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Quality management in the Pangasius export supply chain in Vietnam

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3 Theoretical Review

3.1 Introduction

This chapter reviews the main theoretical and empirical literature related to the involvement of smallholders in export supply chains of the Vietnamese fish industry. Using a farmer perspective as the point of departure, aspects of how to link farmers to export markets are examined and discussed. Food quality management is a key issue in export supply chains. The need for quality management along the agri-food chain has increased due to serious food crises[6] that have occurred in the food industry. Due to stringent food safety standards, involving small-scale farmers in global food chains would require strong quality management. Attention is paid to the institutional requirements that enable smallholders to meet the more stringent food safety and quality regulations. This attention also requires a fundamental reorganization of smallholder production systems and business relationships among chain actors to provide opportunities to smallholders and therefore adjust their supply to meet global food quality standards.

This chapter summarizes food-quality management development in the first section. Subsequently, the global value chain approach is presented. This section followed by a discussion on the role of smallholders in global value chains. Particularly, the challenges of inclusion of smallholders in global food chains and the possible solutions to solve the smallholders' problems are presented. The final pages of the chapter presents empirical studies of successful cases of inclusion of smallholders in export chains.

3.2 Development of food quality management: quality control and quality assurance

During the last half of the twentieth century the complexity of agro-food supply chains has increased considerably. Raw materials are obtained from sources worldwide, an ever-increasing number of processing technologies are used, and a broad range of products is produced. In addition, consumer expectations are continuously changing, with customers demanding more convenience and fresher foods with more natural ingredients. Food quality management has

[6] Bovine Sponggiform Encephalopathy (BSE) and classical swine fever (CFS) in 1997, foot and mouth disease (FMD) in 2001, Avian Influenza in Asia since 2005, Salmonella in the US in 2008, and melamine contamination scandal in China in 2008.

become increasingly important in the agro-food sector (Spiegel et al., 2003), due to changing consumer requirements, increasing competition, environmental concern, and governmental interests. Higher consumer demands regarding quality, traceability and environmental friendliness pose challenges for primary producers, especially smallholders in developing countries (Henson et al. 2000; Humphrey and Oetero, 2000).

The implementation of quality management has evolved from quality control to quality assurance. At this moment, the food industry applies various (combinations of) quality assurance systems such as good practices (e.g. GMP, GHP, GAP), HACCP, ISO, BRC, etc., (Luning et al., 2006).

** Quality control*

Quality control (QC) involves determining what to control, establishing units of measurement for gathering data, establishing standards of performance, measuring actual performance, interpreting the difference between actual performance and the standard, and taking action on the difference in order to prevent quality problems in the next batch/production. Improvement is a form of control in the control process where attention is paid to structural causes and solutions (Luning et al., 2006).

Luning et al., 2006, defines quality control as a combination of technological and managerial quality functions. In an established food supply chain the quality control should be implemented in the process and product of each member. To guarantee quality, these control activities must be directed to critical control points (CCPs). According to Reilly and Kaferstein (1997), important CCPs in quality control at aquaculture farm level are site selection, water management, the use of feeds, the use of antibiotics for fish disease treatment, and harvest (see more details in chapters 8 and 9).

** Quality assurance*

Quality assurance (QA) encompasses all planned and systematic actions necessary to ensure that a product complies with the expected quality requirements. It also provides customers and consumers with the assurance that quality requirements will be met. Quality assurance focuses on system quality instead of product quality. The system must be audited to ensure that it is adequate both in the design and use. Food products are not only tested on their product characteristics, but also on production, packaging, handling and distribution. Quality control is embedded in quality assurance. Control activities form the basis of QA systems, such as HACCP (safety guarantee by using critical control points). The implementation of quality assurance systems, especially in the agricultural-food business, is an issue of the greatest importance. Several characteristics of food chains pose challenges to the QA

system: agricultural products are often perishable and subject to rapid decay due to physiological processes and/or microbiological contamination, most agricultural products are harvested seasonally, and products are often heterogeneous with respect to desired quality parameters, such as size and color; diseases must be prevented and cured, and establishing which measures to allow and how to check their use is not a simple task.Cultivation differences and seasonal variables are difficult to control. Moreover, primary production of agricultural products is undertaken in large part by farms operating on a small scale, e.g., fish culture (Khoi, 2007). Against this background that the total food supply chain must assure and demonstrate that the highest standards of quality and safety are maintained (Hoogland et al., 1998).

** Quality assurance systems and food safety*

Food quality management has become increasingly imporant in the food industry, a fact demonstrated by an increase of applied QA systems and higher requirements within these systems by consumers (Spiegel, 2004; Luning et al., 2006). Moreover, consumer perceptions towards food safety and quality have increased, as reflected in the media attention given to a variety of food safety and quality issues (Luning and Marcelis, 2007). To meet these trends, quality assurance has focused on the fulfillment of quality requirements and proving confidence in meeting customer requirements. In essence, all parties involved in the production process must apply quality assurance measures to control all aspects through the chain that may influence product quality.

In the agro-food industry, QA systems like GMP, HACCP and ISO are widely applied. GMP aims at combining procedures for manufacturing and quality control in such a way that products are manufactured consistently at a quality appropriate to their intended use (IFTS, 1991). HACCP aims to assure the production of safe food products by identifying and controlling the critical production steps (Leaper, 1997; NACMCF, 1998). ISO aims to achieve uniformity in products and/or services, and to prevent technical barriers in trade throughout the world.

At the moment, the basic QA systems are often combined to assure several quality aspects, e.g. the combination of HACCP and ISO 9000 (Barendsz, 1998; Robert, 1999). Moreover, QA systems are often developed specifically for an industry like EUREP-GAP (Euro Retailer Produce- Good Agricultural Practice), for example, which is integrated into new systems such as BRC (British Retail Consortium) and SQF (Safe Quality Food) (EUREP-GAP, 2001). However, total quality cannot be realized by using these specific quality systems, because they each cover only a portion of a quality system. See Table 3.1 for an overview of the characteristics of the QA systems that are most important to the food supply

Table 3.1 Basic and derived quality assurance systems for food safety.

Characteristic		GMP	HACCP	ISO 9001:2000	EUREP-GAP	BRC	SQF
Aim	Food safety	X	X		X	X	X
	Product quality	X	X	X	X	X	X
	Organization quality			X		X	
	Environment, and health and safety at work				X		
	Total quality						
Method	Plan of steps		X				X
	Checklist			X	X	X	
	Guidelines	X			X		
	Awards/Self-assessment						
Perspective	Technology	X	X		X	X	X
	Management			X	X	X	X
Quality management	Quality control	X	X	X	X	X	X
	Quality assurance		X	X	X	X	X
Location in supply chain	Farm sector	X			X		X
	Manufacture sector	X	X	X		X	X
Result	Food safety	X	X		X	X	X
	Product quality	X	X	X	X	X	X
	Organization quality			X		X	
	Total quality						
Composition	Combination of QA systems	-	-	-	-	BMP HACCP ISO	HACCP ISO

Source: Adapted from Van der Spiegel et al., 2004; Khoi, 2007.

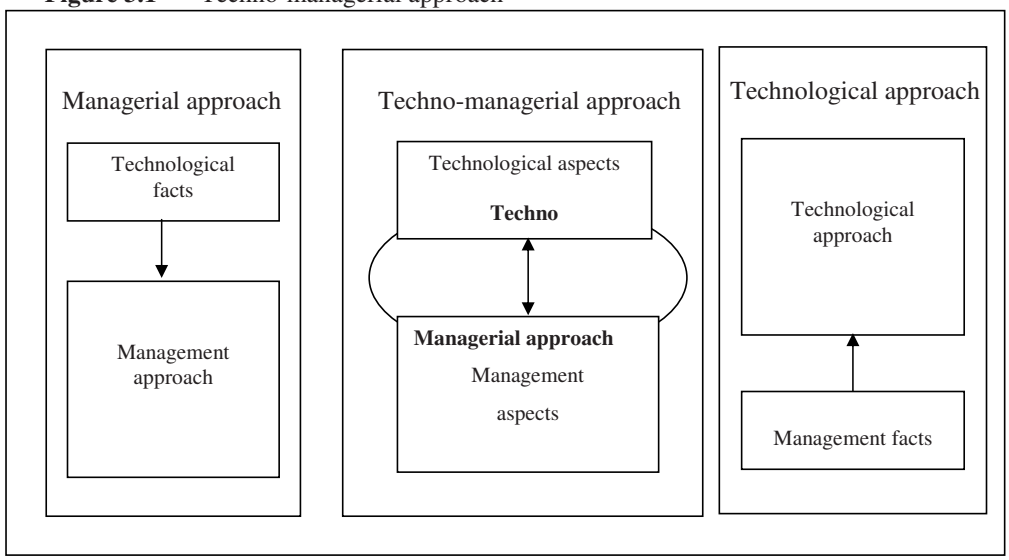
chains. A quality system is defined here as the organizational structure, responsibilities, processes, procedures, and resources that facilitate quality management. Quality management includes the total activities and decisions performed in an organization to produce and maintain a product with a desired quality level at minimal cost.

**Technological and managerial approach in food quality management*

Food quality management involves the complex characteristics of food, such as variability, restricted shelf life, potential safety hazards, and the large range of chemical, physical and microbial processes, in addition to the raw materials of food. According to Luning et al. (2006), food quality management is complicated because it deals with dynamic and complex food systems and people systems involved in realizing food quality. Poon and Lijianage (2003) also observe that food quality management embraces the integrated use of technological disciplines as well as the integrated use of managerial sciences. Both the use of technology to understand behavior of living fish materials and the use of managerial sciences to understand human behavior is needed. Hence, both technological aspects (i.e. fish characteristics and technological conditions) and managerial aspects (i.e. human behavior and administrative conditions) must be managed to improve food quality products.

Luning et al. (2002) propose a techno-managerial approach for food quality management as a way to analyze and solve the complex quality issues. They distinguish between three different approaches: the managerial, the technological and the techno-managerial approach, as illustrated in figure 3.1. The approaches differ in the extent to which they integrate managerial and technological sciences. Technological measures for solving quality issues include, for example, obtaining a better understanding of the chemical mechanisms, the development of more sensitive (e.g., microbial) analyses, and reducing defects by genetic modifications. Managerial measures concern human behavior and human working environments that affect food safety. The techno-managerial approach stresses that integrating the technological and managerial aspects is necessary to predict food systems behavior, and to generate improvements in the system.

Figure 3.1 Techno-managerial approach



Source: Luning et al., 2002.

The *technological functions* are determined by the dynamics of the situation. The quality of food products and raw materials change continuously and can decrease rapidly due to their perishability. Food characteristics and process conditions must be analyzed for us to know how these conditions affect physical product properties. Typical measures to reduce effects of variation and perishability on food quality include the selection of raw materials, processing and preservation techniques, packaging, storage, and distribution. Technological functions involve activities, tools, equipment, or methods that are necessary to produce goods with certain physical properties. Luning et al. (2007) argue that these technological functions are strongly related to the first three primary activities distinguished by Porter (1985), namely the following:

- physical supply and storage of incoming food materials (inbound activities).
- transformation of food materials into processed food products (transformation).
- and physical storage and distribution of processed food products (outbound activities).

From a *managerial point of view*, quality behavior is dependent on the disposition and ability of employees (Gerats, 1990). According to Gerats, factors that influence the disposition are knowledge, standards and information about the results. Additionally, factors that influence ability are skills, competence, facilities, and availability of time. Typical measures to manage human aspects of

food production quality include the provision of suitable facilities, employee training, communication, motivational programs and empowerment, and creating commitment development. It is important to take these aspects into account in when designing the technological functions and tools of quality control.

** The roles of government and other support organizations in food quality management*

Food safety and quality are major issues not only in Europe and in the United States, but worldwide as well. Hanak et al. (2002) argue that governments appear to play a crucial role in helping industries in both developing and developed countries with regard to food safety and quality. Food safety experts from Asia (India, the Philippines, Thailand, Vietnam), Africa (Morocco, Burkina Faso, Ghana, Mauritania, Senegal), and Latin America (Brazil, Costa Rica, Guatemala), representatives of donor agencies (France, Germany, the United Kingdom, WB, FAO, WHO), and members of the European research community also emphasize that food quality assurance cannot be implemented successfully in a country without the support of its governments (FAO/WHO, 2005).

Governments are increasingly responsible for (1) mandating the regulatory requirements, (2) establishing mandated critical limits when necessary, (3) establishing criteria and methods and sampling plans when necessary, and (4) verifying that in individual facilities HACCP plans are adequate enough to assure food safety (Kvenberg et al., 2000; Hanak et al., 2002; Billy, 2002; Ababouch, 2000). According to Suwanrangsi (2002), the provincial government agencies interacting with the fisheries industry are responsible for promoting the sector's development through the introduction of new technologies, extension, research, training, regulation and inspection. Additionally, the government should use epidemiological and scientific data to identify hazards and conduct risk evaluations, to manage food safety in a more efficient manner, and to reassure public confidence in the food supply. Such measures include regulations and policies, guidance on hazards, risk communication and education, incidents and crisis management (Lee and Hathaway, 1999; Motarjemi and Mortimore, 2005).

Aside from these national responsibilities, governments of developing countries face responsibilities in the international arena. Governments that are not actively present in the WTO and the international standard-setting bodies like the Codex Alimentarius Commission are unable to promote the interests of their domestic food industries. However, governments in the developing world face multiple demands and have a limited capacity to respond. Donor agencies may play a key role in improving developing country food safety management. This role

includes facilitating exchanges to build regional networks; providing support to improve the advocacy capacities of developing countries in international forums, offering assistance in obtaining science-based information for certain tropical pesticides, bacteria, and other contaminants; and building up networks of laboratories, etc. For instance, developing appropriate management techniques for a supply chain facing marketing constraints is clearly a useful mechanism.

3.3 Global value chains

No firm is in complete control of all the resources necessary for its operation. The scarcity of resources impels organizations to develop linkages with the external environment. Many businesses have realized that they can achieve a competitive advantage and improve performance by developing cooperative relations with buyers, suppliers, competitors and other firms (Helper and Sako 1995; Porter 1985). Adequate business relationships are also crucial in investigating of the role of the smalholders in (fish) export chains. The following schools of thought are highly relevant for our study: Global Value Chains (Gereffi et al., 2005), Institutional Economics (North, 1990; Williamson, 2000), and Transaction Cost Economics (TCE) (Coase, 1937; Williamson, 1991).

** Institutional economics*

Institutional economics has been very useful for the study of how agro-food chains are organized. Institutions are defined by North (1990) as "the humanly devised constraints that shape human interaction" and form the "rules of the game" needed to limit transaction costs. Transaction costs are simply the costs of using the market (Coase, 1937), or the costs of running the economic system (Williamson, 1985).

Smallholders must be able to meet market conditions if they are to become players in this game. Moreover, institutions delineate the rules of the game within which a governance structure actually operates. Menard (1995) argues that an institution is manifested in a long-standing historically determined set of stable, abstract and impersonal rules, crystallized in traditions, customs, or laws, so as to implement and enforce patterns of behavior governing the relationships between separate social constituencies. Institutions concern formal arrangements such as property rights, contracts, and authority, as well as and informal arrangements such as norms and social ties in governing a transaction (Granovetter, 1985; Powell, 1990). Formal mechanisms are divided into two categories: contractual or outcome-based mechanisms and organizational or behavior-based mechanisms. These formal mechanisms based on rules, incentives, and authority support inter-organizational transactions by reducing governance problems both ex ante (search and information costs) and ex post (enforcement costs). Informal mechanisms, also referred to as social control and

relational governance, relate to mechanisms of identity (Kogut and Zander, 1996), embeddedness (Granovetter, 1985), trust (Nooteboom, 2002), and routines (Nelson and Winter, 1982). Some authors claim that formal and informal institutions should be considered as substitutes (Ghoshal and Moran, 1996; Dyer and Singh, 1998). Most recently researchers have focused on the dynamic interaction between formal and informal mechanisms of governance (Woolthuis et al., 2005; Lazzarini et al., 2001). They concluded that over time a differential mix of formal and informal mechanisms may lead to the most efficient outcome.

** Global value chains*

In this study, institutional economics is used to analyze the institutional environment that coordinates the connection of smallholders to export markets and helps them comply with quality requirements of foreign customers. The Global Value Chain (GVC) approach applies these insights to understand business relationships in the supply chain. This approach reveals the structure of business relations (including transactions and human behavior) related to information, product, and financial flows through the chains. Hence, the GVC approach offers an opportunity to capture the synergy of intra- and inter-company integration and management (Porter, 1985; Lambert and Cooper, 2000; Luning et al., 2006).

The value chain literature views inter-firm cooperation within the chains as the source of competitive advantage (Porter, 1985; Humphrey and Schmitz, 2000). In agri-food business, the value chains are organized linkages among groups of producers, traders, processors and service providers who join together in order to improve quality and value through their activities (Ruben et al., 2007). According to Porter (1985), the value chain describes the full range of activities that are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), to delivery to consumers, and to final disposal after use. Every firm is part of the value system, and by effective cooperation the entire performance of the value system is improved.

GVC analysis focuses on the vertical relationships between buyers and suppliers and the movement of a product from producer to consumer (Ponte and Gibbon, 2005). Gereffi et al. (2005) identify three variables that play a key role in determining how GVCs are governed and transformed: (1) the complexity of transactions, (2) ability to codify transactions, and (3) capabilities in the supply-base. All variables that determine the shape of the GVC governance structure are related to technology, information (complexity, codification) and the ability of suppliers to learn (capabilities). On the basis of these three variables, the

researchers distinguish five different chain governance types: (1) market, (2) modular, (3) relational, (4) captive, and (5) hierarchy.

Gereffi's concept applies insights from transaction cost economics (TCE) and institutional economics (Williamson, 1985). Williamson defines a governance structure as "the institutional framework within which the integrity of a transaction is decided." According to this theory, the governance structure depends on uncertainty and asset specificity (transaction-specific investments). Asset specificity represents the degree to which an investment is specialized for the needs of a particular supplier or buyer, provoking switching costs. These costs facilitate opportunistic behavior and create hold-up problems. Williamson argues that transaction costs seriously hamper the buy decision if uncertainty and asset specificity apply simultaneously.

Asset specificity and uncertainty are related to Gereffi's concepts of complexity and ability to codify a transaction. If uncertainty is low and no transaction specific investments are needed, i.e. product specification fits within the standards of the industry, the complexity of a transaction will be low. However, the complexity of a transaction may increase if product specifications are unique for a specific buyer. This occurence involves transaction-specific investments and, consequently, strenghtens the financial consequences of uncertainty. In this case, codifiability is used as an instrument to mitigate part of the uncertainty. The latter situation is relevant for many GVCs in the food industry as it relates to quality standards. Quality standards are key and some are codified to reduce uncertainty (quality assurance). Some of the quality standards are transaction specific and involve specific investments. As a result, the transaction costs in monitoring and certifying of the quality standards are high.

Gereffi et al. (2005) add capabilities as an additional variable, which results in a major modification of the transaction cost theory (table 3.2). The relevance of this extension is explained by the fact that the GVC approach has been used to understand the position of suppliers in developing countries and/or emerging markets.

Table 3.2 Governance types[7] for GVC

Governance type	Complexity of transactions	Ability to codify transactions	Capabilities in the supply-base	Degree of explicit coordination and power asymmetry
Market	Low	High	High	Low
Modular	High	High	High	↑
Relational	High	Low	High	↓
Captive	High	High	Low	
Hierarchy	High	Low	Low	High

Source: Gereffi et al. 2005.

Gereffi et al. 2005 show five possible types of governance. *Market* governance is dominant when transactions are easily codified, product specifications are simple and suppliers have the capability to produce without much input from buyers. In the market -based system, there are no specific standards exist to adhere to because the product is standardized. This factor implies that there are low barriers to entry since all products are essentially the same. Due to the standards regarding food quality and food safety, the market governance type is not rampant in GVCs.

Modular governance types arise when the ability to codify specifications extends to complex products and when suppliers have the competencies to supply the required modules. As a result, the need for buyers to monitor closely and control design and production processes is lowered. This governance type is also sufficient if quality assurance is easily controlled.

Relational governance types occur when product specifications cannot be easily codified, products are complex, and supplier capabilities are high. This governance type leads to frequent communication between buyers and suppliers within the framework of a certain degree of mutual dependence, which is regulated through reputation, social ties and/or spatial proximity. As a result, interdependence between actors in the food chain is increasing and traditional outsourcing relations are gradually replaced by preferred supplier regimes (Reardon and Timmer, 2006).

Captive governance arises when the possibility of codifying complex product specifications exists, but the capability of suppliers is low. Consequently, a higher degree of monitoring and intervention by the buyer and to a transactional dependence of the supplier on the buyer occur. This governance type is only feasible if quality assurance is easily organized.

[7] Gereffi et al. (2005) exclude three combinations. The two combinations of low complexity of transactions and low ability to codify are unlikely to occur. The combination of low complexity of transactions, high ability to codify and low supplier capability leads to exclusion and is not considered as a governance type.

Hierarchy (vertical integration) governance occurs when product specifications cannot be codified, transactions are complex and competent suppliers are not available; as a result, the buyer must develop design and production skills in-house. This governance form is difficult to match with smallholders, as it implies the integration of smallholder production in the organization of a processing or export firm.

3.4 The role of smallholders in the food chains and major challenges of their inclusion in food export chains

As mentioned in chapter 1, smallholders play an important role in economic development of developing countries. Most global chains originating from developing countries tend to have a pyramid-shaped structure of which the base is comprised of numerous small-scale primary producers (Kambewa et al., 2007). Several studies (Reardon and Timmer, 2006; Weatherspoon and Reardon, 2003; Delgado et al., 1999) document that in developing countries, food demand for high-value primary products (fish, dairy, meat, horticulture, etc.) is growing rapidly. These trends have fostered increasing integration of smallholders and export firms into supply chains in an effort to link rural perishable supply to international demand (World Bank, 2007). Participation in integrated supply chains potentially opens up new market opportunities for smallholders. As a result, a growing range of interventions have been implemented to link smallholders to high value markets (Temu and Temu, 2005; Humphrey, 2006; Shepherd, 2007). These interventions have involved a range of market intermediaries, from producer organizations and cooperatives to private sector exporters, with both "top down" and "bottom up" approaches (Ruben et al., 2007; Henson and Jaffee, 2006).

Smallholders face numerous challenges in accessing international food markets for their products (Table 3.3). Stringent quality standards in global markets hinder smallholders from participating in export chains (Umesh et al., 2009; Kambewa, 2007; Meer, 2006; Henson and Jaffee, 2006). Smallholders lack the technical capabilities to comply with the quality requirements or the cost of compliance will erode their competitive advantage (Meer, 2006). In addition, retailers and supermarkets vigorously pursue a global sourcing strategy by using their buying power to impose safety and quality standards on their suppliers. For example, EUREPGAP demands traceability of produce from the retail shelf back to the farm gate through a complicated and costly certification process by accredited companies. As a result, the company creates challenges for smallholders who are unable to meet these standards (Doland and Humphrey, 2004; Henson and Jaffee, 2006).

Some researches emphasize the fact that small-scale farmers lack production technology knowledge such as proper use of quality inputs, access to technological innovations, application of good aquaculture practices, etc. (Umesh, 2009; Humphrey, 2006; Meer, 2006; Key and Runsten, 1999; Sriwichailamphan, 2007). As a result, smallholders usually fail to meet the required standards on primary production which involves quality control and quality assurance at the farm level (Kariuki, 2006; Bijman, 2007; Page and Slater, 2003; Henson et al, 2008). Key and Runsten (1999) show that efficient production requires knowledge about the optimal production techniques: when and how to apply veterinary drugs, when to supply water, rotate crops, etc. Efficient production also requires that farmers have knowledge about the needs of the export firm – regarding the supply of raw materials, such as which veterinary drugs are permitted in the production process to meet export standards. However, the costs of modern technology and inputs are high for smallholders to procure. From Gereffi's scheme we learn that capabilities in the supply base are a prerequisite for taking part in a global chain.

Several studies have noted that market information constrains smallholders to link to export markets (Umesh et al., 2009; Kambewa et al., 2007; Page and Slater, 2003). Page and Slater (2003) state that smallholders usually face high transaction costs for market information. It is often difficult and costly for smallholders to obtain appropriate information on market demand (Segura, 2006; Bijman, 2007). Guaranteeing the participation of smallholders in global value chains requires a reduction of transaction costs. Smallholders lack information on type and quality of the product demanded, as well as information on market regulations, seasons of demands, and price fluctuations (Umesh et al., 2009; Page and Slater, 2003). This type of information is needed not only to be able the produce the right product and to supply what is demanded, but also to provide the right incentive to smallholders (Kairiuki, 2006; Page and Slater, 2003; Kambewa, 2007). The buyers provide smallholders with insufficient information on market demand and the smallholder has inadequate means to check this information. In other words, smallholders must trust the buyers to provide accurate information (Umesh et al., 2009; Kambewa, 2007; Segura, 2006).

Some authors argue that the quantities that smallholders produce are small and heterogeneous in quality. Therefore, smallholders suffer from diseconomies of scale (Van der Meer, 2006; Umesh et al., 2009; Ruben et al., 2007). This occurrence also constitutes major constraints for the adoption of technological innovation (Ruben et al. 2007; Umesh et al. 2009; Segura, 2006).
The lack of access to credit is also important in this respect. Lack of credit makes utilizing certain types of technologies and services difficult, since banks and buying firms prefer to transact in large quantities rather than deal with many

Table 3.3 Challenges of inclusion of smallholders in global value chains

(1) Stringent food quality standards in global markets	
- food safety (health risks, microbial pathogens, antibiotic residues) and product quality (nutritious, low fat, low salt, etc).	- Umesh, 2009; Kambewa, 2007; Henson and Jaffee (2006); Henson et al., 2008; Ruben et al., 2007
- social and environmental issues	- Henson and Reardon, 2005; Henson et al., 2008
- traceability	- Umesh, 2009; Kambewa, 2007; Sriwichailamphan, 2007;
- high costs of compliance with food quality requirements	- Henson and Jaffee, 2006; Dolan and Humphrey, 2004
(2) Production technology knowledge	
- lack of access to technological innovations	- Umesh, 2009; Humphrey, 2006
- lack of proper use of quality inputs	- Van Der Meer, 2006; Key and Runsten, 1999
- lack of quality control at farm gate	- Francessconi, 2009, Ruben et al., 2007
- application of good aquaculture practices	- Sriwichailamphan, 2007
- veterinary drugs used	- Umesh, 2009; Sriwichailamphan, 2007
- lack of technological support	- Key and Runsten, 1999; Segura, 2006.
(3) Market information	
- asymmetric information from buyers	- Umesh et al. 2009; Kambewa, 2007; Segura, 2006
- insufficient access to market information due to high transaction costs	- Kairiuki, 2006; Bijman, 2007; Page and Slater., 2003
(4) Diseconomies of scale	
- Small scale of production	- Van der Meer, 2006; Umesh, 2009
- small plots of land	- Kairiuk, 2006;
- low investment in advanced technology	- Ruben et al., 2007; Kairiuki, 2007
- family labor	- Umesh et al., 2009; Dannson, 2004; Sriwichailamphan, 2007;
- weak farmers' organization	- Dannson, 2004; Bijman, 2007; Francesconi, 2009; Henson et al., 2008; Key and Runsten, 1999.
- poorly developed rural infrastructure (cultivable land, irrigation system, transport links).	- Kambewa; 2007; Ruben et al., 2007; Henson et al., 2008; Page and Slater, 2003; Reardon et al., 2005, Sriwichailamphan, 2007.
- lack of supply contracts	- Key and Runsten, 1999; Segura, 2006
(5) Access to credit	
- lack of access to credit for production inputs	- Umesh et al., 2009; Segura, 2006; Van der Meer, 2006 Kambewa, 2007;
- banks and buying firms large scale transactions	- Key and Runsten, 1999; Henson et al., 2008; Dannson, 2004.

small production units (Key and Runsten, 1999; Henson et al., 2008; Dannson, 2004). As a result, smallholders may not have the opportunities for harmonizing existing local standards with required international standards.
In conclusion, the literature review shows five constraints for inclusion of smallholders in global value chains: (1) stringent food quality standards in global markets; (2) production technology knowledge; (3) market information, (4) diseconomies of scale, and (5) access to credit (Table 3.3). These constraints for smallholder inclusion are related to the scheme of Gereffi (2005) presented in section 3.3. We expect that the captive and the relational governance form are the most relevant for understanding the relationships between importers–exporters and smallholders. Quality standards and the lack of market information make the spot market less effective. A modular form will become possible in the future if Vietnam manages to resolve the problems related to technology and production knowledge.

The relationship between the buyers-suppliers is essential in finding solutions for the five challenges facing smallholders aiming at participation in global markets. In Vietnam business relationships at two levels in the supply chain are essential: the trade between processing firms and importers and the relationships between processing firms and their suppliers (farmers). The relations between the exporters and importers are rather developed as the exporters know the quality standards required by importers and have made major investments in their production processes to comply with those standards. This study focuses on the relations between smallholders and exporters. The inclusion of smallholders in export chains reflects both their own capability to fulfil quality requirements and the willingness of exporters to purchase from them regularly (Humphrey, 2006; Henson et al., 2008). Hence, this research studies which governance type is needed to establish efficient coordination between global chain actors and smallholders in order to enhance the competitiveness of smallholders and facilitate their entry into global markets.

** Possible solutions for the inclusion of smallholders in global value chains*
The literature shows that there are three important elements in the possible solutions for the inclusion of smallholders in GVCs, namely horizontal coordination, vertical coordination, and public intervention. This section reveals the possible solutions to facilitating the inclusion of smallholders in global food chains, as presented in the literature (see Table 3.4). Increasing evidence shows that producer organizations offer opportunities for smallholders to participate in the market more effectively (Francesconi, 2009, Bijman, 2007). Francesconi (2009) states that horizontal coordination (e.g., producer organization) may help smallholders cope with the stringent quality criteria and the changing quantity demands emerging from chain partners. Small-scale farmers establish producer

organizations (PO) to facilitate their ability to meet the market demands. Farmers operating together have easier access to production knowledge, external financial sources, and also better possibilities to invest in advanced production system. Bijman (2007) reveals that producer organizations can help their members obtain the market information, negotiate prices with buyers, and learn from international best practices. The producer organization will train farmers on production technology knowledge, drug application, disease control and overall management of the production to ensure that quality products are produced (Umesh, 2009; Francesconi, 2009). Umesh (2009) recognizes that the organization of farmer groups through clusters become attractive to buyers who are looking for ways to ensure traceability and reduce transaction costs. As a result, farmers improve their bargaining power with their buyers. Internal economies of scale are also reinforced through the establishment of farmers' associations (Ruben et al., 2007). Higher food-quality and safety standards are also better met if farmers make joint investments and are willing to exercise mutual control on free-riding. Consequently, smallholders compete with larger farmers and gain access into high value markets (Henson et al., 2008; Humphrey et al., 2006).

Participation of smallholders in global food chains depends on adequate chain coordination (Gereffi et al. 2005; Humphrey et al., 2006). Gereffi (2005) shows that the key role is played by management coordinating actions throughout the chain. Coordination in the chain will leads to different governance structures that are dependent on the presence of transaction cost. The increasing of capabilities in the supply base has helped to push the architecture of global food chains away from the market type toward the relational governance type. Small-scale farmers depend on downstream parties in the chain such as input suppliers, exporters and creditors. To guarantee the quality standards, vertical coordination between small-scale farmers and their chain actors is crucial (Ziggers and Trienekens, 1999; Hobbs and Young, 2001; Boger, 2001; Schulze et al., 2006). Vertical coordination is important when examining ways to reduce transaction costs. Hobbs and Young (2001) state that reduction in transaction costs through vertical coordination is beneficial to the firm and the farmers mutually. The firm receives an assured and timely supply of the desired raw material. On the other side, the farmers acquire an assured market for their produce. Moreover, farmers gain more reliable access to production inputs, capital, technology, and market information (Han et al., 2006; Hobbs and Young, 2001; Ruben et al., 2007). Therefore, smallholders can remain involved by using different strategies for improving vertical and horizontal coordination (Kaplinsky and Morris, 2000; Henson et al., 2008; Key and Runsten, 1999).

Finally, public-private partnerships can play a key role in facilitating farm-to-market linkages that satisfy the market demands for food safety and quality

while retaining smallholders in the supply chain (Dannson, 2004; Henson et al., 2008; Amanor, 2009). The government and the private sector help smallholders expand and upgrade their capabilities and practices to meet the quality requirements of global markets. The institutional environment plays a decisive role in guaranteeing the legal framework and defining transparent rules for conflict settlement (Key and Runsten, 1999; Ruben et al., 2007; Amanor, 2009). Small farmers can only make the required investments to improve delivery frequency and quality when they are relatively certain about available market outlets. Key and Runsten (1999) indicate that contract farming provides best outcomes under conditions in which public surveillance is guaranteed. The current paradigm perceives government as an enabler creating the conditions that facilitate and encourage the private sector to structure its supply chains to involve smallholders (Amanor, 2009; Henson et al. 2008). The role of the government is important in establishing regulatory control programs for ensuring food quality at the primary production level. The private sector's role is to invest in supply chain infrastructure, develop service markets, and transfer technical and market information to smallholders (Humphrey, 2006; Ruben et al., 2007).

Table 3.4 Possible solutions for the inclusion of smallholders in food export chains

Author	*Remarks/Solutions of inclusion of smallholders in GVCs*
	(1) Horizontal coordination
Umesh et al. (2009)	Organize farmers into cluster (aqua-clubs) to share resources, empower small-scale farmers, increase stakeholder interaction and involvement within the clusters, and adopt better management practices (BMPs).
Francesconi (2009)	Collective action by cooperatives upgrades production quality, minimizing drawbacks in terms of production quantity and productivity. Ethiopian cooperatives help (1) to improve quality control at the farm gate, and (2) to improve farmers' access to land and market information on quality management.
Bijman (2007)	Producer organization helps farmers overcome governance problems (food quality requirements, safeguarding specific investment, coordinating independent activities)
Sriwichailamphan (2007)	Organize farmers into shrimp Farmers Association to improve economies of scale and negotiation power with processing firms
Dannson (2004)	Establish farmers' cooperative to help farmers access credit and improve product quality.
Ruben et al. (2007)	Smallholders remain involved in export chains by improving horizontal cooperation among farmers.
	(2) Vertical coordination
Dannson (2004)	Vertical coordination between farmers' cooperative and export firms to access global markets. Farmers receive, free of charge, technical training and advice from the processing company to ensure that produce meets their quality standards. Field visits are conducted bi-weekly to ensure that farmers are adopting good agriculture practices taught to them.
Sáenz-Segura (2006)	Vertical coordination by contract farming as a market institution between smallholders and agro-processing firms in Costa Rica. Contracts provide an important device for improving security and enhancing the involvement of smallholders in international marketing chains. Farmers delivering under (in)formal contracts with processors/exporters have better access to credit, critical inputs and information, enabling them to benefit from economies of scale and scope.
Ziggers and Trienekens (1999)	Vertical coordination between smallholders and chain partners to assure quality in food supply chains. Partnerships are likely to extend across food supply chains from input supplier through primary producer to processor and distributor. In addition, the costs of producing the quality product demanded by consumers likely will be lower in a more closely coordinated system.
Hobbs and Young (2001)	Closer vertical coordination among primary producers and their partners to reduce transaction costs and risks related to the changes in technology, and increased needs by small-scale farm operations for capital and managerial skills.
Schulze et al. (2006)	Vertical coordination between producers and processors to improve traceability and assure higher and more consistent quality of product.

Table 3.4 (cont.)

Author	*Remarks/Solutions of inclusion of smallholders in GVCs*
Amanor (2009)	Vertical coordination between export firms and smallholders to enhance efficiency to participate in global markets. Large companies can provide credit, security, and risk-assurance for smallholders. They organize the provision of cost-effective inputs for smallholders through institutional innovations related to linkages with farming groups or cooperatives.
Key and Runsten (1999)	Vertical coordination through contract farming offers many benefits for smallholders including access to new markets, technical assistance, specialized inputs, and financial resources. Contracts also reduce crop price variation, helping farmers bear the risk of food crop production. Producer organizations, such as marketing cooperatives, serve to lower contracting transaction costs for small-scale growers.
Sriwichailamphan (2007)	Contract farming or advice from relevant companies had the largest impact on the adoption of food safety and environmentally-friendly production practices by small-scale farmers.
	(3) Intervention of public and private sector
Henson et al., (2008)	Public and private sectors play the important role of facilitating the inclusion of smallholders to global markets. The roles of government are cast as providing the economic, political, and infrastructural conditions necessary for private investment. The private sector, in turn, is tasked with the responsibility of driving the integration of small-scale producers into higher-value markets via business relationships and associated provision of market information, technical advice, and logistical and other services.
Van der Meer (2006)	The government provides adequate laws, regulation and enforcement necessary for doing business, in particular in food supply chains in which small-scale producers are involved. Important areas of attention are regulation of markets for pesticides and veterinary drugs. Moreover, the government facilitate market access for smallholders in organization, technology, and training.
Sriwichailamphan (2007)	Governments, NGOs, and procesisng firms play an important role in facilitating farmers to adopt quality assruance systems (GAP, HACCP). In addition, the bank provides loans to those farmers who are certified by the Department of Fisheries.
Amanor (2009)	The government and private sector help smallholders expand and upgrade their farming practices to meet the new quality requirements of global markets. Public-private efforts promote collective action and build the technical capacity of farmers to meet the new quality standards.
Sáenz-Segura (2006)	Governmental support is required for supply chain coordination toward quality products and process upgrading at the smallholder level
Dannson (2004)	The support provided by local authorities in the farm-agribusiness linkages helps develop effective smallholder organizations.

These solutions are related to the scheme of Gereffi (2005). For example, the relational governance form requires that supplier capabilities are high.

Smallholders generally lack some of the capabilities needed to comply with the high quality requirements of buyers. To solve this deficiency, smallholders can improve their position with horizontal coordination among themselves and vertical coordination with their buyers through farmers' groups (Ruben et al., 2007).

3.5 Empirical studies of inclusion of smallholders to global value chains

1. Umesh et al. (2009) present a case study of shrimp farmers in India, "linking small-scale farmers to export markets through a cluster-based approach"[8]. This case study is drawn from the book Success Stories in Asian Aquaculture published by the Network of Aquaculture Centres in Asia Pacific (NACA). The farmers in this cluster share inputs and water resources, and adopt better management practices (BMPs) in shrimp farming. The study found that organized farmer groups are one of the key mechanisms for supporting farmer empowerment and increased stakeholder interaction and involvement within the clusters.

Small-scale farmers in India supply approximately 80 percent of the total shrimp production. However, they are poorly organized. They lack technical skills, adequate information, and market access. Consequently, they are vulnerable to the numerous risks and hazards that impact their livelihoods, farm productivity, and competitiveness (Umesh, 2009). At the farm level, the small-scale shrimp farmers face challenges such as pollution, viral diseases, and traceability and food safety concerns. The availability of technical personnel in the fisheries in respective state departments who were put in place to support the vital extension functions at the grassroots level were inadequate, resulting in poor transfer of technology, lack of coordination with other departments, and poor research linkages.

To address the rising concerns about quality, diseases, and the sustainability of the shrimp sector, the NACA in collaboration with the Marine Products Export Development Authority (MPEDA) of the Indian government conceived and implemented a project for "shrimp disease control to address disease and environmental problems in the shrimp industry in India, and to ensure that small shrimp farmers of India meet high standards for bio-security, food safety and environmental protection. The project has since been institutionalized to organize small shrimp farmers and build capacity at the grassroots level in India, and provides a strong basis for future progress, as well as an example for other countries in addressing some of the special problems and concerns facing small-

[8] The cluster is a group of farmers whose shrimp ponds are situated in a specified area; commonly all ponds are dependent on the same water source

scale aquaculture farmers. In a cluster, farmers apply BMPs based on international principles for responsible shrimp farming (Mohan, 2008). Each of the farmer societies has one coordinator selected by its members. The coordinator is trained in cluster management, BMPs, and extension techniques by local authorities.

Regarding quality control at the farm level, good quality larvae are purchased from a hatchery through a contract in which cluster farmers place bulk orders 45 to 60 days in advance of the planned stocking date. All farmers in a cluster stock during the same period, thereby avoiding continuous stocking and harvesting. Through clusters, the farmers receive benefits by efficient use of feed, reduced use of chemicals, and sharing of expenses (water treatment, seed testing, transport of inputs, laboratory analysis, electricity, etc.). Moreover, when a disease outbreak occurs, small-scale farmers are able to reduce contamination because of information shared among cluster farmers, followed up with immediate remedial actions. During any new disease outbreak, it is easy in this format to coordinate the quick flow of information and samples from the field to the research institutes and report back the outcome of the diagnosis and necessary precautionary measures to farmers.

In the cluster, traceability back to shrimp farms and hatcheries is established through proper record keeping and use of Geographic Information System (GIS) maps. This tool is a powerful investment in the quality assurance system and allows farmers to meet the export requirements.

The study recognizes that there is a need to link smallholders to all other stakeholders in the industry both backward and forward. Cluster farmers are linked to hatcheries, input suppliers, processors, scientists, research institutes, government institutes, banks, and other supporters. Bank loans for working capital, which are not available for most of the small-scale farmers, are available once the cluster farmers are linked up with the market. In addition, MPEDA extends financial assistance in the form of the society scheme to kick-start the formation of the aqua-clubs and implement the BMPs.

The small-scale farmers benefit through improved shrimp yields, less impact on the environment, and improved product quality. In comparison to surrounding small-scale ponds where BMPs were not practiced, the small-scale farmers in the cluster obtain a 30% increase in production, an 8% increase in size of shrimp, a 30% improvement in survival, and a 31% reduction in disease occurence (Umesh, 2009). In addition, the cluster creates potential for cooperative action, which changes the position of the farmer in the value chain and influences the business environment of the farming community. Moreover, small-scale farmers through organization, gain economies of scale in accessing

services and markets, which are otherwise limited to large commercial farmers. Farmer groups also improve information exchange and sharing among group members. The small-scale shrimp farmer groups of India are in a better position today to gain these benefits compared to their situation when they were unorganized. This study also found that the organization of small-scale aquaculture farmers brings about positive social and economic benefits to members. Improved farm-management practices reduce environmental impacts, ensure food safety, and improve farm profit. Moreover, farmer groups have stronger negotiation power with the input suppliers and traders/processors. The product becomes more attractive to shrimp export firms because the shrimp have no antibiotic residues, as the clusters do not use illegal drugs or chemicals.

In conclusion, the small-scale shrimp farmers in India face challenges to participation in export markets that are in line with the challenges presented in Table 3.3. The case study found that the cluster organization helps to solve these challenges. Through the cluster organization (horizontal coordination), small-scale farmers gain the advantages of improving technology, information exchange, access to credit, homogenous shrimp quality, and barganing power with buyers through increased scale of production, and adopt better management practices. The buyers prefer to buy shrimp through clusters because they trace back products to shrimp farms and hatcheries through proper record keeping and use of GIS maps. The clusters assure the global market requirements of food safety and social and environmental responsibilities. The governance forms that apply in this case are similar to the relational and captive governance forms defined by Gereffi. Shrimp quality standards are codified and, through training, the capabilities of smallholders are improved to create business relations with their buyers and, consequently, to participate in global markets.

2. Danson (2004) presents a case study of fruit production in Ghana, "linking small-scale farmers to export markets". This case is relevant to our study as it studies the strengthening of farm-agribusiness linkages to facilitate the involvement of smallholders to high-value markets. This study is an example of vertical and horizontal coordination in the fruit export chain. Small-scale farmers in Ghana produce roughly 60% of the total fruit supply. Main problems faced by fruit farmers are lack of access to financial resources, lack of production skills and information, and lack of effective and sustained demand for farm products. The lack of financial resources limits farmers' ability to purchase inputs and adopt improved technology. This deficiency ultimately affects yields and produces quality and reduces profitability and further development. A lack of information on prices and markets for small-scale farmers also exists, thus limiting their ability to explore better prices and better markets. The lack of effective and sustained demand is generally the problem in

the linkages of small-scale producers and processing firms. Smallholders are unable to negotiate with the company for better prices with their products.

The case study reveals that it is beneficial to both the farmer and the processing firms for small farmers to be organized into effective cooperatives. Farmer organizations are important in promoting linkages between farmers and the processing firm Farmapine. Farmapine Ghana Ltd. (FGL) is located in Nsawam, where Ghana's main pineapple-growing area is. The company manages approximately 160 cooperative farmers. In 2003, Farmapine exported close to 12,000 tonnes of pineapples to France, Germany, the Netherlands, Italy, Poland, the United Kingdom, and the United States.

Farmapine ensures that farmers adopt good agronomic practices to enhance yields and fruit quality. With the assistance of the Directorate of Agricultural Extension Services, Farmapine trains farmers on planting, fertilizer and chemical application, pest and disease control and overall management of the plant to ensure that quality fruits are produced. Field visits are conducted bi-weekly to ensure that farmers are adopting practices taught to them. Farmapine began by providing farmers with 100 percent of credit requirements for production. Therefore, farmers are able to overcome the constraint of inadequate access to credit. In addition, Farmapine arranges the supply of inputs such as fertilizer and other agrochemicals to be supplied to the farmers. Regarding production skills, the training provided by Farmapine and both governmental and nongovernmental institutions contributed to strengthening the linkages between the farmers and agribusinesses. Training in farm-level production and management skills is one way Farmpine intervenes to develop effective agribusinesses, which fosters strong farm-agribusiness linkages that result in improved yields and quality. Through cooperatives, farmers acquire training that enables them to adopt good farm practices to increase their yields and to meet the specifications required by the market. Moreover, the farmer cooperatives are trained in methods to improve product quality and business planning. As a result of the vertical integration provided by Farmapine, a proportion of the farmers' supply of pineapple that meets the export requirements increased from 30% to 45% within three years of operation. Farmers receive an average 30% of the FOB price per kilogram of pineapples (Danson, 2004).

Institutions play a valuable role in promoting farm-agribusiness linkages in Ghana. The Department of Cooperatives and the Department of Agricultural Extension Services support the studies of farm-agribusiness linkages. In addition, to develop strong and effective farmer groups to promote farm-level production and linkages to agribusinesses, a Farmer Based Development (FBO) program was designed. The FBO program involves the organization of farmers into groups, training of these farmer organizations, and financial support to

enable them to develop and operate as viable organizations that are self-supporting and that meet the needs of their members. Through FBO, small-scale farmers are able to establish linkages with input suppliers, banks, and a processing company. The cooperatives are transparent in their financial accounting, which creates trust between the executives of the cooperatives and their members and members, thereby enabling members to contribute to the cooperative for its development.

In short, this case study found that the challenges Ghanaian fruit farmers faced in participating in global markets correspond with the challenges presented in Table 3.3. This case study reveals that the organization of fruit farming into cooperatives and the vertical coordination between cooperatives and processing firms solves these challenges. The cooperatives help small-scale farmers enhance their capabilities to meet the export quality requirements. The processing/export firm through the cooperatives provides a wide range of extension serivices to cooperatives'members such as technical training, financial needs, and inputs for production. In addition, local authorities provide support to facilitate the linkages of smallholders to markets. The local authories play a fundamental role in establishing and maintaining farm-agribusiness linkages. A large component of this involment is the provision of market information and extension serivices to farmers.

The coordination mechanism in this case is similar to the captive and the relational governance forms (Gereffi et al., 2005). Through cooperatives, smallholders exchange knowledge with processing/export firms and increase their capability to meet quality requirements. The processing/export firm provides technical assistance for cooperative members to ensure the quality of the products from the very beginning. In addition, smallholders establish linkages with input suppliers through FBO. The competent farmers' cooperative provides a strong incentive to the export firm to outsource primary production processes.

3. Francesconi (2009) presents a PhD thesis of cooperation for competition. This thesis is a case study of linking Ethiopian dairy farmers to high-value markets. The analysis is relevant to our study in that it presents the method by which smallholders cooperate in milk cooperatives to improve the quality and safety of the milk in order to compete in the high-value markets. The demand for high-value primary products such as dairy and meat is growing rapidly in global markets. These trends have fostered increasing integration of farms and firms into supply chains in an effort to link rural perishable supply to international demand. The goal of the study is to present the effectiveness of establishing producer organizations to increase small-holders' competition through improvement of product quality. The case study evaluates the impacts of a dairy

marketing cooperative on milk production, productivity, quality, and safety at the farm gate, as well as compares the performance of cooperative farmers and individual farmers within the same area.

The study found that farmers' participation in marketing cooperatives results in a significant increase in milk production and productivity. The participation of Ethiopian farmers in dairy marketing cooperatives is expected to induce relevant changes in milk quality attributes at the farm gate, with important implications for consumers, retailers, manufacturers and farmers. Small-scale farmers face challenges in milk quality and safety attributes. Farmers' milk supplies do not comply with the standards regarding fat, protein content, and the total bacterial content that is imposed by the processing firms.

The case study presents a cooperative located in the milk-shed of Debre Zeit, 50 km south of the capital Addis Ababa. This cooperative includes 800 members and is the second largest dairy cooperative of Ethiopia). In this area, there are more than 1000 small dairy farmers, a few large dairy farms, two dairy processing plants, and the experimental dairy unit of the International Livestock Research Institute (ILRI). As a result, the milk-shed of Debre Zeit represents the most important production site of Ethiopia, a key source of dairy for the market of Addis Ababa.

The policy of the cooperative states that any individual has the right to join in, as long as he/she can afford to pay the entrance fee and to purchase at least one share of the collective endowment. Fees and shares are set on the basis of regular internal evaluations, and are redeemable but cannot be traded-not even among members. Furthermore, a fixed percentage (10 percent) of members' revenue (generated by selling milk through the coop) is retained as a form of patronage to build up additional equity capital and cover running costs.

The study also found that a difference exists between cooperative members and individual farmers in quality control at the farm level. A major difference is associated with the fact that the cooperative provides smallholder farmers with access to subsidized inputs. Subsidies mainly involve the procurement of artificial insemination services and live cows. As a result, cooperative herds are dominated by high-yielding crossbred cows, as opposed to the zebu cattle typically found in the herds of non-cooperative farmers. While indigenous zebu cattle are characterized by the production of small volumes of milk (2-3 lt/day) with a high density of nutrients, crossbred cows produce larger volumes with lower fat and protein content. Hence, a great deal of the cooperative impact is accredited to technical innovation through the adoption of crossbred cows. In addition, to improve farm hygiene and overall husbandry skills, the cooperative provides training to its members.

The quality assurance relates to output services, which include milk collection and bulking, cooling and processing, transportation, and commercialization (all activities are undertaken twice a day, seven days a week). Before collection, the milk farmers are screened using instantaneous tests (an alcohol test and a specific gravity test), which measure milk quality as good or bad. Milk supplies that do not comply with the minimum standards set by these tests are rejected. Approved milk supplies are weighted, recorded, and bulked.

The study suggests that the enforcement of better grades and standards should result from public-private partnership, in which the role of the public sector is to provide arbitrage, and the role of the private sector (industries and supermarkets) is to provide incentives. Arbitrage requires a strong presence of the local authorities in monitoring the quality in agricultural trade. Private incentives come in the form of strategic alliances or self-enforcing contracts between processors/exporters and cooperatives. Often such alliances do not arise due to power asymmetries in the market. Government encourages these alliances through facilitating the negotiation process and raising awareness of corporate social responsibility. As a result, smallholders would benefit rediscover the importance of the community or collective action for high-value markets.

In short, this study found that the challenges of Ethiopian dairy farmers to participate in export chains correspond with the challenges presented in Table 3.3. This case study reveals that the organization of small-scale dairy farmers in a co-operative leads to better access of quality input and output markets. The study revealed that cooperative members receive advantages in terms of economies of scale which lead to lower transaction costs and improved bargaining power with buyers. Through the cooperatives, the processing/export firms in Addis Ababa supply extension services including regular farmers' field days for training as well as the exposure to new developments in the dairy industry. Moreover, government encourages the alliances between cooperatives and processing/export firms to facilitate the negotiation process and raising awareness of corporate social responsibility. The local authorities provide market information and inspection of quality drugs for animal health to assure milk quality and safety. The strong mutual dependency of dairy farmers is evident in quality system, in which the buyers offer quality input to their suppliers and the suppliers give back the quality output with their products. Through dairy cooperatives, smallholders enhance their capabilities to meet the quality requirements of buyers. As a result, the captive form of governance in Gereffi's concept is effective for providing farmers with the necessary incentives to enhance milk quality.

4. Kambewa et al. (2007) present a case study of "small-scale primary producers in the international Nile perch supply chain from Lake Victoria in Kenya". This study establishes a bridge between improving fishery quality and strengthening the involvement of small-scale fishermen in international markets. Lake Victoria in East Africa is the second largest freshwater body in the world. Nile perch production boomed, triggering unprecedented socio-economic benefits. About 80% of the small-scale fishermen earned primary income from fishing. Rough 37,000 fishermen in total reside in the Kenya part of Lake Victoria (LVFO, 2000). In addition, the European Union remains the main international market for perch, occupying approximately 80% of the Nile perch export volume (FAO, 2005). The study explores whether market-based incentives would encourage fishermen of fresh Nile perch in Lake Victoria to implement practices that improve quality and safety as well as protect natural resources. On the one hand, international organizations and agro-business chains promote the use of quality assurance systems such as HACCP to ensure food safety. On the other hand, international organizations develop other codes of conduct such as the FAO code of conduct for responsible fisheries to protect natural resources (NR). As a result, the small-scale fishermen are caught in a cobweb of challenges ranging from lack of appropriate production technologies, information asymmetries, and ineffective enforcement for sustainable practices that limit their participation in the international supply chains.

The case study begins with the fish quality assurance at the firm level. At the processing firm, all of the factories follow HACCP as a matter of mandatory requirement by the export markets. The factories also assess fish quality using sensory methods similar to those used at the landing sites. Defects might be related to the condition of the fish flesh appearance, which include color defects (bruises, bloodspots) and dehydration (frozen storage defects). The Nile perch processing industry uses three quality grades (A, B, and C) for the whole fish and defines these grades with clear descriptions of the general appearance, eyes, gills, odor, skin, smell, and texture. Only fish with grade A and B are accepted, and C-grade fish are rejected. Factories estimated that about 20-40% of the fish rejection at the factory is due to poor handling such as throwing or stepping on fish, causing crumbling and/or discoloration of the fillet. As a result, the critical control points at the primary production level are crucial to improving fish quality.

At the primary level, the quality is based on the freshness of the fish. Keeping fish fresh requires special technological tools such as ice or cold storage facilities. At the landing sites, the quality of fish determines whether the fish are sold to the export chain or to the domestic market. Fishermen use a number of sensory indicators to assess the quality of fish such as checking the color of gills, eyes, skin, and the firmness of the fillet. However, these techniques do not

always give consistent results. For example, fish might have gills or eyes with a color indicating poor quality, while the fillet is still firm, indicating good quality, i.e., freshness, or vice versa.

In summary, fishermen face a number of constraints in terms of critical control points at the primary production level, and consequently, organizational changes and more resources are required to resolve the problems.

The case study has identified a number of intervention points that may improve fish quality assurance. Lack of knowledge about fish quality is an important factor that must be addressed to improve quality assurance. In the Nile perch case, lack of proper knowledge is reflected in poor handling such as throwing, beating, and stepping on fish. The case study also shows a lack of cooling and storage facilities, which is essential to keep fish fresh. The type of fishing gear used and the time lapsed before the fish are processed are also factors that may contribute to quality deterioration. These results imply that investment in the quality management facilities, such as ice or cold storage facilities in the landing sites or investments in larger boats that can carry ice are needed. In addition, poor handling practices must be tackled through educating fishermen on effects poor handling has on quality. However, it may also require better motivation such as better prices for better quality may also be required. Fishermen are compelled to handle fish properly if they know that they will be rewarded for it. Accordingly, processors should be willing to pay the premium price for quality.

The case study shows how public intervention is useful. Therefore, public institutions have improved their effectiveness in enforcing sustainable fishing practices and making the fishing gears affordable to all fishermen. To solve quality problems, a change in organization and the addition of resources are required to effectively implement and use technological tools to manage fish quality from the boat. Access and use of the fishery is regulated by the Fisheries Act. The Act outlines the type and size of fishing gear permissible for specific fish species in specific water bodies, and also designates fishing places. Failure to enforce the act is punishable by law. The Fisheries Department (FD) is legally mandated to enforce the act. As a result, the act mandates that the FD to license all fishing gear as a way of controlling and monitoring access to and proper use of the fishery.

To address the failures at the primary production level, sustainable and quality-enhancing contracts focus on enabling the primary producers to undertake activities that improve sustainability and quality. Simultaneously, primary producers and buyers engage in contracts that focus on the provision of market information, the acquirement of production facilities, and the enforcement of sustainable practices. The case study reveals that fishermen prefer sustainability

and quality-enhancing contracts that provide production facilities such as fishing gear, and quality management tools, price information, and a selection of transacting partners such as processors, middlemen, and sanctions for non-compliance. As a result, the fishermen obtain access to international channels and allow private policy enforcement of sustainable practices.

In conclusion, this case study indicates that integrating small-scale primary producers into international supply chains comes with many challenges. The fishermen in Lake Victoria face constraints in meeting quality standards on international markets due to information asymmetries, ineffective enforcement for sustainable practices, and the lack of appropriate production technologies. These constraints correspond again to the challenges presented in Table 3.3. The study found that vertical coordination between fishermen and processing firms through contracts are acceptable mechanisms. Contracts are necessitated by the fact that the channel is weakly integrated. Moreover, addressing these challenges implies that either public or private policy or both invest in the primary stages to enhance the capability of fishermen to access modern production technologies both for sustainable and quality-enhancing practices.

The coordination mechanism in this case is similar to the captive and the relational governance forms (Gereffi et al., 2005). Smallholders enhance their capabilities through vertical coordination with processing firms. The processing firms provide technological tools and facilities to fishermen to assure fish quality in the landing sites. In addition, the fishery department or beach management units (BMU) train fishermen on the fishery handling practices to improve the capabilities of fishermen to meet quality requirements of buyers. This practice will provide small-scale fishermen with the opportunity to integrate international markets.

3.6 Conclusions

This chapter reviews the main theoretical and empirical literature related to food quality management, global value chains and the inclusion of smallholders in export supply chains. It begins with an overview of quality management, as this is the most critical issue in export chains. In addition, the literature review has also shown the role of government and other support organizations in managing food quality and safety among chain actors. Subsequently, the literature review shows that the GVC approach is useful as a framework for our study. The GVC approach is used to analyze the challenges and possibilities of integrating smallholders in export chains. Next, this chapter presents an inventory of challenges and potential solutions for the inclusion of smallholders in global food chains. The last section provides four empirical case studies of situations that are more or less comparable with the circumstance of the Pangasius

production in the MRD. These case studies confirm the coordination problems mentioned in the literature. In the next chapter the insights from the literature are used to develop a conceptual framework for this research.