

Paper prepared for the 8th International Conference on Management in AgriFood Chains and Networks, Ede, The Netherlands

Limited farmer's response to cooperative initiatives in Rwanda's coffee sector

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Abstract

This paper investigates the limited farmer's response to new initiatives in coffee cooperatives in Rwanda. These cooperatives are generally expected to improve production and farmers' incomes. However, member rates and commitment in terms of trade with the cooperatives in the case study areas remained low. We describe the structure of the marketing chain of coffee in Rwanda, use a probit model to analyse the determinants of membership and compare determinants of costs of transactions between farmers and the cooperative and farmers and traders. Cooperatives buy coffee berries which are processed at the cooperative washing stations; traders buy dry coffee with less attention to quality. Results suggest that a group of farmers preferred to sell to traders because of their repeated transactions which are related to daily live and long-term relationships in the community. Furthermore, a lack of exclusion mechanisms from the cooperative inspires many free-riders; these are non-members who are given the opportunity to sell to the cooperative and get a better price for their coffee. The results imply that cooperatives need to assess and re-think their relational contracts with the farmers and that the cooperative will succeed in attracting and committing its members when they would build better trust relationships.

Keywords: cooperative membership, governance structures, transaction costs

1. Introduction

Agriculture is the main economic activity in rural Rwanda; this is mainly a result of the quasi absence of minerals and other natural resources, the country being landlocked, current low level of industrialisation and low purchasing power of the population (MINECOFIN, 2002). The contribution of agriculture to the GDP amounted to 40 percent in the period 1999-2004 (MINAGRI, 2006); mainly earned by exporting cash crops, such as coffee, tea and pyrethrum. Exports of these cash crops accounted for on average 70 percent of the country's total export revenues between 1999 and 2004 (MINAGRI, 2004).

Coffee production is predominantly a smallholders' activity, traditionally practiced by many households since its introduction by German missionaries as early as 1904. In 2004, Rwanda counted approximately 400,000 active coffee producers (OCIR, 2005). Other actors in the local coffee sector are traders, private operators, hulling/exporting companies, government institutions and in the last decade many new cooperatives which have emerged as a result of governmental and NGO support. These cooperatives are supposed to create incentives for its members to produce and market coffee through the (a) provision of services and inputs for production, (b) processing high-quality coffee by the washing stations, and (c) increasing farmers' bargaining power which should result in higher selling prices and hence their incomes (OCIR, 2005). One would assume that farmers find it interesting to join these

cooperatives; yet we observe a relatively low level of membership and a limited commitment to trade by members with the cooperatives.

Do the cooperatives fail to sufficiently decrease transaction costs for the farmers or is it a matter of trust? Why do some farmersⁱ find it interesting to sell to traders, even at a lower price? And why would even members sell their coffee to traders? Indeed, although cooperatives have been favoured by the Rwandan government since decades (see e.g. Loevinsohn et al., 1994), the coffee cooperatives seem to attract only a limited number of farmers and there seems to be limited commitment to trade with the cooperatives, which are supposed to provide a better market. This paper aims at analysing this limited farmer's response to cooperatives membership and farmers' commitment. We compare farm, household and farmer's attitude characteristics of members and non-members and analyse the differences in transaction costs between the sales of berries to cooperatives and dried coffee to traders.

The main claim of this paper is that the limited farmer's response is due to a lack of strong exclusion rules on the part of the cooperative and a preference to sell coffee to traders. The latter is explained by the lower requirements in quality by traders and the extra services traders render to farmers; to some extent leading to interlocked contracts between traders and farmers. Traders seem to be closer to the farmer's daily activities. The fact that the cooperatives in the case study are managed with external support may explain their focus on coffee trading and provision of production inputs, with perhaps less room for flexibility compared to the relationship with traders.

2. Brief literature overview

Cooperatives or more generally producer organisationsⁱⁱ are common in developing countries. It is estimated that 250 million farmers belong to a producer organisation (WDR, 2007). The World Development Report (2007) distinguishes (a) commodity specific organisations that provide economic services and defend members' interest for production of a particular commodity, such as coffee, cocoa or cotton; (b) advocacy organisations that defend producers' interest; and (c) multipurpose organisations. Producer organisations are involved in influencing agricultural policy, providing access to input and output markets, supporting the generation and adoption of technological innovations, uptake of new activities and contributing in natural resource management (WDR, 2007). Common characteristics of producer organisations are detailed in Bijman (2007) and include, amongst others, that they need a democratic decision-making structure, to be established bottom-up, to be member-owned and member-controlled and to be an association of members. Basically, a producer organisation is a form of collective action, which generates advantages to its members such as economies of scale in production, marketing and other joint activities, risk sharing, reducing transaction costs, strengthening bargaining power, provision of better access to markets and supporting innovations (see Bijman (2007) amongst others for details).

Bijman (2007) explains how producer organisations may reduce transaction costs in quality-oriented agrifood chains. Staal et al. (1997) and D'Haese et al. (2007) give evidence of the role of farmers associations in reducing transaction costs to facilitate output market access. Wollni and Zeller (2007) show that coffee producers in Costa Rica that are members of a cooperatives seem to be more inclined to participate in specialty coffee markets which offer a better price. Bebbington (1996) describes the importance of campesino and traditional indigenous federations in agricultural and livelihood intensification. Loevinsohn et al. (1994) explain that cooperatives that promote farming collectively in Rwanda were more successful in integrating rice in their production system. Mc Dormick (1999) gives evidence of the spillover effects on technology adoption and labour in enterprise clusters in Africaⁱⁱⁱ. Yet,

collective action is costly (Olson, 1965; 1971), and producer organisations are hybrids (Ménard, 2004) or hierarchical types of governance structures (Hendrikse and Veerman, 2001) (discussed in Ménard, 2007), which raises new transaction costs to secure its management.

Limited members' participation in organizing, implementing and managing the cooperative's activities, was found to contribute much to failure of cooperatives especially in developing countries (Braverman et al., 1991). Failures of cooperatives have been discussed for Africa in Holmén (1990) and recently Kyeyamwa (2007) studied the low interest in forming associations for cattle marketing in Uganda. Brass (2007) analysed the failure of agrarian cooperatives in the 1970s in Peru from a socio-political perspective and finds that class distinctions within the cooperative and the relationships between members and bureaucrats created major problems. Hendrikse and Veerman (2001) argue that several agricultural and horticultural marketing cooperatives considered or already had switched from a cooperative to a conventional firm. They showed that a cooperative was not an efficient organisational form when 'final product markets demand differentiated products, requiring sizeable funds for specific investments at the processing/downstream stage of production' (Hendrikse and Veerman, 2001:206).

Cook (1995) distinguishes a free-rider problem, horizon problem, portfolio problem, control problem and influence costs as critical problems cooperatives could face. The WDR (2007) discusses the following challenges for producer organisations. First, producer organisations need to resolve conflicts between efficiency and equity. It is difficult to exclude non-compliers and rewards for efficiency and innovation are limited. Second, they have to deal with a heterogeneous membership. Third, they need to develop managerial capacity for integrating in high-value chains. Fourth, they need to develop new technical and communication skills to participate in high level negotiations; finally, they need to confront a 'sometimes-unfavourable external environment' (WDR, 2007).

The importance of social capital, including trust, to solve problems in collective action has been recognised. Trust and reciprocity reduce enforcement and information costs for joint activities (Keefer and Knack 2005). Hansen et al. (2002) cite studies by Barney and Hansen (1994) and Dyer and Singh (1998) to argue that 'trust matters in organisational structures'. In their study, Hansen et al. (2002) discuss the role of trust in the sustainability of agricultural cooperatives and their commitment over time. They distinguish cognitive and associative trust in the following way. Cognitive trust is a judgement that an individual, group or organisation is trustworthy as a result of a rational, methodical process; associative trust is more subjective, and is more based on moods, feelings and emotions. They relate cognitive trust to trustworthiness between members and the management of a cooperative; associative trust is linked to trustworthiness among members. They conclude that the impact of trust varies depending on the organisational context (Hansen et al., 2002). In this study, the importance of trust and a farmer's perception of risk for membership are analysed. In the following section an overview is given on the methodology of this study.

3. Methodology

The field study was conducted in the Western and Southern provinces of Rwanda in July/August 2006. Coffee cooperatives are especially important in the Southern province. Primary data was collected among 120 members of four cooperatives and 50 non-members (Figure 1). Farmers in the sample sold berries or dried coffee to the cooperatives, traders or both. The four cooperatives are *Abahuzamugambi ba Maraba* and *Koakaka* from the Southern Province and *Coopac* and *Kopakama* from the Western Province (Map in appendix).

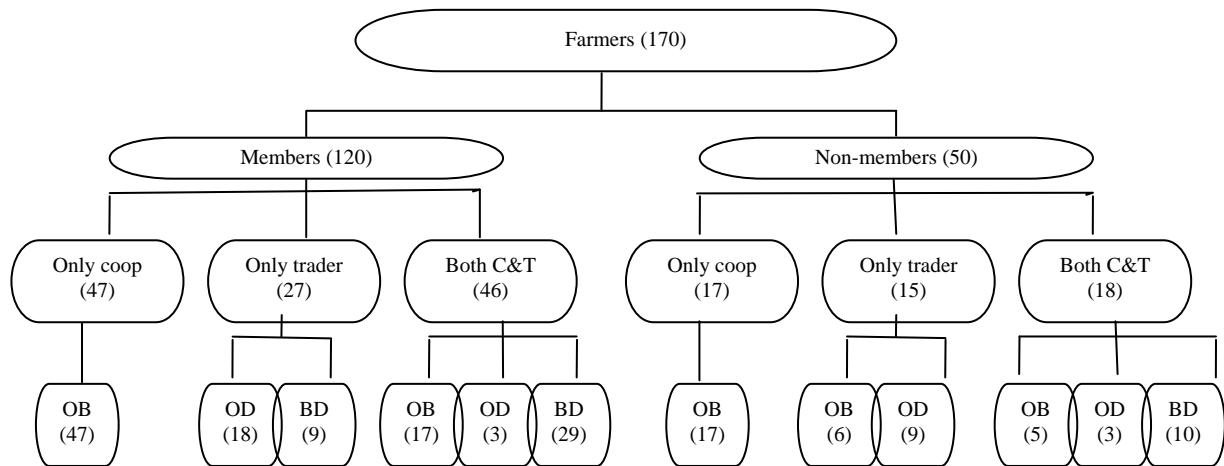


Figure 1. Composition of the sample along membership, choice of transaction trader and type of coffee sold (n in brackets) (OB refers to farmers producing only berries, OD to only dry coffee and BD to both berries and dry coffee)

We start our analysis by drawing the structure of the marketing chain of coffee in Rwanda. Next, the farmers' data is used to characterise members of the cooperatives in comparison to non-members. This describes the decision-making process of coffee farmers vis-à-vis membership of the cooperatives. Finally, we explore the performance of the contractual arrangements between farmers and cooperatives and traders in their relative potential to reduce transaction costs.

With regards to the statistical tools used in the study, the non-equality of averages of characteristics of members of cooperatives versus non-members is described by the ANOVA estimates. Chi-square tests are used to estimate the independence of categorical variables.

The determinants of membership are analysed in a probit model. This model yields estimates of the probability that a certain determinant contributes to the farmer's decision to have become member of the cooperative. We include the following determinants, namely: (a) farmer characteristics: age at membership of producer, education level of producer, household size, and gender; (b) farm characteristics: distance to the cooperative, province in which the farm is located and farmer's perception on the security of the ownership of their land^{iv}; and (c) farmer's attitude and level of social capital: motivation for growing coffee, trust in cooperatives, relationship in the cooperative, and perception towards risk.

Farm and farmer characteristics were also included in the model used by Wollni and Zeller (2007) to estimate the probability of participation of coffee producers in cooperative market channels in Costa Rica^v. The importance of farmer's attitude toward the cooperative management and other members is shown by Hansen et al. (2002) who focus on the importance of trust as one aspect of social capital. Social capital in general has been widely discussed in the context of cooperative performance (for example in D'Haese et al., 2005). This study also takes other aspects of social capital than trust into account such as relationships with family and friends. Family relationships have been used as an indicator of social capital by Fafchamps and Minten (2001) in a study on returns of social capital to trade in Madagascar. They distinguish relationships with other traders, relationships with potential lenders and family relationships as measures of the social capital of a trader.

To check the importance of social capital in membership of the coffee cooperative, we include the following proxies. First, the score on the relationship variable is -1, 0 and 1 for disagree, neutral and agree scores, respectively, on the Likert scale probing the importance of relationships in the cooperative, including family members, neighbours or friends. Second, to

measure trust farmers have in cooperatives in general, they were asked to rank at least 3 elements of preference towards the cooperative. Values of the trust score are thereby generated with a value 0 for those who did not mark trust in any of their preferences and 1, 2 or 3 for a low, medium and high rank, respectively. Third, the value of the risk variable is -1, 0 and 1 for disagree, neutral and agree scores, respectively, on the Likert scale probing the perception of risk to be a victim of theft and cheating. Fourth, the motivation of farmers towards coffee cultivation is measured by a 'growing purpose' dummy which takes value 0 for the choice of coffee farming associated with traditions and 1 for the rational economic decisions associated with expected benefits. We argue that if farmers have invested in coffee production with a strong purpose of making money or improving their livelihoods, their attitude will not be the same as those cultivating coffee just because they have been traditionally doing so or just because they have no other choice.

For the comparison of trading structures between (a) farmers and cooperatives and (b) farmers and traders, a qualitative approach is based on the attributes of transaction costs, i.e. asset specificity, uncertainty and frequency (see Ménard (2004) and Ménard (2005) for details).

4. Results

4.1. The coffee marketing chain

Before comparing the governance structures, actors in the domestic coffee marketing chain in Rwanda need to be characterised; not mentioned in the figure but important is the National Coffee Board (OCIR Café) that intervenes indirectly through regulatory measures. The Rwandan coffee chain can be divided in three stages corresponding to the processing stages of coffee, namely: cherries, dry/parchment and green coffee (Figure 2).

Cooperatives buy coffee berries from members and neighbouring non-members. The cooperatives accept berries from non-members, but these farmers will not get rebates or profit shares at the end of the sales season. The berries will be processed into dry coffee by depulping (i.e. removing the berry outer skin) at the cooperatives' washing stations. Traders also buy berries mainly from non-members on behalf of private operators who own mini-washing stations and undertake the same processing into parchment coffee. The berries of bad quality and the produce of non-members that is not sold to cooperatives (as per the farmer's choice) are processed by farmers themselves into the dry coffee which is sold to traders.

It should be emphasized that farmers can only process small quantities of coffee of which the quality is usually not good, whereas cooperatives have stringent quality requirements and large quantities can be processed at washing stations. Figures from Kopakama's financial report show that the cost of building such station is estimated at around 80 millions of Rwandan francs (approximately 120,000 euros); the cost depends on the processing capacity. It is through the financial support of international organisations (*International Fund for Agricultural Development- IFAD*), public and private projects (*a smallholder cash and export crops development project PDCRE through Twin-Trading and a Partnership and Enhancing Agriculture in Rwanda- PEARL supported by the Michigan State University*) and/or loans from the *Banque Rwandaise de Développement*, that these cooperatives were able to construct washing stations.

The exportable coffee from Rwanda is green coffee. The transformation of dry coffee into green coffee by hulling (i.e. removing the parchment) is performed either by cooperatives (few own the hulling machines) or hulling and exporting companies. These are *Rwacof*, *Rwandex*, *Sicaf*, *Coffee Business Center*, *Agrocoffee* and *Casferwa*. A small part of the green coffee is roasted and domestically consumed, while most coffee is exported. There are five

local roasting companies: some are closely linked to the cooperatives studied (*Coopac* and *Maraba*) and others are departments within hulling companies (eg. *Rwandex*). After obtaining the necessary certificates from OCIR, coffee is exported to Europe (France, Belgium and Switzerland), USA or new niches in Asia such as China^{vi}.

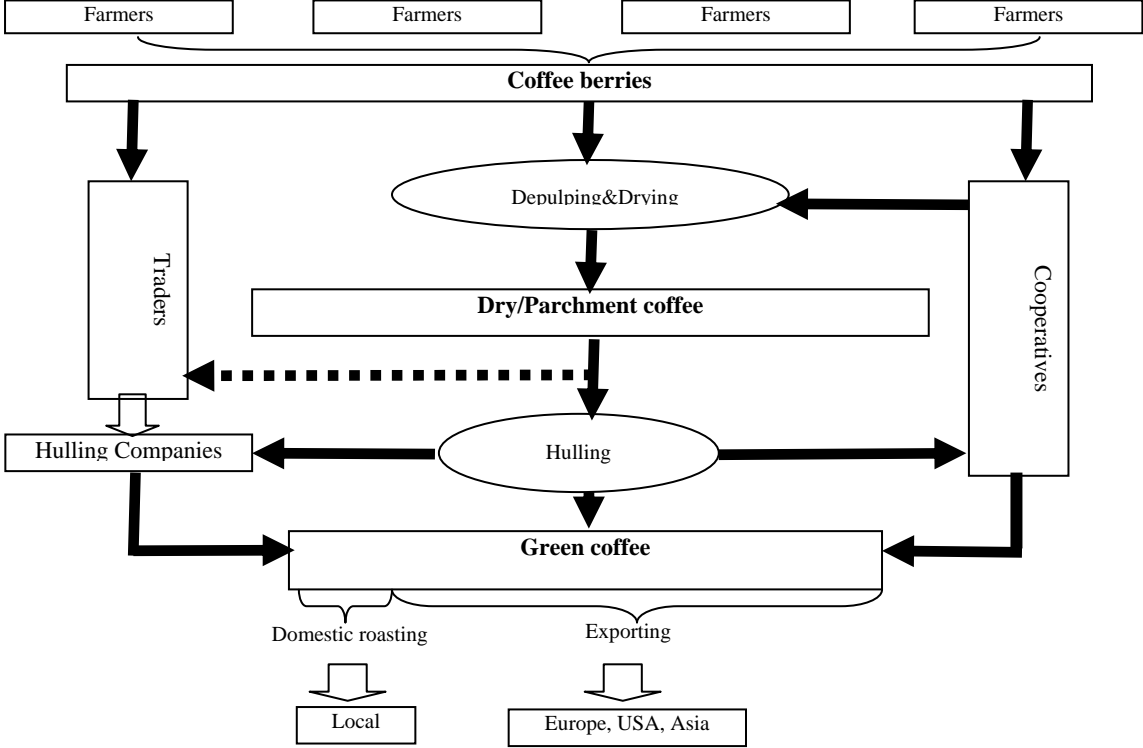


Figure 2. Coffee marketing chain in Rwanda

Before entering into a more detailed discussion of the farmers’ arrangements in the marketing chain, let us explore the functioning of the cooperative and trader businesses. The description is based on survey data and interviews with key-informants.

Coffee cooperatives

Cooperatives in Rwanda are regulated by the law N° 31/1988 of the 12th October 1988 (which is being amended). According to this law, a cooperative is “an autonomous association of persons united voluntarily to meet their common economic, social and cultural aspirations through a jointly-owned and democratically-controlled enterprise”. Key conditions required to establish a cooperative are a minimum of 7 members and a shared capital fully subscribed and paid (MINICOM, 2006).

About 80 cooperatives are registered at the national coffee board OCIR. In the 1990s new coffee cooperatives started as a response to new incentives offered by a favourable Government policy. These cooperatives, however, remain the farmers’ own initiatives, who reasoning on reconstructing their livelihoods after the war and genocide, decided to join hands and organise their production into cooperatives. In some cases, the founders are erudite farmers, who are experienced coffee producers. Other cooperatives were established mainly through the help of developmental NGOs. Abahuzamugambi, Kopakama and Koakaka are cooperatives initiated by farmers. The latter is a merge of 3 associations of coffee growers which were already in operation. Coopac, on the other hand, was created by an individual

entrepreneur who was interested in coffee growing. Table 1 summarizes some major characteristics of the cooperatives in this study.

Table 1. Characteristics of cooperatives

	Abahuzamugambi ba Maraba	Koakaka	Coopac	Kopakama
Year of creation	1999	1998	2001	1998
Creators	Growers	Associations merge	Individual founder	Growers
External support	PEARL	PEARL	-	PDCRE
Membership at start	230	900	110	94
Membership in 2006	1,250	1,610	2,198	708
Rate of membership evolution ^a	10.2	5.5	11.9	10.8
Membership fees (Rwfs)	5,000	500	10,000	3,000
Year of starting washing station operations	2001	2002	2003	2004
Washing station processing capacity (dry coffee) in tonnes	200	250	350	150

^aNote: Yearly rate of membership (M) growth from initial time (0) to 2006 (t): $R = \{ [Mt - M_0] / MT \} * 100/T$
Source: Rwandex 2006

The external support has an impact on value-adding since the projects enabled the construction of washing stations. It is important to note that PEARL offered non-reimbursable financial support whereas PDCRE's support was through repayable loans. Also Coopac was financed by loans from the *Banque Rwandaise de Développement*. These stations have different capacity levels for processing coffee berries into parchment coffee. A smaller station in terms of capacity is that of *Kopakama* with 150 tonnes dry coffee per year.

Despite the influence and importance of the government and external projects, farmers have claimed the ownership over the cooperatives since they are the beneficiaries of earnings made. In reality however, free-riding problems are observed as will be explained later. Almost in all cooperatives, members are encouraged to actively participate in the organisation of their cooperatives through different organs. All studied cooperatives have decentralized structures in which farmers can participate through assemblies held two to four times a year (depending on the cooperative) where decisions are taken through a one-member one-vote system.

A decision requiring farmers' consent at a higher level, such as the elected committees, is made through the leaders of each decentralized zones. The following elected committees are found in the cooperatives in the case study area, namely: (a) an *Administrative Committee* is in charge of executing all the decisions agreed upon by the *General Assembly* and monitoring all the cooperative's activities. The cooperatives' executive secretary is not necessarily a cooperative member; (b) an *Oversight Committee* consists of people within or outside the cooperative. It is charged with the task of supervising cooperatives and following up their accounts; (c) a *Management Service* is under the supervision of the Administrative Committee. Its task is to daily monitor the activities and finances of the cooperative; and (d) the *General Director* is a farmer who, de facto, is a member of the Administrative Committee.

Since coffee farming is a recurrent activity, especially when there are no other sources of income in rural areas, cooperatives involve in building long-term linkages with farmers through the incentives they provide. These incentives include rebates obtained by members only, in proportion to the coffee they have sold to the cooperatives. These rebates are distributed as shares of the profits from coffee exports. They are distributed in addition to dividends proportional to their membership contribution. Other sources of benefits include job

opportunities especially casual jobs offered by cooperatives during the harvesting season for different phases in coffee processing.

When coffee is exported, there are additional benefits to members depending on the price at which coffee is internationally sold. Cooperatives in the study have all acquired Fair Trade certification, which aims at guaranteeing a minimum price for farmers by charging a price premium to consumers (Muradian and Pelupessy, 2005). In Fair Trade markets, the *arabica* coffee is offered at a price of 126 US\$ cents/lb (one pound is 453 gram) that includes a premium of 5 cents/lb reserved for business and social development programmes.

Fair Trade certification implies that attention needs to be paid to fair labour conditions for farm and cooperative workers and to environmental protection activities such as filtering the waste by-products of the coffee washing process. However, cooperatives have not yet started realizing the benefits from Fair Trade. This is because in addition to the costs for meeting the international markets requirements, high fees have to be paid to get permission to use the label (see for details www.flo-cert.net). For this reason, cooperatives do not make much profit and even though they are still selling in these markets; they are reconsidering whether or not to continue the Fair Trade path (Bihogo, Rwakagara, et al., Personal Communication).

Also shown in Table 1 is that membership rates increased at the annual rate of around 10 percent from the time of creation of each cooperative to 2006 except for the Koakaka which started with a relatively high membership level (see note Table 1). This increase is associated with their success, but also it is often the result of relaxation of membership requirements. For instance, to be a member of Coopac, a farmer was previously required to own at least 1,000 coffee trees and buy two shares of 25,000 Rwfs (or about 37 euro) each. At present however, the membership fee is reduced to only 10,000 Rwfs (14.7 euro) partly explaining the relatively high rate of membership adherence. However, as mentioned in the introduction even this relaxation of requirements does not attract high numbers of farmers.

At their start, cooperatives set up entry requirements such as a membership fee or a minimum number of trees that a farmer had to own in order to become a member. However, these were not strongly imposed or were relaxed because the cost of enforcing farmers to abide by these requirements was often higher in comparison with the quantity of berries needed by cooperatives to survive through their washing stations' operations. Cooperatives also started to accept berries from non-members. Without an exclusion mechanism, non-members obtain the same price as members for their berries without differentiation and with free-ride. This lowers incentives of farmers to register to the cooperative.

A second problem for the cooperative is the lack of commitment of its members. Even at higher prices offered by the cooperatives, transactions in berries are not costless; farmers have to incur the extra cost of inputs for producing the coffee of better quality, and harvesting and supplying it in the time limit set for meeting cooperatives' quality requirements. As a result, farmers are found to continue selling to traders.

Traders

Traders are not only involved in coffee buying and selling but also in other businesses such as small boutiques at the rural trading centres or markets. In coffee transactions, they act as intermediaries on behalf of larger operators who own washing stations or deal with coffee hulling companies. Traders are mainly interested in dry coffee. Yet, traders also seem to compete with cooperatives in gaining a share of the coffee market for berries. The difference with cooperatives is that traders are not interested in high-quality production but more in quantity. Therefore they may accept berries without any stringent quality requirements as

cooperatives do. Another distinguishing factor is that profits from coffee sales accrue directly to traders, without any interest in the sustainable survival of the growers.

Traders are often qualified as ‘opportunists’ (Sogestal, 2001) because they interlock coffee trade with credit provision. Farmers receive the proceeds from coffee sales as a lump sum once a year in the harvesting season. This money is often used to make large investments such as paying school fees, buying a plot of land, or repairing the house (Karekezi, Personal Communication). Yet, this implies that these households may be in need for cash to cover daily needs or for exceptional costs outside the harvest season. It is a common practice for traders to propose their so-called financial services when farmers are facing unexpected expenses. It is clear that traders form part of the community and they are more likely to sympathise with farmers in difficulty. As such traders remain a reliable source of income. The unpleasant outcome is that farmers may be forced to pay exorbitant interests, in kind or cash, or are held up on their agricultural products (including coffee) which they are forced to sell with no choice but to accept whatever price these traders are offering. These prices are usually lower and unstable.

4.2. Membership decision

Tables 2 and 3 compare members and non-members; Table 2 gives an overview of production characteristics and makes an extra comparison between the two provinces in the case study, while Table 3 compares the household characteristics and perceptions of members and non-members.

Table 2. Characteristics of coffee growing per membership status and province

	N	Southern Province		Western Province		St. dev.	Equality test ^a
		Member	Non-Member	Member	Non-Member		
Experience in coffee growing (yrs)	159	24	21	28	22	13.80	2.75**
Total number of coffee trees	170	790	268	765	305	750.11	16.31*
Reproducible trees	168	526	112	491	225	537.01	14.24*
Quantity of berries (kgs)	144	600	102	2328	590	3012.7	2.83*
Quantity of dry coffee (kgs)	84	74	53	64	44	69.2	1.68
Income from coffee, 2005 (Rwfs)	128	69874	24954	232288	53700	290410.6	2.89*
Income from coffee, 2006 (Rwfs)	155	83289	22667	284765	81305	339833.3	3.92**

^a Equality test pertains to membership categories. F values are given for continuous variables and Pearson χ^2 for categorical variables

*** significant at 1% level, ** significant at 5% level; * significant at 10% level, + if significant at 15% level.

The descriptive characteristics show that cooperative members had more experience in coffee production. They owned relatively more trees (including reproducible trees; these are trees from which coffee can be harvested; farmers will trim trees for regeneration, which implies that no coffee can be harvested from these trees during some time) and consequently they produced more coffee. We noted higher incomes of members; in particular for farmers in the Western Province the difference in incomes was large. We also observed higher coffee production and sales in the Western Province compared to the Southern Province.

Significant differences were found in the distance to the cooperative and the relatively higher age for members (Table 3). Members seemed to be more risk taking, and were relatively more motivated by economic incentives to produce coffee. Furthermore, a higher share of the members perceived credit needs but feel less secure towards ownership of land. Finally they indicated to have higher level of trust. Table 4 shows the results of the probit model (1: cooperative member with probability P_i).

Table 3. Determinants of membership choice

	Members	Non-members	Equality test ^a
<i>Continuous variables (average values)</i>			
Age at membership (years)	43	40	1.68+
Household size (persons)	7	6	0.85
Distance to cooperative (minutes)	54	101	4.02**
Relation score (likert score) ^b	-0.26	-0.12	1.09
Risk score (likert score) ^c	0.67	-0.32	85.46***
<i>Categorical variables (% yes)</i>			
Gender (1: female)	30	42	2.28
Education dummy (1: higher than Primary School level)	16	8	3.23
Motivation for growing coffee (1: economic rationale)	68	46	8.97*
Credit (1: if needed/taken)	47	28	5.08**
Land security dummy (1: secure)	44	65	5.97**
Trust score_0 (1: score of 0)	25	30	0.38
Trust score_1 (1: low trust)	25	32	0.76
Trust score_2 (1: medium trust)	19	22	0.25
Trust score_3 (1: high trust)	31	16	3.84**
Location dummy (1: Southern province)	53	40	2.21+

^a Equality test pertains to membership categories. F values are given for continuous variables and Pearson χ^2 for categorical variables;

^b three-point likert scale indicating potential importance of personal relationship (family members, neighbours of friends) in choice of membership;

^c three-point likert scale indicating the risk perceived by the respondent for theft and cheating;

*** significant at 1% level, ** significant at 5% level; * significant at 10% level, + if significant at 15% level

Table 4. Probit results of the choice of membership status^a

Variables	Estimates	Standard errors	Marginal effects (dy/dx)
Age at membership (years)	-0.02	-0.02	-0.00
Gender (1= female)	-0.12	-0.31	-0.02
Education (1: higher than primary)	0.62	0.56	0.09
Household size (persons)	0.11	-0.07 ⁺	0.02
Distance to the cooperative (minutes)	0.01	0.00***	0.00
Motivation for growing coffee (1: economic rationale)	0.24	0.19	0.05
Credit (1: needed)	0.28	-0.32	0.05
Land security dummy (1: secure)	0.43	0.31 ⁺	0.09
Trust score_1 (1: low trust)	-0.30	-0.38	-0.06
Trust score_2 (1: medium trust)	-0.00	-0.43	-0.00
Trust score_3 (1: high trust) ^b	0.63	0.45 ⁺	0.10
Relation score ^c	-0.64	-0.24***	-0.13
Risk score ^d	1.22	0.31***	0.24
Location dummy (1: Southern province)	0.09	0.31	0.02
Constant	-0.72	-0.78	

N = 154

LR χ^2 (16)= 71.14 ***

Log likelihood: -51.57

Pseudo R2: 55.4%

Probability of membership status: 0.88

^a *** significant at 1% level, ** significant at 5% level; * significant at 10% level, + significant at 15% level.

^b those who indicate not to have trust in any of the preferences is the reference group

^c three-point likert scale indicating potential importance of personal relationship (family members, neighbours of friends) in choice of membership

^d three-point likert scale indicating the risk perceived by the respondent for theft and cheating

The probability of membership in a cooperative was positively influenced by (a) the distance to the cooperative (we would have assumed that farmers nearer to the cooperative were more likely to be members; yet, model estimates for distance are positive; this unexpected result can be explained by the observation that farmers who live close to the cooperative were less enthusiastic about membership since they could get the benefits offered by the cooperative ‘trickled-down’ to them, e.g. possibility to sell coffee and access to technical advice without any compelling need to abide by membership requirements; it is easier for them to free-ride); and (b) the risk perception (implying that the higher risk of being cheated at sale or stolen in coffee storage increased the perception of the cooperative as a form of protection). Significant at a 85% confidence level were: (a) the household size (larger households increased the prospect of becoming a member as more labour was available for coffee maintenance and harvesting); (b) land security since farmers could undertake activities for enlarging the coffee plantation and improving production; and (c) trust implying that farmers highly value the behaviour of cooperative/its leaders/other members.

An unexpected result of the probit model was the negative estimation for the relationship dummy. We would have expected that farmers with relatives or friends being member would feel more inclined to become member themselves. Yet, the estimations seem to point again at the opportunistic and free-riding behaviour of some farmers, namely that due to the absence of (strong) exclusion mechanisms by the cooperative, farmers did not need to adhere in order to benefit from the support offered by the cooperative. Perhaps having a relative in the cooperative increased the access to support even more.

4.3. Cooperatives versus traders as transaction structures

As illustrated in Figure 1, farmers in the study sold coffee to cooperatives and traders. Farmers indicated that membership status was the main determinant in the choice of selling to the cooperative; yet, as mentioned in the introduction, some members continued selling to traders. The following paragraphs attempt to compare and contrast selected elements of transaction costs and bring out the differences that could help in explaining the farmers’ behaviour. The hypothesis is that cooperatives do not sufficiently reduce transaction costs in comparison to the production costs, selling price differentials and services they render in order to secure the farmer’s commitment. The transaction costs are described over three dimensions, namely asset specificity, uncertainty and frequency of the transaction. It should be noted that this description is not complete; more research would be needed to describe more determinants of transactions costs.

Asset specificity

We consider the size of coffee plantation and the perishability of coffee berries at harvest as major elements of asset specificity. The coffee plantation, estimated by the number of trees, refers to that plot of land which is not used for other purposes than for coffee growing. If this plot is sold, the investment in coffee cannot be recovered. This puts farmers in an early situation of dependency: farmers have to produce coffee and nothing else and they will at some point in time need to sell their produce. Members of the cooperatives have relatively larger plantations.

High asset specificity is associated with the bilateral dependency cooperatives create with their members as the cooperatives make asset specific investments such as purchasing machinery and building storerooms in order to increase the processing and storage capacity of their washing stations. The cooperative is highly dependent on a supply from the farmers. Transacting with traders involves relatively less bilateral dependency. Traders are only

intermediaries in the marketing chain; they do not need to be involved in other coffee transactions nor invest in machinery.

Another determinant of asset specificity is the perishability of coffee, which depends on the relative proportion of berries in total production. It is associated with the economic loss that arises when the good is not offered at particular moments in time (Masten, 2000). This also applies to coffee. Its berries are highly perishable and quality standards of the cooperatives require farmers to bring berries to collection points within 4-6 hours after harvesting or otherwise they would be rejected. Arguably the higher the risk of losing production due to perishability in transacting with the cooperative, the higher is the degree of specificity. The specificity is lower in transactions with traders because: (1) quality of berries is less of a problem as they accept all farmers' coffee, even when berries are sluggish or overripe; and (2) if coffee is transformed into dry coffee, there are less problems with perishability and farmers can take their time to process coffee.

Uncertainty

Table 5 compares the perception of uncertainty associated with the farmer's choice of transaction. Farmers are advised to apply fertilisers, mainly mulch (from crop residues). It is clear that even though many farmers felt uncertain about obtaining fertilisers, relatively more non-members reported it as problematic; however the difference between transaction structures was not significant. Chemical fertilisers are imported by OCIR and distributed to farmers through cooperatives in proportion to the number of trees cut for regeneration. Therefore, it was easier for members to obtain these fertilisers, but a third of them still felt uncertain.

Another important determinant of quality lies in control techniques for pests and coffee diseases. About 20 percent of non-members affirmed that they did not get the pesticides in sufficient amount. This proportion was much lower for members (10 percent). Finally, labour was problematic for many farmers but relatively more members indicated their need for labour in harvest times.

Table 5. Uncertainty associated with difficulties to access inputs (percentage yes answers within membership category)

Problematic access to:	N	Sales to cooperative		Sales to traders		Equality test ^a
		Member	Non-member	Member	Non-member	
Organic fertiliser (mulching)	159	74	86	65	86	0.43
Chemical fertiliser	151	30	14	33	26	0.12
Pesticides	155	8	22	11	19	1.93+
Labour	160	52	25	71	46	0.2

^a *** significant at 1% level, ** significant at 5% level; * significant at 10% level, + significant at 15% level.

Even though a price is fixed by OCIR for dry coffee and berries, farmers felt uncertain about the amount that they would receive. The level of uncertainty was lower for berries sold to cooperatives since they did not change the price they offered. However, for trade in dry coffee, traders had a habit of changing prices for no particular reason by speculating on the farmers' ignorance; for example, farmers were told that their coffee was of very bad quality, without this being checked. Figure 3 illustrates the price variation among the farmers in the survey.

Fixed prices per kg were 120 Rwfs (about 18 eurocents) for berries and 600 Rwfs (about 90 eurocents) for dry coffee (both in 2006) (and one needs 5 kg of berries to produce 1

kg dry coffee). There were occasional and small variations in the price of berries. Many and large variations were observed in the price of dry coffee. High uncertainty was associated with traders. However, since the price of dry coffee was 5 times that of berries, we observed that some farmers were prepared to accept the higher price per kilo offered by traders thinking that this price was better than the ‘lower’ price offered by the cooperatives.

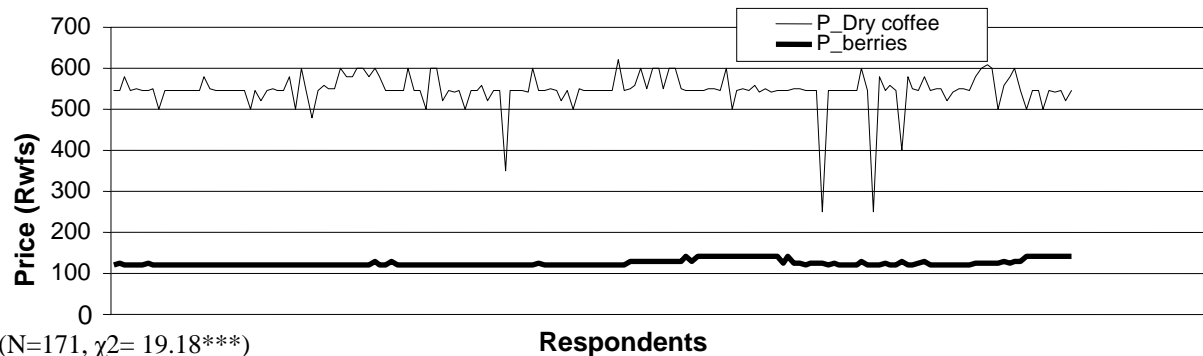


Figure 3. Price variations of coffee over respondents

Furthermore, 49 percent of the farmers who transacted with the cooperative, reported delays in payment as problematic while with traders this proportion was lower (32 percent). An important aspect to consider here is the need for cash in the rural areas. Farmers sold their coffee with the expectation of satisfying the current household consumption requirements. Farmers reported that traders paid immediately after sale, while they had to wait about a month or two for cooperatives to pay. This was mainly due to the time needed for cooperatives to process and sell the coffee and distribute the payments. The quantity of coffee supplied and payments are written on card-indexes with which the farmer could collect the money at a later date.

Frequency

Transactions with cooperatives in coffee are not only based on buying-and-selling. They also entail other relationships such as regular monitoring of the coffee trees as well as training and advising farmers, supplying them inputs, rewarding the best farmers with prizes in cash or kind and distributing rebates and dividends from the profits made after exporting the coffee. This indicates that there are many occasions of interface between cooperatives and the farmers.

Traders’ presence is natural in the community, being neighbours or relatives with whom they meet very regularly. These traders not only buy coffee but also sell other daily consumption items to the farmers and their family or provide credit when needed. This is one of the reasons why some farmers prefer to obtain credit from traders as 12 percent of them mentioned instead of turning to formal credit institutions because they already know them and traders do not complicate procedures of lending money. This happens despite that farmers know they will be held-up to sell their coffee at a relatively lower price.

A statistical comparison of the expected frequency of transactions in coffee throughout a farmer’s career (computed as a weighted difference of farmer’s age from the life expectancy in Rwanda in proportion to experience in coffee growing) between the cooperatives and traders shows no significant differences (F statistic= 0.46). However, it should be mentioned that measuring the full intensity of frequency requires an assessment of what a particular intervention either by the cooperative or trader means to a particular farmer in a particular period/season, how fast the intervention is made and how effective it responds to the need.

Unfortunately, these questions were not a part of this study and remain issues for further research.

Summary table

General characteristics of the transactions associated with cooperatives or traders are summarised in Table 6. Their relative degrees are presented as high (++) or low (+) depending on the description made above.

Table 6. Summary of transactions characteristics

	Cooperatives	Traders
Asset specificity		
Coffee Plantation	++	+
Perishability of produce	++	+
Uncertainty		
Access to inputs	+	++
Price variations	+	++
Delays in payment	++	+
Frequency	++	++

From the above analysis it can be concluded that the choice in governance structure does not follow theory (Williamson, 1991; Ménard, 2004; 2005): coffee cooperatives in Rwanda indeed appear to be hybrids if one considers their long-term relationships with farmers. These cooperatives are mainly built on the mutual trust that each party will honour its engagement. Incentives through pre-harvest and post-harvest services play a role in the building of this trust. Transactions with cooperatives reduce transaction costs for the farmers but also create new transaction costs; cooperatives incur internal organisation costs, but the mutual dependency in the relation between farmers and the cooperative also implies the need for cooperatives to monitor farmers to ensure that they respect the cultivation techniques and produce coffee that meets their quality requirements. Organising the cooperative itself takes time and effort due to more negotiations, information collection and need to monitor the commitment of individual farmers to the cooperative.

The relationship between farmers and traders seems to be more complex than a spot-market transaction of buying and selling. Transactions between farmers and traders are beyond coffee and extend to the daily life in the society. Transaction costs are incurred by both parties (traders take the risk of quality and farmers face more uncertainty), yet there seems to be a trade-off between the lower price farmers receive for their coffee, on the one hand, and the lower transaction costs (mainly due to lower asset specificity) and the services in daily live traders render, on the other, that attracts farmers more than committing themselves to a cooperative.

5. Conclusions

The results suggest that factors influencing the choice to become member include the easy access to labour as reflected by the household size, security with regard to access to land, importance of risk perceptions and higher trust levels between the farmers within the cooperative and with the cooperative management. Evidence on distance to the cooperative and the social capital variables point to free-riding problems as farmers who were closer to the

cooperative and/or had relationships-family ties, neighbours, etc., who were members, were less likely to become members.

Membership is probably the most important determinant of farmer's choice to sell to traders or the cooperative. But also transaction costs matter. Farmers have the choice between two trading arrangements with different transaction cost saving mechanisms and therefore comparative advantages. The asset specificity remains higher in trade with the cooperative in terms of coffee plantation/site and perishability of the product. High uncertainty is characteristic of the sales to traders in terms of accessing inputs and price variations. However, with regard to delays in payment, farmers selling to the cooperative observed higher levels of uncertainty. Recurring transactions between cooperatives and members are related to coffee, while with traders, exchanges were more frequent and diverse.

A distinction between cooperatives and traders should be carefully considered: theoretically cooperatives are closer in features and performance to hybrids and traders in coffee transactions behave like spot markets since they are autonomous in buying-and selling relationships. However, traders also seem to act as hybrids as they are involved in repeated transactions that are related to daily living requirements and in building long-term relationships in the community as they have been doing before the start of cooperatives. In this context, it should be noted that some farmers are attached to the tradition of doing their own processing and selling to traders. This is the first reason why membership rates of cooperatives remain lower than expected. The cooperatives may have not yet established the trust levels with the farmers so that they feel attracted to membership; whereas traders are closer to the farmers in the society and are responsive to the farmers' immediate needs. It seems not to matter that traders behave opportunistically, they are preferred because of the relationships they already have with farmers. The personal contracts of farmers with traders reduce certain transaction costs such as payment in time and easy provision of credit.

The second reason seems to be the entry requirements of the cooperatives. Corresponding to the needs for increasing the quality and quantity of processed coffee berries, cooperatives impose requirements that have to be met by farmers such as the size of the coffee plantation and timely delivery of berries. Accordingly farmers may not adhere to a cooperative because the above requirements are not met and are costly.

Thirdly, due to the absence of an exclusion mechanism, farmers may avoid having to pay the membership fees and are given the 'opportunity to free-ride'. Due to high cost of monitoring, organisational problems within the cooperative or otherwise, non-members do not realise the need for subscribing to the cooperative. This might be due to the fact that they can get the same price, while incentives offered by cooperatives to members are not as high or their impact is not visible.

Further research could focus on the cooperatives' organisations with the aim of identifying on the one hand proper feasible exclusion mechanisms as well as strategic actions for enforcing them and on other hand a reward system of incentives to substantiate the advantages of cooperative membership. Other motivation and control problems of the cooperative management system deserve more attention. There are other institutional arrangements that need subsequent research that could enable an overall assessment of membership problems. These include (1) informal rules including traditions in the society that influence or prevent action including the impact of social networks on membership decisions; (2) formal rules including laws and regulatory measures pertaining to land use, agriculture in general and coffee in particular and cooperatives; and (3) role of other actors in the coffee marketing chain including input providers, marketing unions and exporters. Research should also be oriented towards consumers in such a way that domestic and international markets for Rwandan coffee are investigated.

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APPENDIX



Map. Provinces of Rwanda with location of cooperatives studied

Source: MINALOC, 2007 (Edited)

ENDNOTES

ⁱ It should be noted that we do not have figures on the total number of farmers that are member of coffee cooperatives as share of the total number of farmers in the research areas, which is unavailable.

ⁱⁱ Producer organisation is defined as a 'voluntary organisation, with a democratic decision making structure' (Bijman, 2007: 258), such as cooperatives, producers associations, producer groups and other form of economic structure. It excludes farmer unions, interest groups and non-economic associative bodies (Bijman, 2007).

ⁱⁱⁱ These are just a few examples from the vast literature on collective action for development.

^{iv} Coffee production requires long term investments associated with the coffee productive cycle: 2 to 3 years are needed for seedlings to grow and yield berries, 3 to 4 productive years, cutting coffee for regeneration years; 1 year after the trees becomes productive again and so on. The farmer cannot undertake the cultivation unless he has some security about the ownership of land. However, there remain issues regarding land insecurity that are not so much recent in the country, especially so after the war and genocide of 1994. There are changes in land policy expected to affect the tenure system in Rwanda so will be the use of land, either for coffee or other uses. The land security dummy is '1' for farmers who considered the policy as secure towards their land use and '0' otherwise.

^v They included age and education level of the household head, altitude of the village, land cultivated with coffee, engagement in economic groups, membership of coffee cooperative and number of cooperatively owned coffee stations in the village.

^{vi} Some cooperatives are part of coffee marketing unions that provide assistance for export. At the time of research, there were two such unions: *Rwanda Smallholders Speciality Coffee Company (Rwashoscco)* to which Abahuzamugambi ba Maraba and Koakaka belong and *Misozi* that includes Kopakama. The role of these unions is to act as intermediaries with international buyers i.e. in finding markets for these cooperatives, (re)negotiating prices and sending coffee samples to potential buyers, designing contracts on their behalf and ensuring that these are enforced. For cooperatives that are not part of any union, such as Coopac, these functions are internally performed.