



# FOODMETRES – Metropolitan food planning connecting the local with the global

Group photo of FOODMETRES project team. Photo by FOODMETRES

**FOODMETRES aims to describe, analyse and facilitate the development of short food supply chain (SFSC) innovations in metropolitan regions, including their rural, urban and periurban areas. The research carried out in this project covers questions of food production, processing and logistics; its focus is sustainable and resource-efficient solutions which are socially and ecologically embedded. Prior to entering into dialogue with relevant stakeholders from farming, food processing, fresh chain management, retailing, consumption, planning and governance, FOODMETRES gained the necessary technical and institutional insights by studying six metropolitan regions in Europe and Africa, as described in the following article by Pintar et al. ([page 45](#)).**

## Tools used

Central to the FOODMETRES approach is the development of a set of complementary tools:

- *Innovation storylines* that link spatial and functional characteristics of the food chain with different innovation domains and performance indicators;
- a typology for short food supply chains (SFSCs) that serves as a reference for running qualitative *Sustainability Impact Assessments* (SIA) along socio-economic and environmental criteria, tested for further application during interactive Knowledge Brokerage (KB) workshops;
- *Metropolitan Area Profiles and Scenarios* on the basis of European food demand and supply data, specified for the case study regions (see Pintar et al. in this issue);
- a *European Metropolitan Footprint Tool (MFT)*, used as well in the interactive KB-workshops in each city region, that allows land allocation for 13 different food groups on the basis of zoning rules around urban cores; and
- *Knowledge Brokerage (KB)* tools for stakeholder interaction in support of food chain innovation both during regional workshops and by means of an internet-based KB Platform.

By offering tools for both bottom-up processes on the basis of innovation storylines as well as European data-driven top-down tools such as the food demand-supply scenarios, the impact assessment and footprint tools, FOODMETRES intends to bridge the gap between the international dimensions of food policy, trade and consumption on the one hand, and the regional reality of local actors and consumers on the other.

### Sustainability Impact Assessment

Sustainability Impact Assessment (SIA) has become an obligatory requirement for all EU policies as well as for much national legislation, e.g., as ex ante assessments prior to policy implementation. With its objective of avoiding or minimising negative effects as a result of policies and decision-making, SIA has also developed relevance in the arena of food and food supply. In FOODMETRES, SIA is carried out by applying an assessment framework consisting of a food-oriented set of impact areas which are understood as wider impact and policy fields rather than narrow indicators. Each impact area can be correlated on the one hand to set innovation goals for SFSCs, and on the other hand to political agenda setting towards meeting societal challenges.

FOODMETRES developed its impact areas with the aim of integrating three sustainability dimensions: (i) environment, (ii) economy and (iii) society. Examples of impact indicators in these different areas – as outlined in Table 2 – are food-miles (transport distance, see 1.4) for the environmental impact area, number of jobs along the food chain as an economic impact indicator (see 2.1), and the occurrence of pathogens along the food chain under the food safety domain (3.1). We consider the list of food chain impact areas (see Table 2) to be one of the key outputs of FOODMETRES, as it fills an important gap in this emerging policy field.

The SIA were conducted in a participatory manner, based on judgements by both international experts and regional stakeholders, by online survey and in case study workshops with practitioners. They compared impact areas among a consistent set of SFSC types which include food supply systems that are localised, alternative and social-innovation driven as well as efficiency-oriented and based on sustainable intensification.

The typology developed for the FOODMETRES food chains takes into consideration the fact that short food chains are embedded in a territorial and social context; the typology thus puts the consumer-producer relationship up front. Most types also relate to the different spatial dimensions (local, metropolitan and global) as well as different commodity groups. Preliminary results of the SIA reveal distinct differences between the expert and practitioner perspectives as well as between the different case study sites. These differences highlight the importance of regional situation-adjusted strategies and solutions to SFSC innovation.

Compared to conventional, long food supply chains, all SFSC-types show positive contributions to the various impact fields. Locally, however, depending on the impact and policy

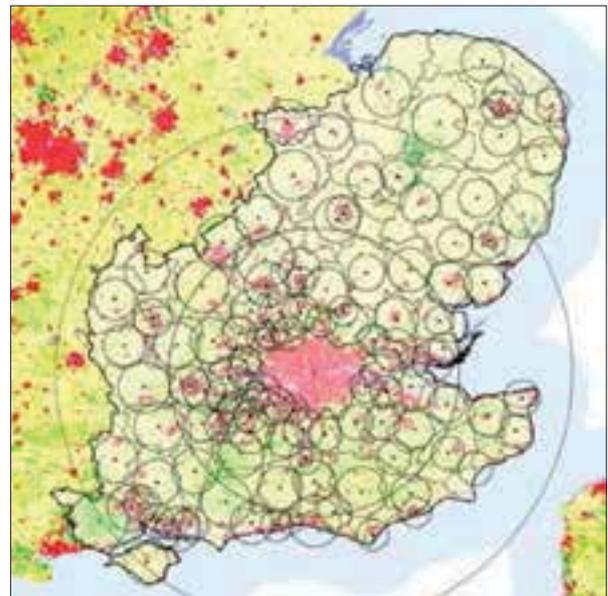


Fig. 1: MAPS output area demand conventional food production for London Metropolitan region, based on population figures 2012 (Source: Zasada et al. unpublished).



Fig. 2: Metropolitan Foodscope Planner supply tool for the metropolitan regions of London; inset: Landscape Units for defining land use allocation rules on the basis of landscape units (source: Wascher & Jeurissen 2015).

area of interest, it would be necessary to apply specific and different SFSC types. In this respect, the developed SFSC typology also serves as a good communication tool. It can be expected that, in the future, the typology will be extended to cover further types and aspects of food chains not present in the FOODMETRES project.

Table 1: Overview of food chain sustainability impact areas

<b>1</b>	<b>Environment</b>
1.1	Eco-efficiency in abiotic resource use (land/soil, water, nutrients) Each food chain is connected with certain farming or gardening systems that may use abiotic resources more efficiently and provide a good input-output relation under given regional conditions.
1.2	Provision of ecological habitats and (agro-)biodiversity Each food chain type is connected with farming practices that may enhance the provision of ecological habitats (e.g., hedges, trees), boost the cultivation of a wider range of crops and livestock (including breeding of traditional or rare species) and increase (agro-)biodiversity.
1.3	Animal protection and welfare Each food chain type is connected with a farming system that may result in different conditions for livestock, animal diseases and ethical considerations.
1.4	Reduction of transportation distance Each food chain type may be connected with a shorter transportation distance from place of production to place of consumption ("reducing food miles").
1.5	Reduction of packaging Each food chain type may be connected with the reduction of the amount of packaging along the whole chain from place of production to place of consumption.
<b>2</b>	<b>Economy</b>
2.1	Employment along the food chain Each food chain type may create new paid jobs (both full- and part-time) within the metropolitan region.
2.2	Income and profitability Each food chain type may generate income and surplus for the actors along the value chain that can be reinvested and used to support the long-term economic viability of the food producers.
2.3	Rural viability and competitiveness Each food chain type may be connected with regional multiplier effects through, for example, regional value-added, income and employment-generated tax revenues.
2.4	Transportation efficiency Each food chain type may be connected with an efficient mode of transport, e.g., adequate vehicles, capacity utilisation, reducing number of travel legs and cutting down on drives without a load.
2.5	Reduction of food loss and waste along the food chain from producer to households Each food chain type may support the reduction of food waste and harvest losses at the production stage as well as along all other stages of the food chain, including consumption at home or out of the home (e.g., at restaurants).
<b>3</b>	<b>Society/culture</b>
3.1	Food safety and human health Each food chain type may result in the absence of pathogens and pollution in the food. Food complies with legal standards regarding microbiological, chemical or physical hazards.
3.2	Food quality (freshness, taste and nutritional value) Each food chain type may result in the provision of food which is fresh and tasty and of good nutritional value.
3.3	Viability of food traditions and culture Each food chain type may result in the increased preservation of cultural distinctiveness and local food, including seasonal variation and local food traditions. This implies knowledge regarding its preparation and cultural role (including religious, ethnic or spiritual purposes).
3.4	Transparency and traceability Each food chain type may result in the increase of transparency and traceability. Transparency refers to information for the consumer about the way the food is grown and distributed through direct consumer-producer relations based on trust and through the use of labelling schemes (e.g., regional & fair, PDO, PGI, organic). Traceability refers to the availability of information at each stage of the supply chain (e.g., tracking of produce with smart codes).
3.5	Food security (availability and accessibility) Each food chain type may result in an increase of food security: that all people, at all times, have physical, social and economic access to sufficient food.

### Metropolitan Footprint Tools

Complementary to the qualitative impact assessment based on stakeholder input, FOODMETRES also assesses the quantitative dimension of urban food consumption addressing spatial, logistical and resource aspects in the context of food planning and governance. Complementary to standard ecological footprint assessments FOODMETRES identifies the location, type and amount of agriculturally productive land in reach of urban centres to supply metropolitan populations with regionally grown food. For this purpose we developed two distinct, yet complementary footprint assessment tools:

1. a regional Metropolitan Area Profiles and Scenario (MAPS) demand tool that uses a geo-statistical approach to produce demand scenarios at the level of administrative units on the basis of different food consumption patterns (see Fig. 1); and
2. a European Metropolitan Foodscape Planner (MFP) supply tool based on GIS-technology, that allows stakeholders to physically manipulate land use change decisions when re-allocating a total of 9 food groups by using a digital maptable that simultaneously monitors the respective food demand-supply balance at the level of homogenous landscape units (see Fig. 2).

Table 2: Food Chain Typology

1. Urban gardening for self-supply / private consumption (subsistence): food production in the urban setting for own consumption.
<ul style="list-style-type: none"> <li>· Relation type: Consumer as (co-)producer</li> <li>· Subtypes: allotments, community gardens, pick-your-own gardens (offered by a farmer).</li> </ul>
2. Urban gardening for commercial purposes: profit-oriented food production in the urban setting.
<ul style="list-style-type: none"> <li>· Relation type: business-to-business.</li> </ul>
3. Consumer-producer partnerships/cooperatives: network or association of individual consumers who have decided to support one or more local farms and/or food producers/processors.
<ul style="list-style-type: none"> <li>· Relation type: Consumer-producer partnerships/cooperatives</li> <li>· Subtypes: Community Supported Agriculture (CSA), Ethical Purchasing Groups (EPG)<sup>1</sup>, Solidarity Purchasing Groups (SPG), and food co-ops.</li> </ul>
4. Direct sales/marketing on-farm to the private consumer: farmers sell their products directly on their farm.
<ul style="list-style-type: none"> <li>· Relation type: business-to-consumer.</li> <li>· Subtypes: farm shops and stands, pick-your-own.</li> </ul>
5. Direct sales/marketing off-farm to the private consumer: direct selling of products from a farm on the market in the urban area.
<ul style="list-style-type: none"> <li>· Relation type: business-to-consumer.</li> <li>· Subtypes: farmers and weekly markets, market halls, home deliver.</li> </ul>
6. Sale to regional enterprises, such as those in retail or hospitality (e.g., restaurants, hotels, pubs), which provide food for the urban population.
<ul style="list-style-type: none"> <li>· Relation type: business-to-business</li> </ul>
7. Sale to public procurement and public catering: preparation and delivery of meals for collective consumers in the urban area. Include intermediaries such as wholesale.
<ul style="list-style-type: none"> <li>· Relation type: business-to-business</li> </ul>
8. AgroParks / Metropolitan Food Clusters (MFC): "spatially clustered agro food systems in which several primary producers and suppliers, processors and/or distributors cooperate to achieve high-quality sustainable agro-food production...". MFC are oriented towards the markets in the Metropolitan Region providing food for the urban population, and also to the world market.
<ul style="list-style-type: none"> <li>· Relation type: business-to-business</li> </ul>

These two tools are in many ways complementary: using exclusively national census data on food consumption and national land use statistics, MAPS is dependent on the accessibility of these data sets at the national or even regional level. MFP, on the other hand, mainly uses European data, making it – to a certain degree – independent from national/regional data sources. The latter must be considered as a pre-requirement for European-wide applications at virtually all metropolitan regions with the European Union. MFP demand figures derived from this database have been projected against the actual metropolitan land use, making use of Homogenous Soil Mapping Units (HSMU). With the digital Maptable technology (see also the article by Pintar et al.), stakeholders can engage in 'serious gaming' exercises and use MFP to develop scenarios for increasing the supply with regional food for 8 food groups on the basis of the urban consumption needs. During regional workshops, stakeholders can suggest where different crop types can be produced for urban consumers. Building upon the classical market-centred Von Thunen (1826) model, but translating it into the system environment of today's agro-food-sector and spatial planning strategies, the following spatial areas are identified: (1) urban core area, (2) green buffer & fingers, (3) metropolitan food production, and (4) transition zone (see example Fig. 2)

## Conclusions

By offering tools for bottom-up processes as well as European data-driven top-down tools, FOODMETRES intends to bridge the gap between the international dimensions of food policy, trade and consumption on the one hand, and the regional reality of local actors and consumers on the other hand. The Sustainability Impact Assessment tool supports the profiling of different food chain types towards innovation goals in terms of impact areas which are specific to food chain innovation. The metropolitan footprint tools MAPS and MFP integrate relevant planning dimensions, for example supply and demand of agricultural productive land and land-use composition, with stakeholder preferences on spatial allocations. Physical tools like the Maptable technology are helpful means to support discussion and decision processes, particularly for scenario building for the integration of multiple land use purposes, zoning and future conceptual designs and delineations. Project results indicate that the tools developed are relevant starting points for a long-term iterative food planning process in metropolitan regions.

Wascher, D.M., Piorr, A., Pintar, M., Kneafsey, M., Sali, G., Corsi, S. L., Mbatia, T., Jeurissen, L., Arciniegas, G., Glavan, M., Doernberg, A., Zasada, I., Groot, J., Schmutz, U., Bos, E., Venn, L., Monaco, F., Simiyu, R., Owour, S., van Asselt, E., van der Fels, I., van Eupen, M. (2015)

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## References

- Avermaete, T., Viaene, J., Morgan, E.J. & Crawford, N. (2003). Determinants of innovation in small food firms, *European Journal of Innovation Management*, Vol. 6 Issue: 1, pp. 8 – 17.
- Pedroli, B., van Doorn, A., de Blust, G., Paracchini, M.L., Wascher, D.M. & Bunce, F. (2007). *Europe's Living Landscapes: Essays exploring our identity in the countryside*. KNNV Publishing (The Netherlands) in cooperation with Landscape Europe, Alterra, The Netherlands. 432 pages.
- Sali, G., Monaco, F., Corsi, S., Mazzocchi, C., Kruit, J., Wascher, D.M., Zasada, I., Doernberg, A., Schmutz, U., Pintar, M. & Glavan, M. (2015). Analysis of food chains in metropolitan regions, FoodMetres Deliverable 2.2, not published.
- Vorst, J. G. A. J. van der and Beulens, A. J. M. (2002). *Identifying sources of uncertainty to generate supply chain redesign strategies*. *International Journal of Physical Distribution & Logistics*, 32; 6, 409-430.

## Note

- 1) these are like-minded individuals who join efforts to achieve a certain food quality or price