is questionable if that is needed or it serves as a deep dive to boost actions and policies and emphasizing the importance of integrative approaches.

"Creating food systems that not only solve multiple existing problems, but more importantly give us hope for a future that we actually want"

(Rockefeller Foundation, 2021)

You don't need eyes, to see you need vision

"To develop an outlook of how the food system would perform in a sustainable state, we can start with taking all of its current negative impacts and describe what the system would look like if they were to be eliminated or reversed, but the ulitimate picture that emerges should be a holistic vision of a system that addresses human and ecological needs simultanouesly...."

(Gladek, 2017)

Time to reflect

Spatial distribution of activities in the food system is in various ways influenced by spatial planning (Van Haren, 2022) or the absence of it. Spatialization seems still not a common standard in food system analyses, especially not in an integrative and strategic way. Spatial planning informed by descriptive spatial information of food systems can have an important role in guiding transformations and steering initiatives towards favourable opportunities for society at large. Understanding and analysing environmental drivers and outcomes, trends and linkages, related with waste, water and climate, to improve food and nutrition security and its resilience.

The different examples and experimentation of spatialization and spatial analyses show a high variety in approach and focus (De Rooij, 2019). Although attempts are made, a full-fledge overview of food system activities in a spatial perspective seems hardly impossible. Acquiring, arranging and developing spatial data towards orderly, understandable and accessible information (systems) is time-consuming and just a snapshot of the present situation, with trends from the past.

The question should be raised, if this should be objective after all. Spatialization and spatial analysis play a supportive and strategic role towards more sustainable and resilient food system strategies and interventions. Nonetheless, it is hardly impossible to unravel and showcasing the whole current system, in one glance nor in its full extent. It is just too complex and comprehensive for that. Both the food system approach as the act of spatialization serve as a guidance, highlighting the importance of the (spatial) connectivity and contextualisation and as such, adressing integrative challenges and a broader assessment. This is already a valuable step in improving food system governance and spatial planning. Bringing those to worlds together; in insights, knowledge but especially in action.

Another good reason to shift the focus in just unravelling the current system, is the belief that transformational change is needed. This means a fundamental change in food systems, including the spatial distribution of food system activities, its appearances and the arrangements.

How much do we need to understand the current system and its challenges to envision another system that is more resilient?


BENNY
POWDERED CHICKEN FLAVOURED STOCK

Our **recommendations**

The food system approach provides a promising framework to increase understanding of food systems, improve current systems and envisioning more resilient future food systems. It calls for an interactive, integrative approach in which co-creation is at the very heart. An approach that brings policy makers, practitioners and researchers together and builds mutual understanding and common vision. It requires new skills, but most of all a different attitude. An open mind: open to other dimensions in scale, scope and time and open to other actors in these complex systems and this complex world.

- **Spatialization should be structurally embedded into food system policies, practice and research**
  Spatialization needs to be incorporated into food systems work in a meaningful way. This goes beyond 'simple baselines'. It is a constant act and a practical way to start understanding the operation, the spatial connections and challenges of food systems. It is about conceptualization and geographical positioning of food system activities. Crucial for a better and more specific understanding of linkages within the food chain and within its environment. Linkages that are important to consider the direct and indirect effects of interventions and strategies. Linkages that also build a broader basis in governance and bring food at different tables.

- **Spatialization must not only focus on the current systems**
  Most of current food system projects have a strong focus on unraveling the current systems and historical trends. However, new trends and a changing world are perhaps more important, especially in working on future-proof, resilient systems and transformative change. One can try to fully understand the current whole, but will never succeed due to the complex nature and the fact that they will be overtaken by time.

- **Spatialization must be an interactive and iterative process**
  Due to the complexity of both food systems and the environmental drivers which influence these systems, spatialization serves to develop a common understanding and allow for the co-development of tailored, place-based strategies and interventions. Spatialization is a constant act in an iterative and interactive process -constantly setting, crossing and stretching boundaries.

As mentioned before, it is the journey that counts. Spatialization does not come with a strict manual. It it all about the intention and opening opportunities. Opportunities that link within a system, opportunities that link action and opportunities that link actors. Valuing the context-specific and place-based nature of food systems and supporting the food system approach towards resilient food futures for all.

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