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## Traceability and certification in food quality production – a critical view

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### Introduction

Traceability and certification in quality-assurance systems are issues which are widely discussed and which are the basis for major initiatives in policy, agricultural interest groups and agri-food industries.

This paper outlines some arguments on these issues, which are meant to initiate a discussion on the appropriateness of principal developments and on the needs for engagements of research either to support or to change their course of direction.

It is the opinion of the author that present discussions and initiatives have lost focus on the key visions and messages of quality management as it developed during the last twenty years. It largely disregards developments in research and experiences from industries, and builds on the knowledge status of many years ago. This opinion is based on ongoing developments with sector-oriented quality-assurance systems in various countries like, e.g., the German initiative Q+S (Budde and Richard 2002).

Difficulties in discussions are partly due to differences in focus. The focus of quality-management research is primarily on enterprises and on enterprise-level management approaches. If a sector is involved in quality discussions, it usually builds on clearly separated supply chains and brands like, e.g., in the automobile industry. The view is closely linked to the enterprise approach and covered by traditional quality-management research.

The agri-food sector is different in many aspects, which makes it difficult to link traditional enterprise-oriented quality-management approaches with quality-assurance requirements of the sector. Its infrastructure is characterized by a large number of rather small production enterprises (farms) on one end and internationally operating industries and retail chains for input delivery and food-product sales on the other end. The dependency on natural production environments sets limits to the control of production environments and makes the delivery of a comprehensive food program or the use of food-product ingredients dependent on a diversity of production sources on a global scale. Basic food products are similar in appearance irrespective of their source and quality, which reduces consumers' ability to make informed decisions.

However, difficulties in the utilization of enterprise-oriented quality-management approaches for the solution of sector quality-assurance problems should not result in the negligence of quality-management research results, but challenge quality-management research to find appropriate ways for the transfer of its accumulated knowledge from an enterprise into a sector view.

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It is the purpose of this paper to analyse some of the problems in sector-oriented quality-assurance approaches and to identify options for the transfer of established quality-management concepts and experience into the sector. The discussion has to some extent to rely on logical arguments and expert conclusions from general observations of developments, as scientific empirical studies on these subjects are still rare.

The next chapter focuses on the difference between enterprise-oriented quality-management and sector requirements. A key critical success factor for sector initiatives is 'consumer trust' and its support through various means like, e.g., certification. These issues are discussed in following chapters. The last but one chapter integrates the arguments into a basic framework for sector quality development in which traceability and certification have their place, but with less prominence than suggested by the current agenda of public discussions.

### **Enterprise vision and sector initiatives: the conflict**

The term "quality management" describes a dynamic management perspective with an offensive and strategic vision. It evolved from half a century of initiatives initiated by Demin (1986) and continued by authors like Juran (1988), Crosby (1979), Ishikawa (1982), Taguchi (1986) and others (for a historical overview see Brocka et al. (1992)). Its core messages focus on development paths towards

- meeting customer expectations (described as quality),
- motivating people to engage in self-control and quality improvement, and
- improving process reliability and process efficiency.

Current discussions and initiatives on tracking, traceability and quality certification throughout agriculture and the agri-food sector are primarily defensive. Their focus is on external inspection and the establishment of sector-wide monitoring infrastructures, which are supposed to guarantee certain baseline quality characteristics and, in case of failures in delivery, to identify possible sources and causes for further action. However, the establishment of monitoring and inspection systems free of risk is an illusion. Any failure to deliver quality in any part of such a system – which is supposed to deliver quality in food and perceived by consumers as risk-free or with a low risk – might discredit the whole sectoral monitoring infrastructure, while consumers will be unaware of any other accomplishments. Previous experiences with universal monitoring systems which had to be abandoned after food-quality failures support this view. A case in point is the German sector initiative 'Kontrollierte Produktion' (controlled production), which was abandoned after the BSE crises reached the country.

Professional evaluations of control systems usually focus on probabilities of failures derived from expert judgement or statistical experience and on probability-based definitions of food safety. However, customer evaluations are based on customers' subjective judgements of risk, which develop from different perspectives. It is sometimes argued that 'quality' and 'food safety' are commodities attached to products which could be handled like any other physical commodity. This argument builds on the assumption that one could link the commodities to undisputed objective values. While this may be feasible in certain environments, in Europe it is certainly not.

The main tasks in the marketing of any quality management system are to

- reduce a gap between customers' risk perception and experts' risk judgement and

- reach a level of risk perception where ‘distrust’ or unacceptable risk switches to ‘trust’ or acceptable risk.

### **The key issue: trust**

The principal approaches for building trust are the experiences and ‘beliefs’ of the consumers. Experience takes time to develop and can easily be shattered by singular events of system failures, whatever their statistical probability, if they are perceived as ‘severe’ by consumers. The feature of traceability does not improve or protect trust acquired through experience, i.e., the negative effects of system failures cannot be counterbalanced by the existence of a traceability feature.

Trust built on beliefs could develop faster on arguments convincing to the target group. And this type of trust remains more indifferent to singular system failures if the beliefs do not only refer to the system itself and its monitoring and control structure but also to underlying supporting elements, which may not have failed, i.e., where the foundation of system trust remained unshattered. In this context a traceability feature could have a positive effect if it demonstrated the stability of the supporting elements. This would allow a delineation of system failures from the supporting elements.

It is obvious that a combination of experience and beliefs would be the most stable basis for sustainable trust and the target to be approached. However, market pressures towards food-quality and food-safety guarantees force the sector to implement concepts which, in a first step, build on beliefs and lay the ground for the subsequent development of experience. A starting point for beliefs could be the ‘appropriate’ communication of objective probabilities for system failures derived from expert judgement or statistical experience. It is sometimes argued that a low failure probability could be communicated as ‘safe food’. This might be the appropriate communication approach if consumers translate it back to ‘low failure probability’. However, if consumers translate it back to ‘zero failure probability’, any system failure will discredit the communication system. A communication system in the sensitive area of trust needs to build on a thorough analysis of consumers’ perceptions of communication concepts. It is our opinion that in food-safety discussions, probabilities from expert judgement or statistical experience still receive too much attention as compared to consumers’ perception of risk.

It is common understanding that principal supportive elements are (a) trust in the appropriateness of processes and (b) trust in people. The first element has been the essence of quality management from the very beginning. In this approach, trust builds on impressions of customers that a certain quality-assurance system is based on a progressive system approach where quality guarantees are combined with continuous and reliable quality assurance and improvement efforts. Such impressions can be developed for integrated food supply chains with clearly distinguishable brands or for clearly identifiable sub-sectors like the sub-sector for organic food.

Trust in the appropriateness of processes may receive additional support through reverse backward tracing. In this approach, backward tracing does not refer to failures but is used for the provision of supporting quality information like, e.g., the display of animals’ living conditions or the display of controls to consumers. This type of personal monitoring of guarantees by consumers may serve as a substitute for process guarantees provided by, for instance, certification.

The second principal supportive element, trust in people, builds on human relationships and longstanding established experience with the trustworthiness of

people who provide personal guarantees on the effectiveness of controls or the reliability of processes. Examples, which were well publicized during the BSE crises, are

- trust in the safety of organic food which did not build on traceability but on images of quality and reliability based on trust in the dedication of people, and
- common references to local butchers with their direct and longstanding supplier–customer relationship with consumers.

## **Certification as a Means for Trust**

It is a common approach to use third parties to support promises of guarantees, which build on control systems or appropriate process-organization and process-improvement systems through auditing and certification procedures. In food marketing, the value of such procedures depends on their ability to generate trust. Certification might support the development of experience or beliefs if critical customers understand a certification approach and is itself accepted as a trustworthy approach.

However, it is doubtful that certification in a general sector (network) control system can fulfil all the expectations. Network systems build on generally accepted quality levels which, as a consequence, tend to result in low-level guarantees. Supply chains in network systems evolve from actual market operations with changing partners and usually do not involve clearly visible ‘trusted’ supplier-customer relationships. In this scenario, quality-improvement initiatives face co-ordination problems and are of rather limited value to participants and customers. Participants have difficulties to disconnect from the network in case of system failures anywhere in the network. Customers have to build their trust on a system, where guarantees primarily have to depend on the inspection system but less on widely accepted personal responsibilities or process organizations. This increases the risk of failures and reduces the value of guarantees for customers.

Certification in this application scenario lacks improvement potential and the personalization element, which might shield it against the loss of trust in case of failures. Its main application value might be in the establishment of a new system as long as no failures occur.

Sustainable and effective certification must allow clearly identifiable segmentation through, e.g., branding of products from clearly specified supply chains. Branding based on clearly identifiable participants supports self-control, motivation and competitive quality improvement. Closed supply chains are the natural basis for high-quality branding, high value of certification, and high differentiation potential in case of system failures within the network as a whole.

However, while a general closed-chain approach might be appealing from a quality-assurance point of view, it is not a feasible solution for the agri-food sector as a whole. The dependency of agricultural production on natural production environments leads to fluctuations in quantity and quality, and, in turn, to conflicts between the needs of markets for continuous delivery of a certain quality and the actual service possibility. This requires sector buffers and a sector organization, which is best modeled by a sector network with chains or enterprises as member units.

## A basic framework for sector quality development

The various arguments in the preceding chapters can be grouped into a framework for sector-oriented quality-assurance systems in the agri-food sector. It views the sector as a network of interconnected enterprises for the production and delivery of food products. The framework involves the following main features:

- Establishment of a hierarchical control and certification system which allows a clear, understandable and accepted identification of different levels of food quality and food safety.
- Visible delineation of co-operating sub-networks for the introduction of stricter quality claims and for improved utilization of quality-supporting elements. This would facilitate a dissociation of sub-networks from the general network in the perception of customers in case of failures of the general control system.
- Utilization of quality-supporting and trust-generating elements by clearly identifiable sub-networks: (a) Personalization may be introduced through the organization of identifiable sub-networks consumers can identify themselves with (e.g., regions), the implementation of reverse backward tracing, or the activation and communication of dedication by people or groups involved. The latter requires, to be effective, a motivating incorporation of enterprises from all stages of the production and delivery process. (b) The activation and communication of processes with a convincing built-in continuous quality-improvement feature.

The principal framework needs to be translated into sector activities. The identification of sub-networks through branding is not enough. The framework asks for a different understanding of branding as a comprehensive ('total') approach for quality assurance. It also changes our view on the development of market organizations towards a further electronic integration. It is best modeled by a network of interconnected but separable trade platforms which link participants of sub-networks (Lazzarine, Chaddad and Cook 2001; Hausen, Helbig and Schiefer., 2001). Similar approaches need to be designed for other aspects of sector developments, which could together form a comprehensive quality-assurance model for the agri-food sector.

## Conclusion

Developments in food markets ask for sector quality-assurance systems. However, the focus of traditional quality-management research is on enterprises and not on sectors. The transfer of quality-management principles into sector environments and the analysis of customer reactions on failures in food safety provide the basis for a sector quality-assurance model. While the principal elements of such a model seem to be clear, the translation into activities and organizational infrastructures still needs to be done.

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