FOODMETRES – Case studies from North to South

Guerrilla allotment gardens on public land in Ljubljana Trnovo district. Photo by Matja Glavan

Food chains considered to be sustainable are chains that produce food closer to the city, reduce the number of steps in the chain and use natural resources more efficiently. In the FOODMETRES project (see previous article), case studies were undertaken for six metropolitan regions – London, Rotterdam, Berlin, Milan, Ljubljana, and Nairobi – to show interesting practices and lessons for achieving short food supply chains (SFSC) for sustainable metropoles.

London – local food initiatives for food chain innovation on a larger scale

The two examples below illustrate different types of food chain innovation in London (UK). *Crystal Palace Food Market* is a small-scale community, not-for-profit <u>Transition Town</u> project bringing the best quality, locally sourced, low-carbon food into the heart of Crystal Palace. The market supports local producers, small-scale farmers and local growing projects and aims to promote community, encourage local growing and create local employment.

Growing Communities serves the locality as well as the wider metropolitan area through community-led trade. Growing Communities runs an organic fruit and vegetable box scheme, the Stoke Newington Farmer's Market, and organically certified <u>urban market gardens</u> which grow products for sale through the box scheme. They also source food grown for the box schemes in back gardens, on church land and on estates.

The Sustainability Impact Assessment (SIA) performed in London aimed to find out how *stakeholders rank the impacts of different types of short food supply chains (SFSC),* comparing them to the current baseline scenario in which most of the vegetable supply comes from supermarkets, long food chains and large-scale producers. Specifically, vegetable food supply chains were considered; potential impacts of five different short food supply chains were rated from very negative (-3) to very positive (+3).

The results showed the highest overall impact rating for the short food supply chain "CSA - Community Supported Agriculture", followed by "Urban gardening for commercial purposes". The lowest overall rating was for the supply chain "Direct sales on farm to private consumer".

Economic related impacts generally received low ratings. Comparing the urban SFSC to current mainstream food supply chains, participants estimated low impacts with regard to transport efficiency. "Transport efficiency" also had the lowest overall rating of 0.3 for the "Direct off-farm" supply chain. Another low impact score (0.1) was expected for "Generating employment along the food chain" for the supply chain "Urban gardening (self-supply)" (see Fig. 1). This, however, may not take into consideration that self-supply can also be seen as part-time self-employment rather than just subsistence food provisioning.

Rotterdam – towards more regional dairy products

In the Rotterdam area (The Netherlands) the project *Kringloopboeren in Midden Delfland* seeks to strengthen the capacities of farmers as the main stewards of the typical Dutch landscape. More than 30 dairy farmers are participating in the project. To guarantee a sustainable income for these farmers while at the same time preserving the typical landscape requires innovation in the chain. Farmers are already diversifying their activities, for example, by producing their own cheese or butter.

De Delflandse kluit is a historical name, used for the butter produced in the Midden Delfland area. Production of 1 kg of butter requires 20 kg of milk. This implies that even with small consumer demand, it is possible to process a large quantity of milk from the farms. In the Midden Delfland area there are roughly one million consumers; even if only 5 % of them buy one single 250-gram package of butter each year, this adds up to 12,500 kilograms of butter requiring 250,000 kilograms of milk: half the annual milk production of an average Midden Delfland farmer.

During the Midden Delfland dairy product workshop, the Dutch project partner Alterra supported knowledge brokerage by showing data on the region on a digital Maptable. The Maptable offers a touch-sensitive large computer screen
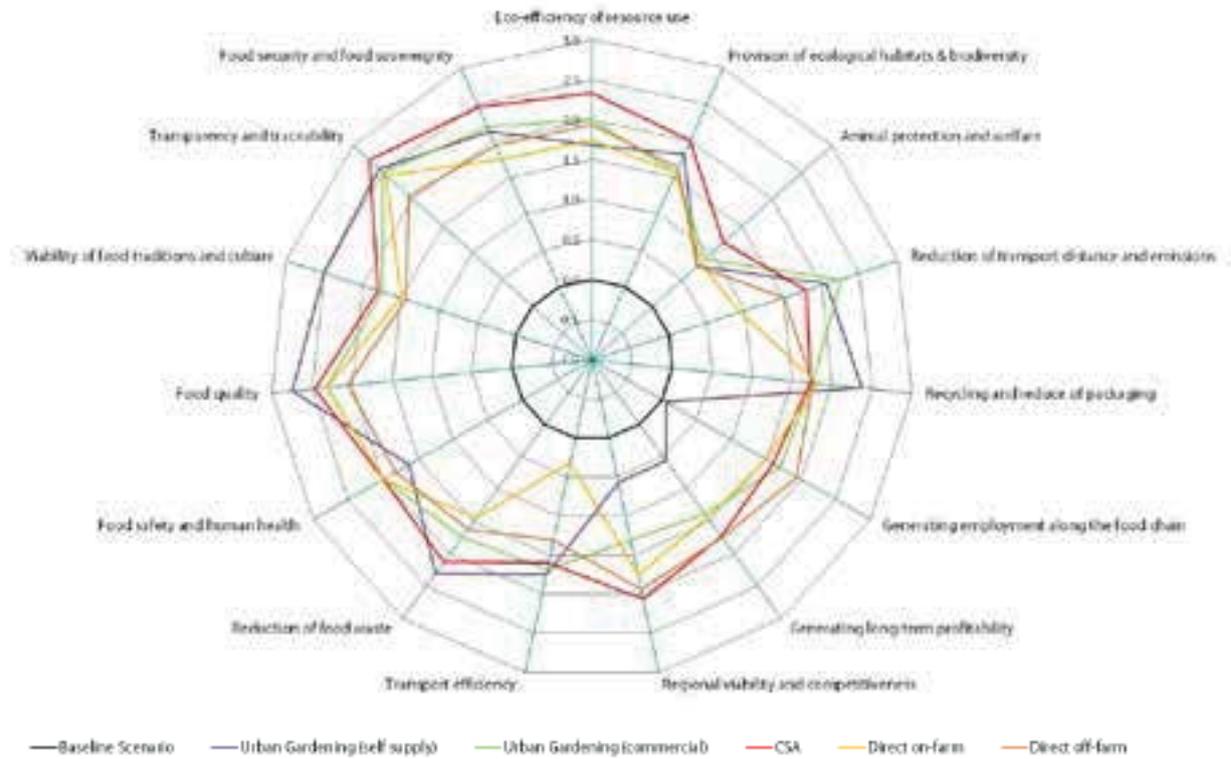
fig.1 Estimation of the environmental impacts by participants of the London workshop for vegetable supply chains (N=17).

that allows users to draw with their fingers or with the aid of a pen. The drawings are made directly on top of georeferenced maps. In the workshop, stakeholders were invited to draw the most convenient locations for the new production chain.

Berlin – organic food production

Berlin-Brandenburg (Germany) is characterised by rural agricultural areas in the direct vicinity of the metropolitan centre. The green and creative image of the region has given rise to a large number of innovative urban agriculture and regional organic food provision, marketing, and food strategies.

Five organic SFSC types were selected for the sustainability impact assessment: (1) urban gardening for self-supply, (2) pick-your-own gardens, (3) community supported agriculture (CSA), (4) regional organic product sold on a Berlin weekly market, (5) retail (global organic chain, supermarket). Regarding their environmental impacts, CSA and pick-your-own gardens were rated highest. Most of the short supply chains are estimated to perform better than the baseline, except urban gardening (self-supply) in the impact area of "protection of natural resources and efficient resource use". This is because it is assumed that urban consumers producing their own food tend to have less expertise and experience than professional farmers and gardeners, and thus apply gardening methods and practices that are less efficient with regard to use of water and nutrients, even in organic production. The economic sustainability profile of the SFSC differs markedly and is positive, as compared to the global chain, except for transportation efficiency.

Regarding social sustainability, impacts of SFSC were generally thought to be positive, except for food security. Stakeholders pointed to the comparably low share of SFSC-derived food to overall urban consumption, and to the strong seasonal variability in production. Another critical point is food safety in urban gardening, where little is known about heavy metal concentrations in urban soils and food safety in general because production takes place outside formal monitoring.

Milan – food supply and demand in the metropolitan region

The metropolitan area of Milan (Italy) is one of the most populated areas in Europe. Its high demand for food is currently satisfied mainly by global food supply chains.

In Milan, FOODMETRES produced three scenarios to support policymakers in improving the sustainability of the agro-food system.

The baseline scenario (scenario 0) represents the current agro-food system, in terms of local area of cultivated crops and number of livestock. This scenario only partially meets the food demand and generates an economic production value of about EUR 2.5 billion. The strong presence of livestock requires a large amount of fodder, of which only 30 % is locally supplied. Scenario 1 assumes that all fodder needed is produced locally. Even if the entire agricultural area were to be devoted to producing forage, this production could not feed all the dairy cows and the broilers currently bred: an additional 55,800 hectares would be needed in order to provide for all the animal feeding requirements. Moreover, this scenario would lead to a decrease in the production value by EUR 500 million.

The second scenario aims to simulate production oriented to a vegetarian diet and replacement of meat proteins with the same amount of legumes, milk and eggs. Increased production of these staple foods would be possible in terms of land use while maintaining other crops, thus corresponding fairly well with the entire food demand. However, the lower income provided by food crops as compared to feed or animal prod-

ucts would largely decrease the economic value generated by 67 %.

The analysis shows that different production scenarios impact both economic and environmental performance. For example, a higher degree of self-reliance for feed would lead to lower production variety. Scenario development can thus support decision making by policy makers.

Ljubljana – urban gardening and agropark food hub

A traditional form of food production in Slovenia is plot gardening. More than 192 self-supply gardeners all over Ljubljana Metropolitan region were asked to estimate their yearly production costs. By multiplying yields (1.9 kg/m2) of the five most common harvested vegetables by the average retail vegetable price, revenues were estimated (EUR 4/m^2). Deducting the production cost (EUR 0.5/m^2) from revenue yields the average gross margin for gardening production: EUR 3.5/m^2. The economic impact of urban gardening (45.89 ha) on the vegetable supply chain in the city of Ljubljana is thus calculated at a gross margin of EUR 1,576,524. Another SFSC is set up by the SME Geaprodukt, a firm that has a 12 % share in the distribution of vegetable and fruits in Slovenia. Together with the SME ProContus, they aim to develop an agropark food hub for local vegetable and fruit producers. This partnership offers local producers (i.e., farmers and home gardeners who sell surpluses for commercial purposes) gratis market space to sell their products directly to customers. Afterwards they can sell remaining leftover products to Geaprodukt.

According to the Slovenian experts' estimations, vegetable food chains with direct consumer-producer relations (direct sales on-farm, CSA and direct sales off-farm) have the highest positive sustainability impact. The lowest impacts were expected from metropolitan food clusters (MFC)/AgroParks and public procurement. Negative impacts are attributed to employment and income in the case of urban gardening for self-supply and to the reduction of food waste and loss for MFC/AgroParks and public procurement, the latter being larger scale and long (regional) food chains. Whether this is true would be an interesting question for further investigation.

Nairobi – do SFSC benefit poor consumers?

One hypothesis that stakeholders discussed in Nairobi (Kenya) was: "Short supply chains, including urban agriculture, do not provide a meaningful food-security solution for Nairobi because it is too small scale, and the land used for urban farming may have better urban uses".

Participants felt, however, that less actors in the chain makes food cheaper, and so the shorter the food chain, the better for the poor and middle class, making short chains more desirable. And while it is true that SFSC do crowd out middlemen, such actors are far fewer compared to the consumers of SFSC, the majority of whom are poor. In other words, a food supply chain cuts off a few poor people to benefit many. Furthermore, it is assumed that the shorter the food chain the safer the food will be, especially for informal chains and comparing production to street food vending. In fact, it is partly because of the fear of consuming contaminated vegetables produced within the city that many urban residents and youth groups tend to take up urban gardening (further shortening the food chain) and/or prefer to purchase vegetables from known sources such as their neighbours.

However, there are reservations about scale and future availability of land for local production. What will happen in 2020, given that Nairobi is growing so fast?

All five vegetable chains assessed by Kenyan experts were rated highest in their social aspects of sustainability. The results show that urban farming for self-supply in Nairobi has quite a low positive economic, but a high social impact. This is because urban farmers in Nairobi do not practice gardening for commercial purposes, but rather for social reasons associated with food quality, safety and health, security and traceability. When there is surplus, however, urban gardeners sell the extra produce for income.

For all chain types, the experts expect positive impacts on sustainability in comparison with the baseline. High positive impacts identified included "food quality" (all chain types except CSA), "food safety" and "food security" as well as "reduction of food waste and loss" (urban gardening self-supply, urban gardening commercial and direct sales off-farm). This was expected, given the transport inefficiencies and multi-actor logistical organisation along the conventional vegetable supply chain that results in spoilage and waste; and also given the large proportion of income spent on food by the urban poor, as well as widespread concerns about the possible use of untreated waste water and sewage for vegetable production in some parts of the city.

Interestingly, urban gardening for self-supply is seen as very efficient in the use of natural resources in Nairobi (as in Ljubljana), whereas the European experts in Germany and London came to a different conclusion. In the particular case of Nairobi this could be explained by the involvement of agricultural extension service personnel who educate urban farmers on the adoption of sustainable farming methodologies including recycling of waste, composting, etc. The Nairobi participants also associate food production in urban areas more strongly with the provision of ecological habitats than do the European participants. This might be the result of a generally more positive impact rating in Nairobi, or of the fact that, in the densely populated Nairobi region, green (production) space is of great value to its inhabitants.

The variety of case studies involved allows valuable insights into the different European and African contexts and the investigation of the regional peculiarities and challenges of the individual metropolitan agro-food systems. The SIA tool supports profiling of different food-chain types towards innovation goals in terms of impact areas which are specific to food-chain innovation. The proof of sustainability benefits through innovation, in addition to the importance of regional situation-adjusted solutions, are important project findings.

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