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# THE POWER OF LOCAL

## – sustainable food systems around the Baltic sea


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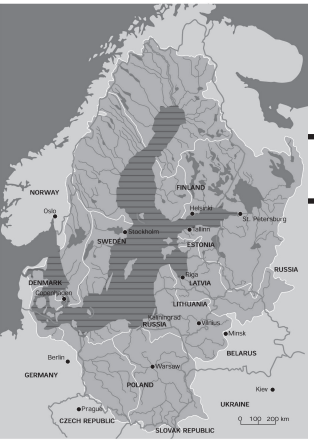
**Interdisciplinary Synthesis of the BERAS project**

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*The Power of Local*
*- sustainable food systems around the Baltic sea*
*Interdisciplinary Synthesis Report of the BERAS project*

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# Material and methods

This chapter introduces the cases and the disciplinary approaches and methods. Details can be found in the work package reports (see *List of work package reports of the BERAS project* at the end of this report, for the scope of each workpackage see Fig. 2). The actor participation and the interdisciplinary process are also described.

The BERAS study had a case study approach, and this report presents the interdisciplinary synthesis of the multidisciplinary study (see *Conceptual Framework* for definitions). Ultimately, the BERAS study attempted to clarify the potential impacts of enhanced localisation and recycling rather than to compare the average status of the present local, organic food systems and organic farms with the dominant food systems and agriculture. Those parts of the BERAS case study work utilised in the interdisciplinary synthesis are itemised below. For the case food systems and case farms utilised, see Table 1.

- Study of the initiatives in local, organic food and the interactions between actors conducted through interviews and workshops, with a historical perspective included
- The situation as perceived by actors in the local, organic food chains was compared with the situation in the dominant conventional food chains represented in the case food systems
- Monitoring of the purchase of local, organic food by consumer groups
- Investigation of present waste management and discussion of the potential for enhanced recycling
- Comparison of the state of the case farms with national statistics
- Drawing up of scenarios on the basis of the case farms for examination of the prerequisites and potential for and the effects of further localisation and enhancement of recycling on the case farms, and for assessment of the impact of converting all agricul ture within the drainage area of the Baltic Sea to recycling, organic agriculture
- Reviews of the literature
- Discussion of the obstacles and alternative solutions identified with the above-mentioned approaches, carried out with stakeholders for purposes of feed-back, revision and verification

Triangulation of data sources (e.g., cases), investigators, theories and methods was carried out. The disciplinary work was done in interaction with an interdisciplinary process to create a synthesis that would provide answers to the common research questions.

### Case food systems: location, description and aspects studied

The BERAS study was based on case food systems in the eight partici-

| Country | Case scale | Inhabitants/km² country/county/municipality | Age distribution in the municipality (%) | | Unemployment rate[1] (%) country/county | Organic production (%) country/county/municipality | Special features |
|---|---|---|---|---|---|---|---|
| Sweden | Farms, village (country) | 20/151/23 | 0-14<br>15-24<br>25-44<br>45-65<br>Over 64 | 20<br>14<br>26<br>25<br>15 | 6,5/5,7 | 7/6/43 | Declared as an "Ecological municipality" in 1993. Antroposophy-inspired movement with pioneering biodynamic farming and processing. |
| Finland | Farms, municipality (country) | 17/12/6 | 0-14<br>15-24<br>25-44<br>45-65<br>Over 64 | 15<br>10<br>22<br>31<br>22 | 8,8/12,5 | 7/7,9/16 | Declared as an "Ecological county" during 1980's. Pioneering municipality in organic production.<br>Strong local identity. |
| Denmark | Farms and its customers, county | 125/135/67 | No data available | | 6,4/7,3 | 6/1,9/- | Biodynamic farm and consumer movement, box scheme started 1994. |
| Germany | Farm and its customers | 230/30/15 | 0-14<br>15-24<br>25-44<br>45-65<br>Over 64 | 17<br>11<br>33<br>16<br>23 | 10,3/18,4 | 4/-/- | Village with a formerly state-owned farm in East Germany, now owned by an enthusiastic and active farmer. |
| Estonia | Village | 30/230/27 | No data available | | 9,7/- | 4/-/- | Anthroposophy- inspired Camphill community, initiative for adults with special needs. |
| Lithuania | Municipality, county | 52/85/27 | 0-14<br>15-64<br>Over 64 | 21<br>56<br>23 | 11,4/8,5 | 0,3/-/1,0 | Local marketing through organic producer cooperative |
| Latvia | County | 36/16/16 | No data available | | 10,4/- | 2/-/- | 90% of farms are very small. Regional organic initiatives with cooperation between farms. |
| Poland | Municipality, county | 124/78/184 | 0-19<br>20-29<br>30-49<br>50-65<br>0ver 64 | 28<br>15<br>29<br>16<br>12 | 19,0/17,8 | -/-/- | Pioneering in organic and local processing and marketing initiatives. |

**Table 1.** *Demographic and socio-economic features of the eight case food systems.*

[1])*Eurostat news release 126/2005 and national statistics for 2004.*

[2])*Organic farming as percentage of the total utilised agricultural area in 2002. Eurostat, European Environment Agency and national statistics.*

pating countries around the Baltic Sea and on 42 case farms, some of them included in the case food systems and some of them outside (Fig. 5, Table 1). The former farms were organic farms typical for the case food system, while the latter were organic farms with advanced recycling. The farms with advanced recycling had at least 85% self-sufficiency in fodder and also produced bread grain or other cash crops for human consumption. The main focus was on one Swedish (Järna) and one Finnish (Juva) rural food system, where initiatives had been taken by actors in local, organic food, the first more than 40 years ago (for the location of the case food systems, see Figure 5).


**Figure 5.** *Location of the case food systems.*

Food systems, especially their demographic, social, cultural, economic and political characters, and the role and structure of agriculture differ markedly in the eight countries (Table 1, Fig. 6). It follows from this that the locality and degree of recycling, as well as the obstacles to the further development of locality and recycling, vary significantly. Sweden, Finland, the former West Germany and Denmark were industrialised early under conditions of market economy, thanks in part to policies aimed at reducing the cost of food, raising farm income and releasing labour for other industries. Their agriculture is intensive and based on external inputs. In the former Soviet countries Estonia, Latvia and Lithuania and in the former German Democratic Republic (GDR), agriculture was industrialised only after the second world war and as part of a planned economy. But some small-scale subsistence farming continued to exist. In these countries, and in Poland, the switch to a market economy occurred as late as 1990, when large, market-oriented farms emerged. In Poland, where most farms were privately owned even before the political upheaval in 1989, agriculture is clearly less industrialised than in EU and other post-communist countries. In 2000, only half of Polish farms produced primarily for the market, and 70% of farms were smaller than 5 ha. With the admission of the Baltic countries and Poland to the EU in 2004, agriculture faced the challenge of integration.

The available field area per capita in the Baltic Sea drainage area varies widely: 0.32 ha in Sweden, 0.38 ha in Poland, 0.40 ha in Denmark, 0.48 ha in Finland, 0.62 ha in Germany, 0.73 ha in Estonia and about 1

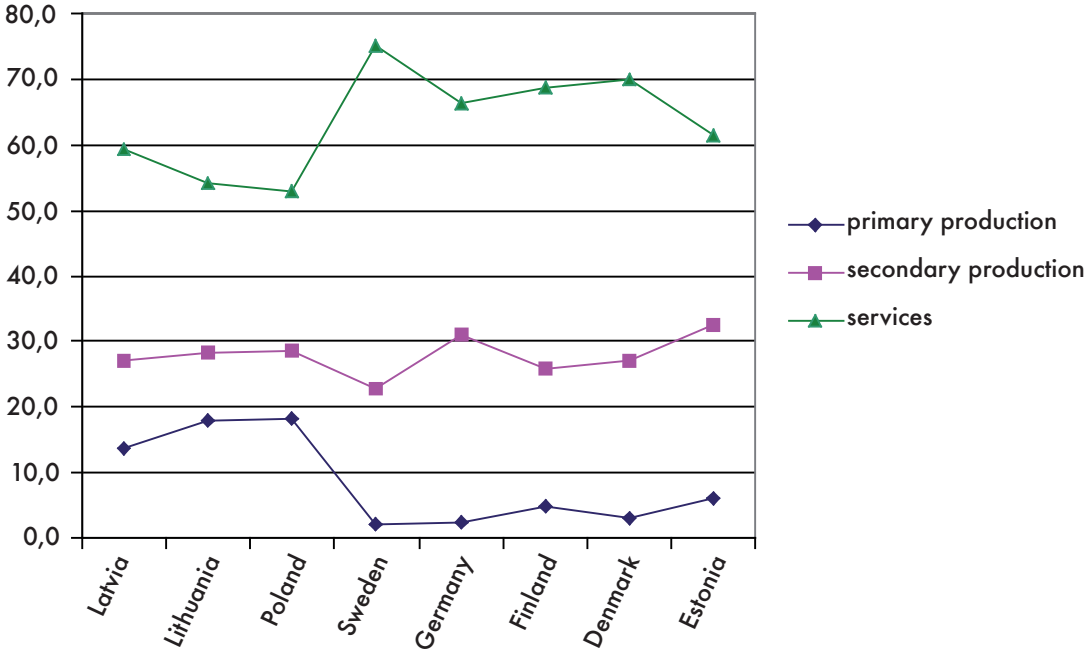


**Figure 6**. *Employment by industry. Employees in manufacturing and construction are included in secondary production, and employees in trade and transport in services 2005 (http://www.tilastokeskus.fi/tup/maanum/12_tyolliset.xls).*

ha in Latvia and Lithuania according to the HELCOM reports for the year 2000. In Sweden and Finland, there is a strong tendency for crop production and animal husbandry to be regionally separated, while the whole Denmark is devoted to animal production. Two thirds of Danish animal production is exported, and half of the fodder is imported. Most farms in the Baltic countries are mixed farms. Agriculture in the Baltic countries collapsed after 1991 due to the loss of the Soviet market, and all three countries relied on subsidised imports from the EU until they themselves joined to EU. In the Baltic countries and Poland, industrial food systems exist side by side with the local ones, organic farming is in its initial stages, though developing quickly, but the organic market is almost non-existent. In Sweden, Denmark, Germany and Finland, local food systems have a marginal position, though they are gaining ground as a viable option; the organic branch has an established share and is growing at a varied rate. The nutrient surplus on the drainage area and thus the load from agriculture to the Baltic Sea is clearly highest in Denmark, but high also in Sweden and Finland. It is lower in Poland and Germany and very low in the three Baltic countries. The load per capita from Polish agriculture is only a third of that from agriculture in Sweden and Finland.

The representativeness of the cases for each country, and for rural food systems around the Baltic Sea, varies markedly, but together the cases provide a representative picture. For example, Järna in Sweden is located close to the Stockholm market (Figure 5). The region has a high proportion of immigrants. The average farm size is considerably larger than the average in Sweden and proportions of the land in the region in both agriculture and urban use are high. Järna also has some special cultural features (Table 1). Juva in Finland, on the other hand, represents a rural county where economic growth and productivity of work are among the lowest in the country. Agriculture, especially milk production, and forestry are of greater importance than in Finnish rural areas in general. Although food processing is well-developed in Juva, an exceptionally low proportion (5%) of the primary agricultural production of the county is processed in the region. Table 2 shows which aspects of each case food system were studied in BERAS.

## Disciplinary approaches

The indicators of sustainability (see *Conceptual framework*, *Sustainability*) were assessed using established methods of environmental, economic and social sciences, described in detail in the respective WP reports and shortly outlined in the following.

| Country | Case | Environmental sustainability | | | Economic sustainability | | | Social sustainability | | Actor networks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Nutrient surplus | Energy use | Global warming | Environ-ment | Local community | Farm | Social capital | Other | |
| Sweden | Farms | x | x | x | | | x | | | |
| | Processing | x | x | x | | | | | | |
| | Transport | x | x | x | | | | | | |
| | Consumers | | | | | | | | | |
| | Food system (village) | x | | | | | | x | x | x |
| | Country | | | | $x^2$ | | | | | |
| Finland | Farms | x | $x^1$ | $x^1$ | | | x | | | |
| | Transport | | x | $x,x^1$ | | | | | | |
| | Processing | | $x^1$ | $x^1$ | | | | | | |
| | Consumers | | | | | | | | | |
| | Food system (municipal) | x | | | | x | | x | x | x |
| | County | | | | | $x^1$ | | | | |
| Denmark | Farm and its customers | x | | | | | x | | | |
| | County | x | | | | | | | | |
| Germany | Farm and its customers | x | | | | (x) | x | | x | x |
| Estonia | Farms | x | | | | | | | | |
| | Food system (village) | | | | | | | | x | |
| Lithuania | Farms | x | | | | | | | | |
| | Municipality | | | | | | | | | |
| | County | | | | | | | | | |
| Latvia | Farms | x | | | | | | | | |
| | County | | | | | | | | | |
| Poland | Farms | x | | | | | | | | |
| | Food system (municipal) | | | | | | | | x | |

**Table 2.** *Use of the case food systems in the assessment of environmental, economic and social sustainability.*

*[1]) Results are based on a regional agro-economic (RegAE) model.*

*[2])Results are based on a literature rewiev.*

**Assessment of ecological sustainability**

For assessment of ecological sustainability, fields, farms, processing and packaging, transportation, and waste management of the food system were investigated. Assessments were made as follows:

- Nutrient loads from fields were obtained by direct measurements.
- N and P balances on farms were calculated.
- Nutrient surpluses of the organic, recycling farms were compared with statistics representative of the present dominant farming system. The comparison was performed on the basis of the primary nutrient efficiency (PNE), which indicates the ratio of harvested nutrients to input nutrients from outside the system (here the farm) to crop production.
- Material, N and P flows in the waste management system were identified.
- A life cycle inventory (LCI) of energy and material use was perfor

med on farms and for different product chains including processing, packaging and transportation. The consumption of primary energy resources and global warming potential (GWP) were then calculated.
- Use of non-renewable energy and GWP in the cases was compared with average figures for the dominant food chains presented in literature.
- Pesticide use and its development were approached through national statistics.

**Assessment of economic sustainability**

There were six different economic analyses making use of different theoretical frameworks and methods.

- Two studies on farm economics were based on production economics where the data consisted of real farm-level costs. The method was cost calculation and linear programming maximising total gross margin.
- Scenarios were developed to assess the potential gains and income forgone by enhanced localisation and recycling and evaluate the effects of incentives. Sensitivity of farm activities to changes in prices and subsidies were studied indirectly on the basis of validity ranges. Numerous institutional and environmental constraints were analysed.
- A scenario was developed to describe regional economic and environmental impacts through an extended regional input-output model (RegAE).
- A literature review was carried out on the costs at societal level of reducing nutrient emissions to the Baltic Sea and on the willingness-to-pay for this reduction.
- A study on social capital utilising the concepts of trust and resilience and data from in-depth interviews with entrepreneurs.
- A consumer expenditures survey of households committed to environment and health was carried out, on the basis of food purchase diaries, and compared with national average.

**Assessment of social sustainability**

Since the social reality of any food system is created by actors involved in these systems, and by the relations between the different actors and the wider social context, the alternative food systems (AFS's) were approached through the perspectives and perceptions of the involved actors.

Interviews based on an argumentative attitude approach were conducted with farmers, processors, traders, consumers and politicians in Finland, Sweden, Poland, Estonia and Germany. In all countries, the studies were conducted along the lines of qualitative attitude research using the same questions (statements). The common overarching question was: How do the involved actors evaluate alternative food systems

(organic mode of production and local distribution), and especially, how do they evaluate them in terms of social sustainability? Social sustainability was further viewed in terms of

- social capital/trust in the networks (see also Assessment of economic sustainability),
- viability of local community, and
- equity/fairness in the distribution of control and benefits among the actors, especially from the farmers point of view.

### Actor participation

Obstacles and alternative solutions were identified on the basis of actor interviews and workshops and the disciplinary studies described above. Semi-structured interviews and meetings were conducted in Sweden and Finland. Key informants were utilised in addition to open participation. In Sweden (Järna), meeting formats were based on Open Space Technology (first meeting addressed to positive considerations and the second to the changes needed to improve the system) and a variation of Appreciative Inquiry. Instead of focusing on problems, the choice was made focus first on the moments of innovation and breakthrough in the development of the local food system at Järna. Through this approach the participants sought to discover what makes the Järna food system a positive example. The meetings were documented.

In Finland (Juva), an open meeting was arranged for all interested actors along the food chain. Key actors were invited personally, but in addition there was an open invitation. Afterwards the discussion was closely analysed. In addition, in both Sweden and Finland, constraints on the use of local, organic food in households were monitored. A meeting of actors was organised at the end of the project to present, obtain feedback on, and discuss the main results and appropriate conclusions, especially the obstacles to and alternative solutions for sustainable localisation and recycling. All the main food system actor groups (farmers, retailers, processors, institutional kitchens, municipality executive board) were represented. Meetings between researchers and individual actors or actor groups were also organised throughout the study.

### Interdisciplinary process

BERAS was designed as a multidisciplinary study, and to begin with there were no plans for an interdisciplinary approach. During the first year of the study, however, it became evident that there was a tendency for the different disciplines to formulate their own research questions and hypotheses from their own disciplinary perspectives and scientific interests. It became clear that relevant results that could form a solid basis for decision-making of actors required interaction among the disciplines. Interaction was essential if conclusions were to be drawn about the impact on sustainability with all its three dimensions, which was the implicit evaluation criterion for agriculture and food systems in the study. Interaction was also needed if conclusions were to be drawn

about a sustainable way to localise and recycle, taking into consideration the impacts on all the dimensions, and if alternative solutions were to be presented. Klein's (1990) classic generic model for an interdisciplinary research process was therefore applied as far as was possible given that the design, structure and organisation of BERAS were not primarily aimed at interdisciplinary work. Hence the interdisciplinary process was considered the method to obtain the interdisciplinary synthesis, which is presented in this report. The model was as follows:

1. Problem definition
    a. Defining the problem (question, topic, issue)
    b. Determining all knowledge needs
    c. Setting the integrative framework and appropriate questions
2. Division of tasks
    a. Specifying particular studies to be undertaken
    b. Role negotiation in teams
    c. Gathering current knowledge
    d. Resolving disciplinary conflicts by working towards common vocabulary
    e. Communicating through integrative techniques
3. Integration and evaluation
    a. Collating all contributions and evaluating their adequacy, relevance and adaptability
    b. Integrating the individual pieces to determine a pattern of mutual relatedness and relevance
    c. Confirming or disconfirming the proposed solution (answer)
    d. Deciding about future management or disposition of the task project

The main deviation from the generic model was that the interdisciplinary research was started late and performed as a secondary task beside the multidisciplinary research and development, which was the main approach of the study. Thus, specifying particular studies to be undertaken and role negotiation in teams were weak points as these had already been specified in the teams from a disciplinary point of view, and there were few opportunities for complementation. Nevertheless, the process was carried out to completion, with due attention to the definition of interdisciplinarity and quality criteria presented above (*Conceptual framework*, *Interdisciplinarity*).