Available online at www.centmapress.org

INTERNATIONAL JOURNAL ON FOOD SYSTEM DYNAMICS

Int. J. Food System Dynamics 8 (3), 2017, 236-249

DOI:http://dx.doi.org/10.18461/ijfsd.v8i3.835

Organisational Challenges of Moroccan Dairy Cooperatives and the Institutional Environment

Nora Ourabah Haddad[1], Giel Ton[2], Mohamed Taher Sraïri[3], and Jos Bijman[2]

[1]*FAO, Rome, Italy*
[2]*Wageningen University, The Netherlands*
[3]*Hassan II Agronomy and Veterinary Medicine Institute, Rabat, Morocco*
nora.ourabahhaddad@fao.org; giel.ton@wur.nl; mt.srairi@iav.ac.ma; jos.bijman@wur.nl

Received January 2017, accepted May 2017, available online June 2017

ABSTRACT

Marketing cooperatives in developing and transition countries face challenges when they aim to strengthen their competitiveness. One of these challenges relates to improving the quality of the products delivered by their members. Another challenge relates to the financial sustainability of the cooperative, as cooperatives have to choose between paying out a surplus to members and retaining it in the organisation. As these problems are not specific to one organisation, and public policies often affect the scope for individual cooperatives, we explore how the institutional environment helps in reducing those challenges. We present a case study of the Moroccan dairy industry, exploring how the institutional environment has affected the development and performance of dairy cooperatives. The methods used were in-depth semi-structured interviews within six dairy cooperatives. Findings point to the weak coordination between the main value chain actors. We also found a lack of financial instruments to facilitate investments in adequate quality assurance equipment and capacity development programs. Finally, we found a perceived lack of support from state policies vis-as-vis smallholders and their cooperatives.

Keywords: Institutional environment; dairy cooperatives; policy dialogue platforms; organizational challenges; collective marketing capacity

1 Introduction

Milk production is an important economic activity of millions of small farmers and landless labourers. As a highly perishable product, milk requires special and timely care. Collective action, in the form of agricultural cooperatives (ACs) and other types of producer organizations (POs) is often used to link smallholder farmers to processing plants (Best et al., 2005; Dorward et al., 1998; Uotila and Dhanapala, 1994). Dairy cooperatives and dairy POs are operating in a broader economic and institutional environment. To perform well, ACs and POs require an external environment that supports their operations and strategies as well as facilitates the effectiveness of their internal governance. In reality, however, ACs and POs are often facing internal organizational challenges, while the external environment does not provide much help in solving these challenges. Two typical organizational challenges are often present in ACs and POs, one relating to the quality of the product delivered by the members and the other relating to the financial health of the organisation. These challenges have serious implications for the performance of ACs and POs.

An enabling institutional environment consists for example of transparent and sound regulatory and legal frameworks (World Bank, 2012), enabling policies (Agarwal, 2001; Penrose-Buckley, 2007; Markelova and Mwangi, 2010), a climate conducive to investment through incentives and other support services (Gijselinck and Bussels, 2012), and spaces for policy dialogue, allowing social capital development (Coleman, 1988). In order to make markets function for the poor, well-designed institutions are key requirements (Dorward *et al*., 2003; Bienabe and Sautier, 2005). Institutions are understood as the "rules of the game" (North, 1990), such as formal rules, informal incentives and constraints (conventions, norms of behaviour, and self-imposed codes of conduct).

This paper explores the demands that dairy marketing cooperatives in Morocco have towards the institutional environment and the extent to which this environment is supportive to addressing the challenges these cooperatives face. Two challenges are central to most cooperatives and POs in developing countries: product quality control and financial health of the organisation. Milk quality is important as it affects the efficiency of processing and marketing as the quality requirements in consumer markets are going up. For milk quality to be enhanced to and maintained at the required level, quality assurance systems need to be in place.

Organizational efficiency is important because cooperatives operate in a competitive market and because it is needed for the sustainability of the organisation. Organisational efficiency requires a good balance between paying rewarding milk prices to members and retaining a part of earnings in the cooperative for having sufficient working capital and even for making investments. Payment systems in cooperatives are often problematic, for at least three reasons. First, there is often a perceived lack of transparency of price determination between farmer and cooperative and between cooperative and processor. Second, cooperatives often use delayed payment procedures, while private traders (hawkers, peddlers) pay immediate cash. Finally, the presence of informal milk collection circuits influences the leeway for cooperatives to be strict on member compliance to agreements on product quality and quantity.

These challenges are analysed in a sample of four dairy cooperatives in Morocco. Three of these co-operatives were active in milk collection, as they gather daily milk from smallholder farms and sell it to dairy processors. The fourth one was large scale milk processing co-operative. We discuss the solutions to the organisational challenges in collective marketing as implemented by the dairy cooperatives, and then explore how the institutional environment has affected the development and implementation of these solutions. The field research is used to 'ground' our analysis of the institutional environment in the real-world practices of the selected dairy cooperatives in Morocco. The study links to a wider research on the interaction between organizational challenges in collective marketing and the institutional environment in which these cooperatives operate (Bijman *et al*., 2012).

Institutional context and main features of the dairy sector in Morocco

The dairy chain in Morocco is one of the main animal production chains of the country (Sraïri, 2015). The dairy sector in Morocco generates annually close to 1.4 billion USD. More than 300,000 full-time producers and around 100,000 seasonal producers make a living out of dairying. The dairy chain in Morocco is characterized by a duality. On the one hand, there is the large private processing company *Centrale Danone* whose capital is for 96% controlled by the global food company *Danone.* On the other hand, there are smaller private (e.g. *Safilait*) and cooperative processors such as *COPAG* (*Coopérative Agricole d'Agrumes*) (see Figure 1). *Centrale Danone* is the leading dairy company in Morocco, processing 30% of the total raw milk production.

Around 65% of milk production in Morocco goes through the formal sector whereas 13% goes through informal channels. The remaining 22% are used on-farm for self-consumption (Sraïri, 2011). Milk

deliveries to dairy collection cooperatives are crucial for the supply of milk to large urban centres, given that imports are less than 15% of the total amount of milk consumed (Sraïri *et al*., 2013).

The current structure of the Moroccan dairy industry is the result of a historical process consisting of roughly five phases. The analysis of this process helps to understand the evolution of the institutional environment and the influence of this environment on dairy cooperatives dealing with organizational challenges.

At the Independence in 1956, the dairy value chain was disorganized and dairy farmers were small and dispersed. Distribution circuits were short at the time as the dairy industry was still embryonic and cities were mainly supplied directly from neighbouring farms.

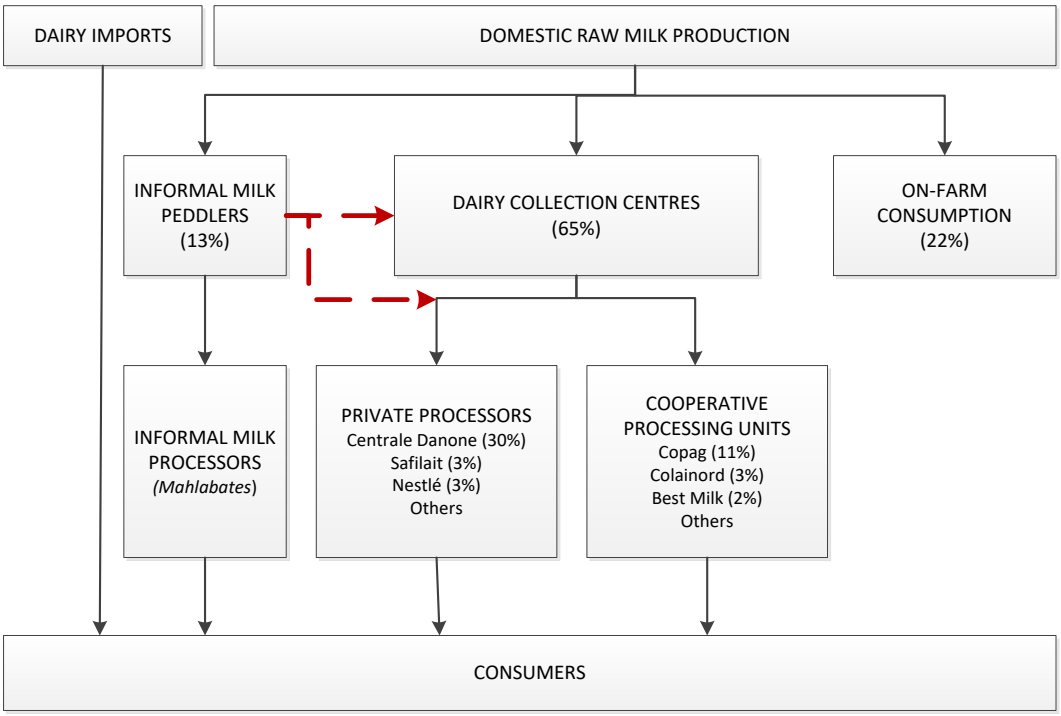

Figure 1. Structure of the dairy chain in Morocco (Based on Sraïri *et al*., 2013)

The 1970s marked a turning point with the adoption of a national dairy policy, focusing on the most favourable areas to develop large-scale irrigation schemes. The Ministry of Agriculture launched a strategy called the 'National Dairy Plan' aimed at strengthening the Moroccan dairy value chain from production to processing and consumption. This strategy was backed by heavy taxes on imported milk powder and support to farm gate milk prices. This policy has led to a duality between production and consumption areas. Production is located near the mountain areas (and dams) of the central and eastern parts of the country while consumption is in the large urban centres along the Atlantic coast. This geographical separation causes relatively high transportation costs in the distribution of dairy products.

The third phase started with the 1983 Structural Adjustment Programmes. The liberalization of the economy resulted in the withdrawal of public policies, exemplified by significant budget cuts. Prices of feed concentrates in livestock farming soared. By mid-1980s, state-owned dairy farms were dismantled. On the positive side, smallholders adopted the idea of diversifying their sources of income by rearing cattle of imported origin while increasing production of milk. The progressive disengagement of the state from the dairy sector in the 1980s has resulted in the emergence of private operators, both in farming and in milk processing. In this period, public authorities encouraged the creation of professional associations. In 1988, the National Cattle Breeders' Association (*Association Nationale d'Eleveurs Bovins* - ANEB) was officially created. ANEB took over some of the former public services, like extension services, artificial insemination and record keeping.

In 1992, the liberalization of milk prices throughout the value chain marked the fourth phase in the evolution of the dairy sector. This induced a process in which farm-gate milk prices stagnated while consumer prices steadily increased (Table 1). This created room for the emergence of informal milk

collection circuits to supply neighbouring cities, particularly in the North Western part of the country. In cities like Casablanca, Rabat and Kenitra raw milk started to be sold in small shops locally known as *Mahlabates*. Overall, the sector kept on growing steadily to meet an increasing domestic demand.

Table 1.
Milk prices in Morocco, 1995-2015

Year	Farm gate price (DH/litre)	Farm gate price (USD/litre)	Consumer milk price (DH/litre)	Consumer milk price (USD/litre)	Share of farm gate price in final consumer milk price (%)
1995	2.94	0.33	5.00	0.55	58.8
2000	2.94	0.33	5.40	0.60	54.4
2005	2.94	0.33	6.20	0.69	47.4
2010	3.00	0.33	6.40	0.71	46.9
2015	3.40	0.37	7.00	0.77	48.6

Source: Sraïri (2015)

The fifth phase started in 2008 when the government re-articulated the dairy chain and renewed its commitment to the prioritization of the agricultural sector through the adoption of the "Green Morocco Plan". This plan truly represents a roadmap for the development of Moroccan agriculture towards 2020 and places the development of value chains at the core of state policies. Support to the sector is foreseen to continue as the government aims at reaching the target of 4.5 million tons of raw milk production by 2020. Milk prices have increased in 2013 as the government decided a 5% increase of farm-gate prices (from 0.33 USD to 0.35 USD per litre) following a 9% increase of consumer milk price fixed by the leading dairy company, *Centrale Danone*. In May 2014, the latter has inflicted on consumers a 10% increase in prices of yoghurt and cottage cheese.

2 Conceptual framework

This research deals with the interaction between the institutional environment and the organisational challenges dairy cooperatives in Morocco face. The institutional context consists of markets, infrastructures, institutions per se, networks and trust (Leana and Van Buren, 1999; Ostrom and Ahn, 2008). We argue that the impact of the institutional environment on solving the organisational challenges works through the organisational capacities of the cooperatives. More specifically, our paper focuses on organizational capacities for managing collective marketing activities (Ton, 2010). These organisational capacities can be enabled or constrained by the external environment. Figure 2 shows that a dairy cooperative operates in an institutional context and that this environment affects certain outcomes through the type and strength of organisational capacities. As to the main contextual factors, our paper focuses on institutions like political regulation, economic incentives and policy dialogue facilitation, as these institutions are expected to affect the ability of the cooperatives to enhance milk quality and maintain organisational efficiency.

Organizational capacities result from social capital that is created when individuals "spend time and energy working with other individuals to find better ways of making possible the achievement of certain ends that in its absence would not be possible" (Ostrom, 1995). Producer organizations and agricultural cooperatives are organisational expressions of this social capital. These organizations constantly adapt to the institutional environment in order to suit their needs (Herbel and Ourabah Haddad, 2012).

The main research question addressed in this paper is "What is the influence of the external environment on the ways in which dairy cooperatives deal with two organisational challenges?" More specifically, how do these cooperatives develop and apply (1) effective and efficient milk quality assurance systems and (2) payment systems that can accommodate the financial needs of both smallholder members and the cooperative organization?

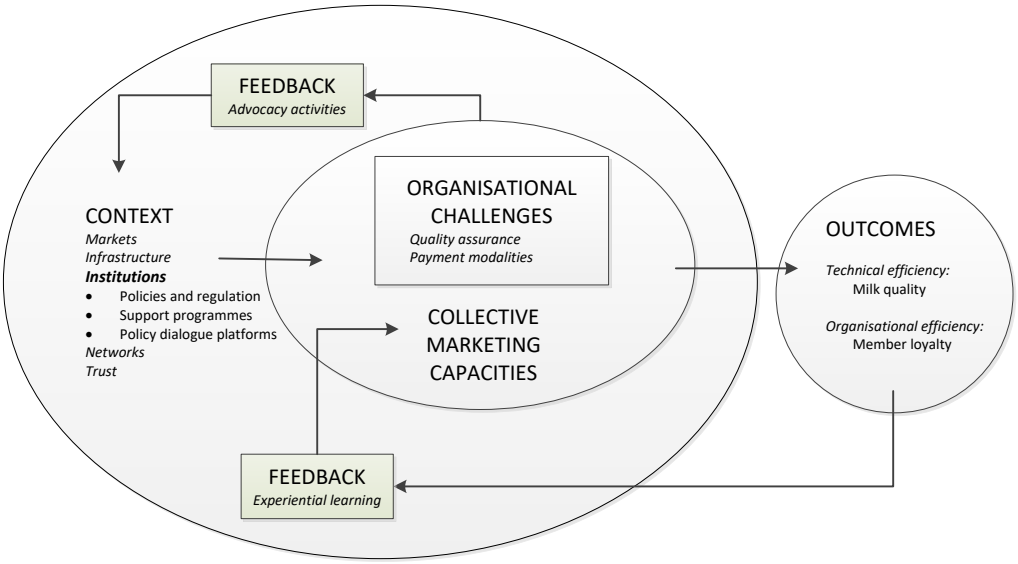

Figure 2. Conceptual framework: institutional environment, organisational capacities and performance outcomes (Based on Ton, 2015)

- *Developing and applying effective and efficient quality assurance systems*

Delivering quality milk is of crucial importance for a cooperative as it is tightly linked to the quality of the processed dairy products, as well as to food and nutrition safety. Failure to meet milk quality requirements often becomes a public health issue. A dairy cooperative needs to monitor the quality of the raw milk that is delivered to the plant. Low-quality milk cannot be used for Ultra High Temperature milk. For cheese or yoghurt making, the milk needs to be free of antibiotics. Low and variable quality poses a risk for the cooperative in its marketing activities. Improperly processed milk may imply a food safety risk for consumers, as pathogenic bacteria from the cow may be transmitted to the consumer. Also, foreign substances added to the milk may hold a risk for the consumer, as shown by the melamine scandal in China.

Milk quality is one of the main issues where the individual dairy farmer may have a different interest than the group. The farmer wants to deliver all his milk, irrespective of the quality, while the cooperative only wants to receive milk that complies with minimum quality standards. This inherent tension between group and member is called an agency problem. Agency theory addresses information asymmetry and incentive incompatibility between trading parties (Eisenhardt, 1989). It applies where one party has an informational advantage over another that can be exploited to the benefit of the advantaged party at the expense of his trading partner, whenever this information asymmetry is costly to correct (Fama and Jensen, 1983). To solve the agency problem and prevent opportunistic behaviour of supplying members, the cooperative may implement internal rules and regulations for information disclosure through quality testing as well as for paying premiums for high quality and applying discounts for low quality deliveries (Mujawamariya et al., 2013).

- *Developing and applying payment modalities which can accommodate the financial needs of both smallholder members and the cooperative organization*

An agricultural cooperative needs to pay for the milk purchased from its member suppliers. Many smallholder farmers tend to face cash constraints and expect quick payment, while the cooperative needs time to complete transactions with the processing customer. The cooperative needs to secure working capital in order to resolve this tension. But this working capital has a price. Delayed payment is inevitable when the group cannot access bank loans. However, the cooperative faces competition from other buyers that may pay immediate cash. Another problem appears when the cooperative provides inputs (e.g., feed) and services (e.g., veterinary) to members, to be discounted from the milk payment. Farmers may be inclined to side-sell and get a higher price from buyers that did not provide these services.

The precise internal rules and regulations about milk payment and input provisioning to the members will vary according to the needs of the producers, the trust between the cooperative and its members as well

as the presence of competing buyers. The payment modalities applied by the dairy cooperatives vary according to market dynamics, farmer advocacy, banking technology, legal provisions and regulations and any other type of institutional features.

3 Data and Methods

We used a case study approach to answer our research question. Four case studies of dairy cooperatives in Morocco have been carried out, in the 2015/2016, through 13 in-depth semi-structured interviews with three key actors in the cooperative: managing director, elected president and treasurer. A semi-structured interview guide with key questions was used. All the interviews were realized face-to-face, at the location of the cooperative headquarters. All interviews were conducted in groups, thus with the manager, president and treasurer at the same time. After each interview, transcripts were made and a synthesis was drawn on the basis of these transcripts. Data was processed in a separate Excel sheet for each interviewed cooperative. Data analysis was carried through the use of simple descriptive methods (i.e. mean, standard deviation) for quantitative data.

The sample includes both collection and processing cooperatives, thus covering a diversity of organizational forms, which may be differently affected by the institutional environment. The sample is made of three milk collection cooperatives and one processing cooperative. Two of the collection cooperatives are located in large-scale irrigation schemes: the Al Badre cooperative in the Tadla area (Center Eastern part of Morocco) and the Al Fouarate cooperative in the vicinity of Kenitra city, in the Gharb large scale irrigation area (North Western part of Morocco). The third milk collection co-operative, named Al Mouna, is located in the rain-fed agricultural area of Khémisset, in the Center Western part of the country. The fourth cooperative named Colait/Extralait is a dairy processor. It is located in the Gharb irrigation area, and it was established in 1953, during the French colonization era, in order to add value to the milk output of the region and to contribute to the supply of dairy products to growing neighbouring cities. The main characteristics of these four dairy cooperatives are reported in Table 2.

In addition, two professional organizations related to the dairy chain in Morocco have been interviewed. The two apex professional organizations representing the dairy value chain are the National Cattle Breeders Association *ANEB* and the official dairy chain governing body called *FIMALAIT - Fédération Interprofessionnelle MArocaine du LAIT* - which includes representatives from dairy farmers, milk collectors and milk processors.

Table 2.
Main characteristics of the four case study cooperatives(2015/2016 data)

	Al Badre	Al Fouarate	Al Mouna	Colait/Extralait
Location	Tadla irrigation scheme	Gharb irrigation scheme	Khemisset rain-fed area	Gharb irrigation scheme
Date of creation	2003	1978	2000	1953
Initial number of members	71	27	12	21
Current number of members	81	56	9	88
Daily milk volumes collected (metric tons)	2.5	1.6	3.7	165
Non-member supply	None	35%	20%	Second tier

Source: Interviews done by the authors

4 Results on initiatives of cooperatives

In the following, we will discuss the challenges that were experienced by the four case study cooperatives as well as the solutions that these cooperatives have developed and implemented. The next chapter will present the results as to how the institutional environment has supported (or not) the cooperatives in dealing with the organisational challenges.

Challenge 1 – Developing and applying effective and efficient quality control systems

The quality of raw milk is low in Morocco. This situation is mainly due to the relatively poor hygienic quality of milk (i.e. its level of contamination by microorganisms). In addition, milk quality may be low due to residues of antibiotics in the milk, which has consequences both as losses of unsold quantities of milk and also as a risk to food safety.

All the stakeholders in the dairy chain acknowledge that on-farm investments and better handling practices are needed to improve milk quality. Nevertheless, the price (premium) for quality that is paid by the processor is not translated in quality-differentiated prices at farm-level. Payments to farmers are based on volumes delivered rather than on the quality of milk. This implies that farmers lack incentives to enhance milk quality (Sraïri *et al*., 2009a). This lack of price incentives for milk quality is difficult to address given that the offer of raw milk from smallholder farmers is fragmented. Small volumes of milk are delivered by smallholders daily to 2550 small collection cooperatives throughout the country, before supplying the processing units. Dairy farmers can switch easily between buyers, and are free to sell to informal traders or other cooperatives that collect milk in the area when these pay a better price or apply lower quality standards. Especially in the dairy basins located close to the large cities, there are multiple private traders who collect milk from the farms and deliver it to the cooperatives. These traders mix the milk collected from several farms, making it difficult to avoid contamination and to trace the origin in case of a quality problem.

In general, farmers are perceived as not sufficiently aware of the consequences of antibiotic residues in raw milk destined for processing. According to the interviews at Al Badre, for most farmers, the notion of milk quality remains insufficiently understood due to the numerous parameters it carries (hygienic, chemical and physical). They feel a lack of clarity on the criteria used to measure the level of quality. Moreover, the premium paid by the processor to the cooperative for milk quality deliveries does not reach individual farmers despite their efforts to comply with these requirements.

Solution 1: Initiatives to improve quality at farm level

As one of the easiest organisational solutions, the cooperative Al Fouarate started to separate the milk delivered by peddlers from the batches coming from private farms. The Al Mouna collection cooperative has increased the frequency of milk collection. However, these measures alone are not considered sufficient to guarantee required milk quality. Therefore, the Al Fouarate cooperative has asked its members to use exclusively aluminium cans to transport the milk from the farm to the collection centre, in order to meet the quality requirements of the processor (i.e. *Centrale Danone*). However, this measure did not hold a consensus among all farmers because of its high cost and the heavy weight of the cans.

Solution 2: Initiatives to improve quality at the collection centre

In order to deliver quality milk, many of the sample cooperatives proceed with washing milk tanks with disinfection products. Al Badre cooperative for instance bought a high-pressure cleaner to clean the tank. The Al Mouna cooperative uses a product called “Easy Foam VF 32” provided by its client, the dairy company *Safilait*.

The Al Mouna established a system of mandatory milk collection twice a day with frequent measurements of raw milk density and a daily testing of antibiotics residues. This system enables the cooperative to meet the dairy plant’s quality requirements. However, even when the collection cooperative puts in place these more sophisticated systems of testing antibiotics’ residue, acidity and density, as in the case of Al Mouna and Al Fouarate, the testing is not carried out systematically. In practice, tests were only applied on samples from those farms for which cooperative managers have a suspicion of treated cows or fraudulent behaviour.

Sometimes, cooperatives prefer paying for contaminated milk, under the condition that it is not delivered to the cooperative. As cooperatives do not test the quality of the milk before combining it with milk from other farmers and delivering it to a processor, contaminated milk may jeopardize the supply relationship with the processing customer, as the processor may reject those deliveries. Since 2013, the cooperative Al Badre has adopted a policy of paying for non-delivery of the milk containing antibiotics residues.

FIMALAIT is currently preparing a program in collaboration with the National Office of Sanitary Security of Food Products (*Office National de la Sécurité Sanitaire des produitsAlimentaires* - ONSSA) to strengthen the capacities of the staff operating in milk collection centres. Some 340 collection centres out of 2550 have been identified as needing specific support to make sure that they comply with international standards. Water quality is considered as an important issue in order to facilitate cleaning of the cooling tanks in the centres, and equipment is needed for milk quality analysis.

Solution 3: Transparency in quality testing

In several cooperatives, including Al Badre, both the top management and the members complain about the lack of transparency of the evaluation system for milk quality. In fact, the criteria used to evaluate milk quality are imposed by the dairy processor, who is the only operator with laboratory analysis devices, and therefore the cooperative members have no say in the definition of criteria and no way as to dispute the test results. In fact, dairy processors use the issue of milk contamination by antibiotics to avoid collecting all the raw milk supplied by farmers. Since a single batch from a farm that treated a sick cow with antibiotics can contaminate the entire milk tank in a collection cooperative, dairy processing factories use this argument to reject raw milk, and this allows them to avoid paying farmers. Such behaviour is particularly used in cases of excess milk supply, with the result that collection cooperatives' members have to find alternative solutions to sell milk, such as informal milk markets in suburban areas, but at lower prices.

The cooperatives Al Mouna and Al Fouarate had good but short-lived experiences to control the processors' laboratory results. For example, in 2012, the dairy processor sold to the cooperative Al Fouarate a rather costly (1500 USD) miniature laboratory called Milkoscan, which performed rapid routine tests on raw milk chemical quality. This milk quality assessment system has resulted in improvements in milk traceability, allowing a rapid identification of batches with limited fat contents or inadequate solids non-fat contents. It also allowed a stabilisation of raw milk prices paid to the cooperative, as the members of the cooperative had a reliable tool to challenge the results of the tests that were carried out by the processor.

However, this system came to an end when the device broke down for lack of maintenance. The cooperative could not afford to get a new device as advised by *Centrale Danone*. For the same objective of increased traceability, the cooperative Al Fouarate purchased a Gerber centrifugation machine that determines milk fat content according to the standard method used for this analysis.

Given the complex handling of chemicals such as sulphuric acid, as well as its time-consuming routines (more than 30 minutes for a single analysis), this device is no longer used by the cooperative.

FIMALAIT is also planning to create laboratories dedicated to milk quality analysis. This requires good governance and good collaboration within the dairy chain. Currently, there is a willingness to develop three laboratories located in the most prominent regions of dairy farming in Morocco, namely Doukkala, the Gharb and the Tadla regions, which currently represent 60% of the national raw milk output. These regions are expected to become more prominent as they have relatively abundant water availability allowing a sustainable development of the dairy activity in comparison to water scarce areas.

Challenge 2 - Developing and applying payment systems that can accommodate the financial needs of both members and cooperative organization

Private traders deliver the raw milk directly to private factories through private collection centres. This situation creates fierce competition between cooperatives and private traders. This results in a dairy sector in Morocco characterized by a segmented supply given the large number of small and family producers, which deliver small quantities of milk. This makes it difficult to introduce payment systems at farm-gate that reflect quality-based prices for milk (Sraïri and Chohin-Kuper, 2007).

In the three collection cooperatives Al Mouna, Al Badre and Al Fouarate, farmers are paid for the delivery of the raw milk every second week. Therefore, these cooperatives find themselves in a delicate financial situation with liquidity imbalances as they have to pay their farmer suppliers while not having received payment from their processing customers. To solve this problem, some cooperatives negotiate with their bank to obtain financial facilities such as overdraft authorization. As these financial facilities are costly, the cooperative is confronted with weak business margins. This situation reaches its paroxysm during low production periods when overhead (salaries, payment of electricity bills, transport, and procurement of material) exceeds income from milk sales. "Business is highly seasonal" as it was expressed by interviewees from the Al Mouna and Al Fouarate cooperatives. Both suffer from this seasonality, as they are located in areas where irrigation facilities are limited, implying periods of severe fodder shortages and reduced raw milk output.

Solution 1: Shortening the payment period

The private companies have to pay taxes as opposed to cooperatives that are exempted from such payment. Milk prices of private traders are lower than those from the cooperatives. Nevertheless, milk volumes collected by the cooperative Al Fouarate have been decreasing as farmers started to increasingly sell to private traders. Also, private traders are not as demanding as cooperatives with regard to the quality of raw milk and farmers do not have to transport the raw milk as it is collected at the farm gate by a fleet of pick-up trucks

Different payment systems are being put in place by collection cooperatives to reduce the delayed payment period for farmers. For instance, the cooperative Al Badre ensures rapid payment of its farmers on a regular basis at the end of a week period. The cooperative has also developed the capacity of paying farmers through a bank transfer. However, this modern payment system is not accepted by all farmer members as the majority (80% in the case of Al Badre and Al Mouna) still prefer receiving cash.

Solution 2: Provision of additional social services

Some cooperatives have been developing social services to their members. Al Badre for instance has managed to implement several financial activities with social implications benefitting the whole village community, beyond member farmers. In 2008, it bought an ambulance to transport villagers in need of getting urgent medical care. Besides, the cooperative has built a school and a room for medical assistance. The cooperative finances also a medical insurance plan worth 60 USD per year for its members by contracting with a private insurance company. This social insurance plan came unfortunately to an end soon after the private company's decision to increase the insurance premium significantly to 180 USD per year.

Solution 3: Value addition to increase farmers' incomes

Value addition represents an avenue for farmers to increase their income. For example, farmers from the Al Badre cooperative prompted a movement to transform raw milk into value added dairy products such as mozzarella cheese. However, this initiative remained at the individual level instead of being internalized as a service by the cooperative, since the management of the cooperative has not been able to find a reliable client who would buy daily the output of cheese all year long. Contacts are still being established with restaurants located in the city of Casablanca to try to sell the daily output of mozzarella at good prices.

Solution 4: Establishment of contract farming

Despite unbalanced relationships between cooperatives and private processing firms such as *Centrale Danone*, overall the cooperatives recognize that contracts with the private processors allow them to get a steady income, even in times of excess milk supply. They do not get this type of stability when dealing with other processors.

5 Results on the institutional environment

A summary of the challenges faced by the dairy cooperatives in Morocco and the measures adopted to overcome them is reported in Table 3. In view of the two main organizational challenges that hinder the marketing capacity of the cooperative, as well as the solutions that they found to address them, we now present the key findings on the role of the institutional environment.

- *Coordination in the dairy chain*

Farmers cannot be paid on the basis of quality parameters, fat and protein content and level of microbial contamination because milk from different farmers is put together at the cooperative collection centre before it is delivered to the processor (in this case *Safilait* and *Centrale Danone*) and no individual quality check takes place. At the level of the processor, the quality of the whole batch is measured, and the cooperative is paid according to the quality level of the whole batch. Payments of the cooperative to the individual farmers are based on volumes only (Sraïri *et al*., 2009a). For example, the *Colait/Extralait* dairy processing cooperative, located in the suburbs of the Kenitra city, is mainly supplied through its 91 collection centres. These centres may, however, be tempted to deliver to other processors (e.g., *Centrale Danone* or *COPAG*) when *Colait/Extralait* will apply strict quality controls on the milk delivered by farmers.

The *Colait/Extralait* cooperative continues to suffer from unfair competition from milk traders working mainly in informal milk trading networks given the proximity to several important urban centres including the conurbation of Kenitra-Salé-Rabat (population of 3 million). This situation creates unfair competition to formal milk collection circuits. However, the informal circuits seem to accommodate both farmers and

consumers, i.e. farmers selling directly to small shops without having to comply with complicated procedures of quality and payment, and consumers pay lower prices for fresh milk and traditional dairy preparations (e.g., buttermilk, locally known as *lben*, and yogurts locally known as *raib*), available in small milk shops called *Mahlabates*. Importantly, these circuits are tolerated by local authorities because of the important social and economic roles they play. In fact, they provide steady incomes for a large number of families (Sraïri *et al*., 2007).

Table 3.

The main challenges and solutions regarding marketing capacity of dairy cooperatives in Morocco

Main organizational challenges	**Main issues**	**Main initiatives**
Effective and efficient quality control systems	Low milk quality for processing Food safety risk for consumers Lack of understanding of the concept of milk quality by dairy farmers Segmented milk collection networks which prevent quality-defined milk pricing	*Initiatives to improve quality at farm level:* - Capacity development and infrastructure development - Sanctioning fraudulent behaviour as part of rules and procedures - Using aluminium cans to transport milk to the cooperative collection centre - Increasing frequency of milk collection *Initiatives to improve quality and traceability at collection centre:* - Separation of trader-provided milk - Payment of contaminated milk from the cooperative to farmers as an incentive not to deliver it to the client processor. - Improvements in cleaning of cooling tanks - Regular testing of raw milk density - Investments in quality control devices - Agribusiness providing cooperatives with devices for quality testing *Initiatives to improve transparency in quality testing:* - Fair use of quality tests by processing plant - Investments to control tests results - Accredited laboratories
Payment systems to accommodate financial needs of member cooperatives and cooperative organizations	Need for transparency of price setting (premiums & penalties) from farmer to cooperative and cooperative to processor - Delayed payment by cooperatives to farmers versus cash payment by traders - Informal milk collection circuits create unfair price competition for cooperatives	*Shortening the payment period:* - Rapid payment system in cash or bank transfer according to milk volumes delivered - Increase bankability of farmers *Provision of additional services:* - Provide transport to collect the milk on the farm - Financing social protection services - Developing product value addition *Establishing contract farming:* - Long-term agreements between collection centres and agri-business processor ensuring steady farm incomes and a way to provide embedded services (e.g. credit facilities)

- *Financial instruments and capacity development programs that facilitate investments in quality assurance equipment*

Despite some efforts of collection cooperatives to upgrade milk quality and meet the requirements of private processors, in most of the cases the measures to be implemented are too costly (aluminium cans, quality testing devices) or unsustainable (devices not easy to maintain, unfair competition of informal circuits). The cooperatives' leeway to improve the quality of milk deliveries is therefore limited.

In most of the cases, the lack of financial resources needed for investments in quality control equipment and the lack of capacity development programs on quality management are serious impediments for

cooperatives to pay farmers for the quality of their individual deliveries and to supply the processors with consistent quality milk. These cooperatives are in need of support for investments, for capacity building programmes, and for the implementation of innovative payment systems. If Morocco is to expect significant increases in milk yield per cow on the numerous smallholder farms, higher levels of government support are needed (Sraïri *et al*., 2011). At the same time, the room for improving milk quality with fair remuneration of smallholder farmers in a context of fragmented supply is limited. The presence of competitors from the informal sector and the lack of transparency in quality measurement by private processors are other reasons for the limited room of manoeuvre of the cooperatives.

- *Institutional support for effective smallholder collective action*

The study revealed a perception of a lack of support from the institutional environment and notably of the current state policies for smallholders and their cooperatives. According to our respondents, the Green Morocco Plan includes measures for supporting collective action, but they do not reach smallholder cooperatives. The *ANEB* and Al Fouarate representatives pointed out that support measures to smallholder farmer organizations allocated by the Green Morocco Plan through *FIMALAIT* were not implemented. An annual envelope of 15 million DH (eq. 1.5 Million USD) has now been allocated to the dairy chain through *FIMALAIT* after five years of delay in disbursement. Another 55 Million DH (eq. 5.5 million USD) per year should have been made available to the dairy chain operators and in particular to farmers. *FIMALAIT* is planning to convene a meeting with board members to decide on the use of the 15 million DH per year. This situation is a result of the lack of trust among the dairy chain actors, within the inter-profession *FIMALAIT* and also towards cooperative managers. Mistrust is partly due to the unclear governance structure within *FIMALAIT* and the weight of farmers' representatives compared to processors' representatives, asymmetric information in the market, but most importantly unbalanced power relations between chain actors.

- *Connections between cooperatives, private companies and public authorities*

The establishment of the Green Morocco Plan in 2008 prompted the need for each commodity chain to create its own representative body. As a result, *FIMALAIT*, the Moroccan Inter-professional Dairy Federation was created in 2009. This inter-professional body brings together representatives of dairy farmers, milk collection cooperatives and milk processors.

During its creation, the inter-professional organization gave rise to a number of trust related issues among actors due to a lack of clear governance mechanisms within the organization. For example, according to ANEB, some processors have not accepted the idea of discussing sensitive issues with regard to the dairy chain. Also, *Centrale Danone* has insisted on having its own group of farmer suppliers (namely the Fédération Nationale des Producteurs Laitiers - *FNPL*) to be represented in *FIMALAIT* instead of *ANEB* as the overall representative of livestock farmers at the national level. After an intervention by state authorities, *ANEB* and *FNPL* merged into *FENEPROL* (Fédération Nationale des Eleveurs Producteurs Laitiers), which is meant to constitute the unique representing body of dairy farmers at the national level. On the milk processing side, private companies as well as cooperatives formed the Fédération Nationale des Industriels Laitiers (*FNIL*) and this entity is also represented in *FIMALAIT*.

FENEPROL and *FNIL* have reorganised *FIMALAIT* and according to an official decree *FIMALAIT* is now the only legitimate body to represent the dairy chain. It has therefore become eligible for public funds and public programs destined to the development of the dairy chain. The first meeting of *FIMALAIT* also included representatives from the Ministry of Agriculture. The director of *Centrale Danone* was elected as the first president of *FIMALAIT*, with the support of the Ministry of Agriculture, despite *ANEB*'s initial reservations. After convening a crisis meeting in 2013, in a context marked by soaring milk powder prices on international markets, *FIMALAIT* requested national authorities to intervene through an increase in milk prices throughout the dairy chain (from farm gate to consumer). In August 2013, national authorities responded favourably to the request with price increases shared between processors and farmers.

The dairy sector has recently suffered from bad publicity related to the quality of dairy products and the assumption that milk consumption has a negative effect on human health. Unfortunately, this issue exacerbated in 2015, at a time where favourable climate conditions (heavy and steady rainfall throughout fall 2014 and winter until spring 2015) induced a significant increase in raw milk output. In view of rebuilding the reputation of the sector and solving the issue of reduced dairy product sales, the inter-professional organization *FIMALAIT* launched a large campaign that included scientific conferences and TV spots, aimed at promoting consumption of dairy products.

The main challenge for *FIMALAIT* is to find board members capable of advocating the joint interests of all the actors of the dairy chain. *FIMALAIT* has recently (November 2016) obtained the final approval from public authorities to be recognized as the only representative body of the dairy chain in Morocco. Another

challenge of this body which is expected to play a major role both at national as well as at regional level is to find a budget and the competences that will allow expansion of its activities.

6 Discussion and Conclusion

In the ambition to be effective marketing organisations for their members, cooperatives face several organisational challenges. One of these challenges relates to the development and application of a quality control system (Kirezieva *et al*., 2016). Good quality milk is important for processors as it enhances the efficiency of processing, but it is also important for consumers as it often relates to food safety (Luning *et al*., 2015).The cause of this organisational challenge is the classical collective action problem: the individual member has an interest in reducing effort (and thus costs) in reaching a certain product quality level, while the cooperative has an interest in receiving products of agreed quality level as that directly relates to efficiency in processing and marketing (Winfree and McCluskey, 2005). Particularly when information is asymmetrically distributed (in order words when transparency is lacking) and incentives structures are not clear, members of a cooperative do not have an incentive to exert effort or make an investment (Cook, 1995).

Internal regulations on quality standards and measurement may solve the collective action problem. However, these regulations do not work effectively in situations where quality cannot easily (i.e., against low costs) be measured and in situations where farmers have alternative, more attractive sales options (Mujawamariya et al., 2013). The latter implies that members of a cooperative can sell milk to traders (or even other cooperatives) that do not apply quality controls while still paying the same price as the cooperative.

In those situations, a cooperative cannot solve the problem of low quality individually. Because test equipment is expensive and members have alternative sales options, no majority of members can be found to agree on investments in such equipment. One way to address this problem is collaboration among cooperatives to setting up joint quality testing facilities and collectively agreeing to use the outcomes of the test in rewarding/punishing their members (Sexton, 1984). This, however, does not solve the problem of competition by private traders who do not require a particular milk quality level while paying the same price. The latter problem can be solved by state regulations on minimum milk quality and compulsory quality testing (Chang, 2009). Thus, the state can play an important role in enhancing milk quality by setting minimum standards, controlling compliance and sanctioning non-complying actors.

Another solution requires close collaboration in the dairy chain. Milk processors could pay premiums for good quality milk, and help collecting cooperatives to test the milk deliveries (Dries et al., 2009). This solution also requires individual payments for milk deliveries, as group deliveries continue to allow free riding behaviour by individual group members. Still, the issue of investing in milk quality testing remains. The state could support cooperatives in investing in and building capacity for decentralized quality testing at the milk collection points.

From our exploration of milk collection cooperatives in Morocco it has become clear that developing and implementing quality testing systems is typically a task of a partnership between public and private actors, where state regulation and financial support has to go hand in hand with strict agreements both among cooperatives (thus in the horizontal space) and between cooperatives and private milk processors (thus in the vertical dairy chain).

Our study has shown that dairy cooperatives in Morocco have high expectations of the supporting role of the state. This not only relates to basic public services like good infrastructure, agricultural research, and a judicial system that facilitates contract enforcement, but also to implementing regulations on minimum milk quality, facilitating quality testing, and monitoring compliance to those rules. In other words, dairy cooperatives demand an enabling institutional environment in which the state plays an important coordinating and standard-setting role.

State policies may also facilitate the dialogue between the various actors of the value chain, particularly within FIMALAIT. By facilitating a space for professional organizations and agricultural cooperatives to establish dialogue platforms allowing them to discuss policies, the government is supporting the development of social capital as a precondition for the legitimacy of these platforms to foster collaboration and networking. In fact, both quality improvement and the establishment of fair and efficient payment schemes may benefit from strong collaboration between public and private actors along the dairy chain. This will not only lead to enhanced information exchange but also to solving organisational challenges.

References

Agarwal, A. (2001). Common property institutions and sustainable governance of resources. *World Development*, **29**,10: 1649-1672

Best, R., Ferris, S., and Schiavone, A. (2005). *Building linkages and enhancing trust between small-scale producers, buyers in growing markets and suppliers of critical inputs.* London: Crop Post Harvest research program, DFID.

Bienabe, E., Sautier, D. (2005). The role of small scale producer organizations to address market access. In F. A. Hainsworth (Ed.), *Beyond agriculture-making markets work for the poor.* London: DFID.

Bijman, J., Iliopoulos, C., Poppe, K. J., Gijselinckx, C., Hagedorn, K., Hanisch, M., Hendrikse, G. W. J., Kühl, R., Ollila, P., Pyykkönen, P., and Sangen, G. V. D. (2012). *Support for Farmers' Cooperatives: Final Report*. Wageningen, The Netherlands: Wageningen UR.

Chang, H.-J. (2009). Rethinking public policy in agriculture: lessons from history, distant and recent. *The Journal of Peasant Studies*, **36**: 477-515.

Cook, M. L. (1995). The Future of U.S. Agricultural Cooperatives: A Neo-Institutional Approach. *American Journal of Agricultural Economics*, **77**: 1153-1159.

Coleman, J. (1988). Social capital in the creation of human capital. *American journal of sociology,* 94, 95-120.

Dorward, A., Kydd, J., and Poulton, C. (1998). *Smallholder cash crop production under market liberalisation: a new institutional economics perspective.* UK: CAB International.

Dorward, A., Poole, N., Morrison, J., Kydd, J., and Urey, I. (2003). Missing links in livelihoods analysis. *Development Policy review*, **21**: 319-332.

Dries, L., Germenji, E., Noev, N., and Swinnen, J.F.M. (2009). Farmers, Vertical Coordination, and the Restructuring of Dairy Supply Chains in Central and Eastern Europe. *World Development*, **37**: 1742-1758.

Eisenhardt, K.M. (1989). Agency Theory: An Assessment and Review. *The Academy of Management Review*, **14**(1): 57–74.

Fama, E. F., Jensen, M. C. (1983). Separation of ownership and control. *Journal of Law and Economics*, **26**: 301-326.

Gijselinckx, C., Bussels, M. 2014. Farmers' Cooperatives In Europe: Social And Historical Determinants Of Cooperative Membership In Agriculture. *Annals of Public and Cooperative Economics*, **85**: 509-530.

Herbel, D., Ourabah Haddad, N. (2012). Successful farmer collective action to integrate food production into value chains. *Food Chain*, **2**: 164-182.

Hoekstra, A. (2012). The hidden water resource use behind meat and dairy. *Animal frontiers*, **2**: 3-8.

Kirezieva, K., Bijman, J., Jacxsens, L., and Luning, P.A. 2016. The role of cooperatives in food safety management of fresh produce chains: Case studies in four strawberry cooperatives. *Food Control*, **62**: 299-308.

Leana, C., Van Buren, H. (1999). Organizationalsocial capital and employment practices. *The Academy of Management Review*, **24**: 538-555.

Luning, P.A, Kirezieva, K., Hagelaar, G. Rovira, J. Uyttendaele, M., and Jacxsens, L. (2015). Performance assessment of food safety management systems in animal-based food companies in view of their context characteristics: a European study. *Food Control*, **49**: 11-22.

Markelova, H., Mwangi, E. (2010). Collective action for smallholder market access: Evidence and Implications for Africa. *Review of Policy Research*, ***27***: 621-640.

Mujawamariya, G., D'haese, M., and Speelman, S. (2013). Exploring double side-selling in cooperatives, case study of four coffee cooperatives in Rwanda. Food Policy, **39**: 72-83.

North, D. (1990). Institutions, institutional change and economic performance. (C. U. Press, Eds.), Cambridge, 153

Ostrom, E. (1995). Self-organization and social capital. *Political theory and policy analysis*, **4**: 131-159. Bloomington: Indiana University.

Ostrom, E., Ahn, T. (2008). Social Capital and Collective Action. In *The Handbook of Social Capital:* (Vol. 70).

Otmann, G. F., King, R. (2007). *Agricultural cooperatives: history, theory and problems. Cooperatives and commodity development: A perspective on the use of cooperatives in development, **46**: 18-46.*

Penrose-Buckley, C. (2007). *Producer Organizations. A guide to developing Collective Rural Enterprises.* Oxford, Oxfam.

Poulton, C., Kydd, J., and Dorward, A. (2006). Overcoming market constraints on pro-poor agricultural growth in sub-Saharan Africa. *Development Policy Review*, **24**: 243-277.

Robbins, P., Bikande, F., Ferris, S., Kleih, U., and Okoboi, G. W. (2005). The territorial Approach to ruralAgro-enterprise Development. *Collective marketing for smallholder farmers, 4*. Bogota, CIAT.

Sexton RJ (1984). Perspectives on the development of the economic theory ofcooperatives. *Canadian Journal of Agricultural Economics,* **32**(2):423-436.

Sraïri, M.T. (2015). The Moroccan dairy chain: recent evolutions and future prospects. CIHEAM Watch letter 35. Sebastien Abis (Ed.). CIHEAM. Paris.

Sraïri, M.T. (2011). Dairy development in Morocco. Animal Health and Production, FAO, Rome

Sraïri, M.T., Chohin-Kuper, A. (2007). Conséquences de la libéralisation des marchés sur les opérateurs de la filière laitière au Maroc. Revue d'élevage et de medecine vétérinaire des pays tropicaux **60:** 177-187.

Sraïri, M.T., Benjelloun, R., Karrou M., Ates S., and Kuper, M. (2016). Biophysical and economic water productivity of dual-purpose cattle farming. *Animal,* **10**: 283-291.

Sraïri, M.T., Benyoucef, M.T., and Kraiem, K. (2013). The dairy chains in North Africa (Algeria, Morocco and Tunisia): from self-sufficiency options to food dependency?.Springer plus. 2, 162.

Sraïri, M.T., El Jaouhari, M., Saydi, A., Kuper, M., and Le Gal, P.-Y.(2011). Supporting small-scale dairy farmers in increasing milk production: evidence from Morocco. *Tropical Animal Health and Production*, **43**: 41-49.

Sraïri, M.T., Benhouda, H., Kuper, M., and Le Gal, P.-Y. (2009a). Effect of cattle breeding practices on operating in a two-stage dairy chain.*Tropical Animal Health and Production*, **41**: 259-272.

Sraïri, M.T., Kiade, N., Lyoubi, R., Messad, S., and Faye B. (2009b). A comparison of dairy cattle systems in an irrigated perimeter and in a suburban region: case study from Morocco. *Tropical Animal Health and Production*, **41**: 835 - 843.

Sraïri M.T., Ben Salem M., Bourbouze A., Elloumi M., Faye B., Madani T., and Yakhlef H. 2007. Analyse comparée de la dynamique de la production laitière dans les pays du Maghreb. *Cahiers Agricultures*, **16**: 251 – 257.

Thorp, R., Stewart, R., and Heyer, A. (2005). When and how far is a group formation a route out of chronic poverty World development report 33. Oxford: University of Oxford.

Ton, G. (2010). *Resolving the Challenges of Collective Marketing: incentive structures that reduce the tensions between members and their group.* Wageningen. ESFIM.

Ton G. (2015.) Measuring Tensions and Intentions: Mixing methods in the impact evaluation of development support to farmer organisations. *Wageningen University Ph D-thesis Development Economics Group.* Wageningen: Wageningen University, 302.

Ton, G., Bijman, J. (2006). The Role of Producer Organizations in the Process of developing an Integrated supply Chain: experiences from quinoa chain development in Bolivia. In J. Bijman, S. W. F. Omta, J. H. Trienekens, J. H. M. Wijnands, & E. F. M. Wubben (Eds.), *International Agri-Food Chains and Networks: management and organization*(pp. 97-111). Wageningen: Wageningen Academic Publishers.

Ton, G., Grip, K. D., Lançon, F., Onumah, G., and Proctor, F. (2014). Empowering smallholder farmers in markets: strengthening the advocacy capacities of national farmer organisations through collaborative research. *Food Security*, **6**(2): 261-273.

Uotila, M., Dhanapala, S. (1994). Dairy Development through cooperative structure. *World Animal Review*.

Winfree, J., McCluskey, J. (2005). Collective Reputation and Quality. *American Journal of Agricultural Economics*, **87**(1): 206-213.

World Bank (2012). *Development and changeWDR 2012.* **43**, 1, (pp423-437).Washington: The World Bank.