SCIENTIFIC SUPPORT PLAN FOR A SUSTAINABLE DEVELOPMENT POLICY
(SPSD II)

Part 1:
Sustainable production and consumption patterns

SUMMARY

INSTRUMENTS AND INSTITUTIONS TO DEVELOP LOCAL FOOD SYSTEMS

CP/59

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1. INTRODUCTION

1.1. Context

Local food systems (LFS) are systems in which consumers prefer to buy their food from local sources for both social and environmental reasons. Often, but not necessarily, such systems are based on direct contact between producers and consumers. The role of intermediary institutions, both governmental and non-governmental, is often a prerequisite for the establishment and sustainability of local food systems.

Since the 1990s, there is increasing interest from consumers in local food systems. Key to LFS is that consumers purchase their food from predominantly local sources. A host of marketing channels is used for this: on-farm sales, farmers' markets, community-supported agriculture, farmer cooperatives, box schemes and various other ways. But also institutions such as food banks, school lunch programmes, local nutrition education and food policy councils can be part of local food systems. As the central theme of LFS is that the distance from producer to consumer is as short as possible, they are often denoted as short supply chains.

The establishment of LFS is based on a combination of supply-driven, demand-driven and institutional factors. The most crucial factor in the emergence of LFS is the consumer. Research has confirmed the importance of consumer concern for food safety, animal welfare, environmental effects, regional development and the interest in better quality and fresher food. Part of the reason can be found on the supply side. Farmers turn to direct marketing practices as a key strategy for survival. However, to establish local food systems substantial transaction costs need to be overcome. Cooperation is crucial in saving on such transaction costs. Finally, various governmental and non-governmental institutions can facilitate the emergence of LFS.

In Belgium, local food systems find their origin in farmers' markets in the beginning of the 1980s. Later, also vegetable box schemes were established following Dutch examples. Food teams have been established since 1996. Presently, efforts to stimulate local food consumption are restricted to organic produce.

With respect to the environmental impact of LFS, a small number of studies have emerged in the literature in recent years. Some studies are limited to relatively qualitative assessments of the impact on the environment. Most quantitative studies focus on the negative transport externalities characterizing different food supply chains like food miles, life cycle assessment, carbon dioxide emissions and the ecological footprint.

1.2. Objectives and expected outcomes

The aim of this project was to investigate whether LFS can contribute to more sustainable production and consumption patterns and how the development of such systems can be stimulated. The most important were:

- to develop a scientifically sound set of indicators for Flanders after analysing their validity and to introduce these indicators as instruments to be used by institutions dealing with these issues,
- to investigate the potential to expand LFS by institutions already active in this field and other institutions, and to facilitate the implementation of this potential,

For this, we first developed an operational definition of local food systems as used in this study. Local food systems (LFS), as we define them, include the entire chain of producing, processing, selling and consuming food. They are systems which allow a direct contact between consumers and producers, and/or in which consumers and producers enter into a long-term contractual relation with one another. The distance between the different actors should remain limited (geographically as well as for the number of links in the chain). In this project the focus is specifically on LFS with a 'network character'. This means that food systems that are also local, but more on an individual basis, like on-farm sale, are not included here.

Next, we made an inventory of all LFS in Flanders within the scope of this definition. We then selected four cases representative of Flemish LFS and one supermarket chain to assess various economic, social and ecological impact indicators. To investigate the potential of LFS, we selected three cases for an in-depth study on the factors influencing the development and the dynamics of LFS.

2. MEASURING THE IMPACT OF LOCAL FOOD SYSTEMS

The objective of this part has been to analyse the validity of a scientifically sound set of indicators to be introduced as instruments by Flemish institutions working with these issues. For this, we focus on the marketing phase of the supply chain, that is, from the point the product leaves the farm to the point of purchase by the final consumer. Three economic, three social and two ecological indicators were selected and tested using case data from four LFS cases and one mainstream food system (MFS), i.e., a supermarket chain.

2.1. Economic indicators

The local multiplier three effect (LM3)

The LM3 offers a general understanding of how a variable aspect of the local economy (e.g. a food system) is working by measuring the money expenditure, while describing where the money goes to. The calculation of the LM3-effect was not performed on the basis of our case studies. Given the high population density, and the regional level of Flanders as a whole, the local multiplier effect seems less relevant here compared to sparsely populated areas where locality is to be seen on community level. As the information retrieved from MFS was limited, the situation in Flanders could not be examined on the hypothesis whether high skilled staff is predominantly originating in an other region. Both for the MFS and for the LFS it has shown to be difficult to get hold of the exact information when local spending has a whole is considered.

To get a meaningful value of the effect of local spending, we suggest researchers to make a selection of spending channels on which they can test the local multiplier effect in a precise way, based on the information which can be collected from the MFS as well as from the LFS. One could select a restricted number of spending posts on both direct inputs at one hand an specialised services at the other hand. The results then should not be addressed as a complete image of the local spending behaviour, but they can give a numerical indication on possible differences amongs LFS and MFS. Those numerical data then should in our opinion be combined with a descriptive over-all view of spending behaviour to give a complete image of the local impacts.

The impact on local employment

One can question whether in local food systems more people from the region are employed since local employment would mean a lower unemployment rate, less environmental impacts and economic costs due to proximity, and possibly more flexible employees at crucial moments. The impact on employment can be measured by counting the number of full-time equivalents related to the added value created in the firm, while describing the origin of the employees.

We suggest the development of a simple and clear tool to keep track of time and job-investment related to different activities on place (focused on producers level) would be of great help. Not in the least for farmers themselves to value and evaluate their time investment. Obviously, the importance of such a tool reaches further then only the description of the impact on employment. On the marketing level, limited availability of information on employment underlines this request for a uniform, simple and clear tool to keep track of time and job-investment related to different activities on place. For further research on the impact of employment of food systems (and other economic activities) we want to suggest always to integrate a descriptive analysis of the employment effect in combination with numerical data. The basic underlying reason is the different involved aspects: social employment,

flexible employment, education tasks: they can be described in a structured way to provide a basis for comparison of different systems.

Absolute differences in actual producer and consumer prices received
When LFS and MFS are compared, the underlying hypothesis is that there is a difference in those prices. Prices to the consumer optimally cover the production costs, complemented with processing and marketing costs, which include a profit share of each involved party. Also here the hypothesis is that this coverage differs between LFS and MFS.

A price comparison is an easy indicator to involve in a general comparison of different systems. Special attention should be addressed to the products compared, since different systems might work with different breeds or strains at one hand, and with different production methods, causing different production scales, a.o. When all those aspects are carefully dealt with during measurements at one hand, and explained when the results are published at the other hand, this indicator is a fairly simple and useful tool in both measurement and communication.

2.2. Social indicators

A social sustainable community is said to have the ability to maintain and build on its own resources and have the resilience to prevent and/or address problems in the future. Within this scope, social capital is defined as the possibility of an individual to mobilise resources from social networks in which he takes part, and it is seen as a production mean, fed by social relationships within a community or a group, to be used by individual members. There is a need to assess how local ecologies and social relationships are or become implicated in existing or emerging production systems and whether stakeholders in different food systems have access to social capital in a different way.

Networking
Since social capital results from the social networks in which an individual takes part, it is interesting to describe those networks. The social networks farmers are involved in can be called upon threefold. At one side farmers function in relation to their colleague-farmers. Furthermore, farmers sell their produce, resulting in more or less networking to middlemen, consumers and others. A third aspect in networking then is the contacts with other external bodies as there are knowledge institutions, service providers and input suppliers. For those aspects, a description of the preconditions for successful relations, and their meaning when successful was found a useful analysis.

Our research suggests that networking is important in all food systems and differences are more sector determined and less by the food system. One then could focus on these sector differences and identify where the different sectors could cross-pollinate one another, in order to strengthen the independencies of individual or grouped farmers.

Social capital

Social capital, defined as the possibility of an individual to mobilise resources from social networks in which he takes part, is seen as a production mean, fed by social relationships within a community or a group. Do farmers within LFS entitle a different amount or a different form of social capital compared to farmers in MFS? The most important aspects of social capital involve access to: knowledge, production means and support when needed.

We conclude that if one wants to support the social capital of farmers in general, it is more important to stimulate cooperation and exchange amongst farmers within any chain, rather than to focus on the LFS. In this light, the pioneering work of LFS towards the MFS can be compared to the pioneering role of organic agriculture towards conventional agriculture: asking for more appreciation for the farming sector as a whole through elaborated forms of communication and cooperation without the loss of positive efficiency effects existing in the MFS.

Job satisfaction

Job satisfaction in relation to different marketing systems involves mainly the appreciation one experiences with relation to the performed job. When this appreciation answers the needs of the involved person, this contributes to job satisfaction.

Based on our research, we stipulate that it is not the nature of the supply chain that causes the amount of appreciation a farmer receives for his products, but the nature of the farmer himself, who addresses those chains where he feels comfortable and appreciated. Within this scope it is desirable to support farmers in making their own choices according to their own expectations. At one side, this means choices should be open and reachable for as many farmers as possible. This requires not only a policy shift, supporting individual activities rather then monopolistic dominance, but also a shift in the present ideology concerning entrepeneurship (bigger is better). However, we do recognise that this evolution is determined by many different factors and is not to be expected at once. At the other hand, we wish to stress the importance of individual entrepeneurship, based on own ideas and expectations, supported in its singular character. In this scope it is important to stimulate farmers to 'take their future into their own hands', supporting any kind of innovation, specialisation, change or preservation as an answer to generalisation and globalisation.

2.3. Ecological indicators

To compare LFS with MFS on an ecological level, the energy required during the life cycle of a selected number of food items sourced by different food supply systems (farmers' market, food teams, on-location sales and box schemes versus supermarket) was calculated, as well as their resulting carbon dioxide emissions. The energy required during the life cycle of a selected number of food items,

sourced by different food supply systems (farmers' markets, on-location sales, food teams, and a box scheme versus a supermarket) and their resulting carbon dioxide emissions were measured. Being aware of the large variations that exist between different local and mainstream food systems due to variations in transport distances, transport modes and their loading factors, storage facilities, etc., our results show that energy use and carbon dioxide emissions in the basic simulation of this study (full summer, inland production) are almost always higher in the LFS compared to the MFS, though these variations are in the same order of magnitude. Larger differences occur when the side effects of the basic simulation, like the consumers purchase, production in heated greenhouses and import from abroad are taken into account, the following recommendations are formulated in order to make local as well as mainstream food systems less energy consuming and CO_2-emitting:

- LFS can be much more sustainable when they are efficient enough in optimizing their transport and storage through diminishing the transport distance and storage time to a strict minimum or by increasing the stored and traded quantities to a full storage room and a full loaded transport mode.

- Supermarkets can exploit economies of scale, but could be a lot more efficient by diminishing the transport distance and storage time.

- The consumers' purchasing by car can have a large impact on the total energy and emission bill, depending on the amount purchased per trip. This contribution can be bigger than all other transport, storage and processing energy uses and emissions of the marketing section together. Purchasing on foot or by bicycle adds no extra energy use or emission to the final energy bill and is as a consequence more sustainable.

- By choosing food products that are in-season and can thus grow in open air or non heated greenhouses and are not imported from abroad energy uses and resulting CO_2 emissions can be reduced even more. Products from heated greenhouses consume on average 9 to 21 times more energy than products cultivated in open air when keeping all other parameters constant. Depending on the transport mode and transport distance, import from abroad can consume from 0.01 up to 97 times more energy than homegrown products, with the highest values for intercontinental aircraft transport.

Finally it should be taken into account that a lot of LFS dó sell food products that are in-season, are grown in open air and are produced locally, so not imported, this has a considerable effect on the final energy bill of their products (as shown in the different scenarios above). In addition many LFS like box schemes and food teams deliver their products to collecting points just on walking or cycling distance of the consumers' house, work or children's schools, resulting in an external (extra) energy use of zero to purchase these food items through these systems. Furthermore

products that are sources by local food systems are often traveling very fast from the field to the consumers home what results in less energy uses and emissions due to storage.

3. THE POTENTIAL TO DEVELOP LOCAL FOOD SYSTEMS

The appeal of food that is locally produced and sold directly to the consumer is increasing in response to globalisation and food crises. Farmers convert to quality food production and establish niche markets. However, such conversion involves costs, changing policies and new competences. Previous research has primarily focused on the policy and market environment on the social aspects of local food systems and on the switching costs for farmers. Research on the development of LFS and particularly on the competences needed for their establishment and development is virtually absent.

3.1. Method and research design

To answer the research questions we choose for an inductive case study approach. The researcher reports in the learning history how the actions of actors have led to certain results. The following steps have been taken:

- In a first step, researchers have observed meetings, conducted in-depth interviews with key informants and collected documents. Emphasis is put on events and actions that are important in the development of the local food system. The information is analyzed and written down in a case history. Critical points that form a pattern in the case are formulated in a number of dilemmas.
- In a second step, all the case members are confronted with the case history and analysis in a joint meeting. This validates the correctedness of the data and gives the possibility to adapt the case history. Further, the researchers propose an intervention based on their anaylis. The case members approve.
- In a third step, the intervention takes place in the form of a workshop led by the researchers and attended by all case members. The intervention took the form of a vision workshop in all three cases. This was because in all three cases the researchers diagnosed a lack of shared vision as the major stumbling block in the further development of the LFS.

In addition, a joint workshop was organised in December 2005 at the yearly national agricultural fair (Agribex) in Brussels. The aim of this workshop was to organise a dialogue and to use the knowledge and expertise of the participants. Using an interactive way of working, we not only wanted to validate our results and recommendations, but also to co-create recommendations with the stakeholders, such that they are disseminated more swiftly. In total, about 60 participants from a

variety of backgrounds (academics, government, farmers organisations, intermediary organisations, individual farmers, NGOs, etc.) actively engaged in the workshop.

3.2. Towards a theory of LFS development

Using the data of the observations, the stories and particularly the interventions, we built up a theory of the development of LFS by exploring the conditions or leverage points that make it possible for the LFS to grow. For this, we proceed in two steps. First, we take an inward perspective by looking at the LFS in isolation of its environment. Second, we broaden our scope taking an outward look and looking at the dynamics in which the development of LFS is embedded.

An inward look at LFS: the importance of competences

Most of the dilemmas and much of the tensions observed during the interventions are related to differences in vision and decision making processes. We propose that members' individual and collective competences form a first set of conditions for LFS to succesfully develop themselves. More specifically, we formulate the following three propositions that relate to competences that need to be present in an LFS in order for it to successfully develop:

- *Proposition 1*: *To be succesful, an LFS needs managerial competences to support the ability to act*. With managerial competences we mean the skills to convert an idea into action.
- *Proposition 2*: *To be succesful, an LFS needs cognitive competences to support the ability to reflect upon its actions, to learn and to develop new ideas*. The ability to learn from experience is essential for adapting actions and generating new ideas, and thus for further development. In addtion, entrepreneurship entails being able to spot market opportunities.
- *Proposition 3*: *To be succesful, an LFS needs relational competences to support the ability to share*. Relational competences refer to the necessity to act and learn jointly. They aim at producing trust and shared meaning. It is essential as a basis for sustained joint action.

As a result, when one of these competences is lacking or ill-developed, LFS tend to stagnate in their development or to be highly dependent on external input. The latter is not sustainable as often depending on the possibility to receive government subsidies.

An outward look at LFS: LFS as innovation niches in the transition towards a sustainable agricultural and food system

Under pressure of a manifold of driving forces, agriculture is in Western Europe is in transition from a supply-driven commodity-based system towards a demand-driven system bringing forth differentiated food of high quality, both with respect to product and to production process. However, such a system change is often hampered by the presence of system imperfections, which open the door for government intervention. The literature categorized system failures as follows: (1) infrastructural failures, referring both to the physical infrastructure (IT, telecom, roads, etc.) and the science and technology infrastructure; (2) Institutional failures, referring both to hard or formal institutions, such as rules, and soft or informal institutions, such as culture and values; (3) interaction failures, referring to the linkages between actors that can be too strong resulting in myopia or too weak resulting in lack of cooperation and blind spots; and (4) capabilities failures, referring to a lack of competences or resources especially with small and medium-sized enterprises.

The last failure has been addressed by the first three propositions. Using our data to applying this theory to the development of LFS yields three additional propositions:

- *Proposition 5*: *To further develop LFS, the knowledge base that supports the development of competences and insights needs to be developed*. Universities, applied research stations and other science and technology actors are still geared towards the existing mainstream of commodity production. The development of knowledge relevant for the LFS niches occurs itself in niches within these actors. A typical problem is that LFS are not able to generate the necessary co-financing for applied research projects compared to mainstream sub-sectors.
- *Proposition 6: To further develop LFS, existing rules and institutions need to be adapted*. The rules governing the agricultural and food sector are based on the old system of strictly separated production stages. In LFS, however, production stages are reintegrated leading often to a conflict with the existing rules. This may refer to food safety regulation, transportation, retail, zoning regulations, etc.
- *Proposition 7: To further develop LFS, initiatives need largers networks*. When drawing the networks of our cases, it becomes immediately evident that these tend to be limited to a small group of people sharing the same assumptions and having established trust relationships. This refers both to other farmers, advisors and consumers. This may lead to myopia towards developments outside. This is also clear from the learning journeys to kindred initiatives and the invitation of experts who are part of the same inner circle. At the same time, weak ties with external partners outside the LFS sector are generally lacking.

4. GENERAL CONCLUSIONS

This research project had as central question how to further develop local food systems. The first part of the project looked into the identification, measurement and communication of indicators of sustainability that would appeal to the consumer and that is hence directed at the demand side of LFS. The second part of the project investigated the interior and exterior conditions for LFS to develop from the supply side.

In our quest for a set of scientifically sound and practically usable indicators comparing the sustainability of local food systems compared to mainstream food systems, we had to abandon our original plan to develop rich economic and ecological indicators. We did develop an ecological indicator depicting the energy use of different food systems taking a life cycle assessment approach. However, the calculation of economic indicators assessing the impact on employment and the multiplier effect of different systems has proven to be too difficult, primarily because of the heavy data requirements of these instruments and the lack of statistical data. In addition, following the advice of the accompanying committee, we refocused our attention to the social dimension of local food systems, as these were argued to be the most important asset of local food systems. However, the social dimension turned out to be even more difficult to grasp as it is not well developed in the literature.

Future research should focus more on the consumer as object of investigation. It is still unclear to what arguments consumers are prone to listen to. Our research suggests that for the social, economic and ecological dimensions, differences in performance between LFS and MFS are less related to the system itself, but more to the attitude and behaviour of various actors and the exploitation of scale efficiency in for example cooling and transportation. As a result, LFS and MFS can learn from each other.

We intensively studied three cases studies of LFS to find out what are the leverage points in their development. We distinguished between interior and exterior factors. We propose that managerial ability, reflection and trust are key elements and competences necessary for success in collaboration. When one is absent or incomplete, the probability of survival or growth is small. These competences can be developed, a task for farmers organisations and government. However, so far most competences addressed by most programmes are of a rather technical nature only (e.g., bookkeeping, marketing).

A supporting R&D system, more flexible government regulations and broader networks are important external conditions for LFS to develop. Room for experimentation should be created to foster radical innovations also in the social or organisational realm. Our concluding workshop provided additional proof of how difficult it is to open-up the thinking of a relatively closed group of people that actually sees itself as being quite open-minded.

Future research should focus more on the learning 'disabilities' and system imperfections that hinder the further development of LFS. Success stories of cases

that were able to counter these disabilities and imperfections can lead to improved advice and policies.