

QLIF subproject 6:

Transport, trading and retailing



Photo: Organic Denmark

Development of strategies to improve quality and safety and reduce costs along the food supply chain

One of the aims of QLIF subproject 6 was to provide a better understanding of the supply chain performance and the collaboration system of organic supply chains. A notable finding was that supply chain actors with a high collaboration index outperformed respondents with a lower collaboration in terms of overall, non-financial and financial performance. Also, there is evidence that the higher the perceived risk for quality and safety is, the higher the probability that collaborative practices were in place. Nevertheless, overall, the level of collaboration is still too low.

In a second part of QLIF subproject 6, HACCP case studies and training courses have been developed with special reference to organic agriculture. A HACCP approach to food safety management can be applied throughout the food chain, from farm to fork. Although a HACCP approach is not a legal requirement in primary production in the EU, it is recognised as an effective and logical means for food safety control that is equally applicable to agriculture including organic and low-input production systems.

Quality and safety of organic products is advanced by controls to prevent potential hazards and by sharing of information

Case studies of organic supply chains

One of the aims of QLIF subproject 6 was to provide a better understanding of the supply chain performance and the collaboration system of organic supply chains. This specifically included a focus on the effect of supply chain relations on quality and safety performance.

Photo: Organic Denmark



As supply chains for high-quality foods are complex and product-specific, a case study approach was chosen, which was conducted for six organic supply chains: milk, apples, pork, eggs, wheat and tomatoes. Thus, on the basis of case studies, we analysed the supply chain structures for these organic commodities in Europe, and identified the economic pressures in organic supply chains which impact on food safety and quality.

Strengths and weaknesses of the chains

Our analysis identified a number of strengths and weaknesses of European organic supply chains. Thus, the following *strengths* appear:

- adoption of traceability procedures
- customer feedback procedures
- labour force and managerial skills
- use of extra quality management systems

On the other hand, main *weaknesses* are:

- high logistic and transport costs
- high levels of input costs
- low spending on research and product development

While input, logistic and transport costs are considered to have only a low impact on food quality and safety, the situation is different for expenditures on research and product development. Increased expenditure on research and product development offers the greatest potential for quality and safety improvement in organic food supply chains.

Supply chain collaboration structures

Collaboration between supply chain actors is a means to reduce the costs identified as weaknesses. To analyse organic supply chain collaboration, we looked at relationships with respect to: (1) trust, perceived risk to food quality and safety and level of formalisation; (2) the impact of collaboration on financial and non-financial supply chain performance.

There were five main reasons for the organic supply chains to establish close supplier-retailer relationships, all of which were related to information-sharing: product quality, timely delivery, product safety, prices and price changes, and demand forecasts.

The level of collaboration was measured with respect to information sharing, decision synchronisation and incentive alignment. While we found a high level of collaboration on information sharing, there was a very low level of collaboration with respect to incentive alignment and decision synchronisation. Indeed, there is almost no collaboration with respect to joint decisions on optimal order quantity and inventory requirements as well as for all cost relevant issues of the supply chain. Similarly, collaboration with respect to research and product development is low.

A notable result was that supply chain actors with a high collaboration index outperformed respondents with a lower collaboration in terms of overall, non-financial and financial performance. Also, there is evidence that the higher the perceived risk for quality and safety is, the higher the probability that collaborative practices were in place. Thus, when significant risks are perceived – here for product quality and safety – the chain actors engage in knowledge creation and sharing of information benefits. Nevertheless, overall, the level of collaboration is still too low.

Systems for hazard and quality control

HACCP (Hazard Analysis and Critical Control Point) is a system of food safety assurance based on the prevention of food safety problems. The philosophy in HACCP therefore has a role to play in food safety and quality assurance in organic production, including management of quality attributes special to the organic nature of the product.

A HACCP approach to food safety management can be applied throughout the food chain, from farm to fork. Although a HACCP approach is not a legal requirement in primary production in the EU, it is recognised as an effective and logical means for food safety control that is equally applicable to agriculture including organic and low-input production systems.

In QLIF subproject 6, HACCP case studies and training courses have been developed with special reference to organic agriculture.

Outline of HACCP case study documents

Case study documents have been prepared for field vegetables, wheat for bread making, apples, eggs and dairy (milk production). The focus is on on-farm operations (primary production), where the application of the HACCP technique is most problematic and where guidance on best practice most applicable.

The case studies, published as a single document, are based on a common format and are in three sections.

Section 1: How to set up and conduct an organic HACCP study. Firstly, a description is given of stages that need to be considered in sequence to develop a HACCP system in the organic sector. This has proved important as it is necessary to incorporate current best practice and to help the organic sector meet international standards such as ISO 22000.

Section 2: Hazards in organic production. Here an overview is given of the different hazards, including food safety and product quality attributes. The latter is particularly relevant to the organic sector, where issues such as organic integrity and nutritional quality are potentially important issues to be identified and controlled within a hazard analysis and control system.

Section 3: Example of an organic HACCP study. To demonstrate the application of HACCP principles a worked example is pre-



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sented for the crop or animal production system under consideration. The example is used to illustrate the application of HACCP principles involving identification of prerequisite programmes, operational and Critical Control Points (CCP).

Role of prerequisite programmes and CCP

The control of food safety hazards in primary production relies principally on reducing the likelihood of introducing a hazard to the product rather than eliminating or reducing the hazard in the product. The former are controlled by prerequisite programmes and the latter at CCPs. In general, the severity of the consequence in the case of failure of the control measure is greater at a CCP which therefore needs more frequent monitoring. In agriculture there are few, if any, true CCPs. There are, however, a number of points in the process where specific control is necessary to prevent the occurrence of a hazard. These may be designated operational prerequisite programmes where there is greater focus on checking the performance of the control.

HACCP training

An organic sector HACCP course was developed and specifically tailored with practical exercises adapted from the case studies. Focus was on the primary sector (crops and livestock production) and food safety hazards and key organic quality attributes. The main priority was to train the trainers, i.e., those people who can then transfer the ideas in their own country - that is to the practitioners. In this way an active dissemination of the subproject results was facilitated. Courses were held in five countries with QLIF partners and attended by ~100 participants.

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Links

Find more information at www.qlif.org

Selected publications

Naspetti S, Paladini ME, Bteich MR and Zanolì R (2008). Collaborative relationships in the organic wheat supply chain: a case study on three EU Countries. In: *Cultivating the Future Based on Science*, 2nd Scientific Conference of the International Society of Organic Agriculture Research ISOFAR, Modena, Italy, June 18-20, 2008. Vol. 2, pp 404-407

Stolze M, Bahrtdt K, Bteich MR, Lampkin N, Naspetti S, Nicholas P, Paladini ME and Zanolì R (2007). Strategies to improve quality and safety and reduce costs along the food supply chain. In: *Improving Sustainability in Organic and Low Input Food Production Systems* (Niggli U, Leifert C, Alföldi T, Lück L and Willer H, eds). Proceedings of the 3rd International Congress of the European Integrated Project Quality Low Input Food (QLIF), March 20-23, 2007, Hohenheim, Germany, pp 405-410

About QLIF

The Integrated Project QualityLowInputFood aims to improve quality, ensure safety and reduce costs along the organic and low-input food supply chains through research, dissemination and training activities. The project focuses on increasing value to both consumers and producers using a fork-to-farm approach. The project is funded by the European Union and runs from March 2004 to March 2009. The research involves thirty-one research institutions, companies and universities throughout Europe and beyond.

QLIF comprises seven subprojects on:

- 1) Consumer expectations and attitudes
- 2) Effects of production methods
- 3) Crop production systems
- 4) Livestock production systems
- 5) Processing strategies
- 6) Transport, trading and retailing
- 7) Horizontal activities



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Information on partners and subprojects is found at the project website www.qlif.org. The website also holds the library for project newsletters and serves as entry to Organic Eprints, where more than 100 publications from the QLIF project are available: http://orgprints.org/view/projects/eu_qlif.html