



WAGENINGEN **UR**

*For quality of life*

MSc Thesis Development Economics Group

# ‘You sell when you have to pay school fees, not when the price is good’<sup>1</sup>

Determinants of bulking practices and marketing decisions of oilseed farmers in Northern Uganda



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<sup>1</sup> Reaction of female soya bean farmer on the question why she sold her produce to a specific buyer

# Abstract

Using both farmer group and member level data from 20 oilseed farmer groups falling under a marketing cooperative in Northern Uganda, this study aims to explore individual and collective marketing practices of soya bean and sunflower. Findings suggest that collective cultivation and higher average trust in the cooperative are important factors inducing groups to start bulking. Delay in payment, no positive price difference between collectively bulked produce and individual produce and broken promises of buyers are factors challenging the sustainability of the activity. A very small part of members in the sample sold individual produce via the group. Using logistic regression, risk aversion and distance to the market significantly correlate with the probability of a member selling soya bean to a trader. Time preference and buying sunflower seeds from a Mukwano (processor) agent turn out to be important determinants for selling sunflower to a Mukwano agent.

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## List of abbreviations

AFSRT	Agency for Sustainable Rural Transformation
FG	Farmer Group
IFDC	International Fertilizer Development Centre
NAADS	National Agricultural Advisory Services
NGO	Non-Governmental Organization
OSSUP	Oilseed Subsector Uganda Platform
PO	Producers Organization

UDB	Uganda Development Bank
UOSPA	Uganda Oilseeds Producers and Processors Platform
USAID	United State Agency for International Development
VSLA	Village Savings and Loan Association

1 USD = 2567.41 UGX (yearly average exchange rate 2014)

1 USD = 3202 UGX (yearly average exchange rate 2015)

Average exchange rate 2014/2015= 2884.71 UGX



# 1 Introduction

This thesis will contribute to the policy debate on under which conditions collective marketing by farmer groups fails or succeeds. Furthermore, it will explore the determinants for the choice of marketing channels by individual farmer group members. Of these channels the trader channel has turned out to be the most important for my sample of farmers. From the farmer group and marketing literature, factors that might influence the individual marketing decision are: location (distance of the farmer to the nearest store of the FG or cooperative/market), trust (trust in the cooperative, trust in the farmer group leader, trust in members, trust in traders), risk attitude, time preference, quantity of individual output (Bernard et al., 2015; Fafchamps & Hill, 2005) and quantity of collective output needed (Kodjo, Aflagah, Bernard, & Viceisza, 2015).

It is important to get insights in the determinants of an individual farmer group member to sell to traders, as farmer groups and cluster cooperatives struggle to bind their members to the collective marketing. Therewith they have difficulties aggregating a high enough output and receiving a higher output price. 'Side' selling can be reasonable, from a rural livelihood perspective, as traders can offer immediate cash constraint relief and are more likely to accept lower quality oilseeds (Mujawamariya, D'Haese, & Speelman, 2013; ). Side-selling by the whole farmer group to other buyers than the cooperative also happens, due to several reasons including delay in payment or lack of information on when the cooperative will gather the farmer group's stored produce. Moreover often traders are also informal credit providers which binds farmers to them in another way. As farmer groups and bigger cooperatives are characterized as member-driven organizations, the success of collective marketing lays in the participation and loyalty of its members (Olapade, Frölich, Hill-Vargas, & Maruyama, 2014; Shiferaw, Hellin, & Muricho, 2011).

Collective marketing by farmer groups under a cluster cooperative is seen as a potential mechanism to improve smallholders' access to the market. Because imperfect rural markets do not facilitate all the services (education, extension, rural roads, access to credit, transparent market information) needed for successful market participation, farmer groups can smoothen the many obstacles of rural markets. Popular claims are that collective marketing improves economies of scale and lowers transaction costs (see for example Hazell, Poulton, Wiggins, & Dorward, 2007, Kaganzi et al., 2009, Robbins et al., 2004). "If farmers have a large stock of goods to sell they can share the costs of transport among themselves and they can travel to more distant markets to find traders who pay better prices than local traders" (p. 4, Robbins et al., 2004). The farmer group engaging in collective marketing can also help the member increase his bargaining power by creating a larger share of the supply they

control and only supply after demanding higher prices or better contracts (Carley, 1969). Still, existing marketing channels like traders and agents of processors cannot be discarded, as they can be viewed as more sustainable and successful in the bulking produce and providing the farmer with cash (Kindness & Gordon, 2001; Marter & Wandschneider, 2002, Schoonhoven-speijer, 2015). This thesis will give insights into the success and failure of collective marketing and the choices of marketing channel by individual farmer group members.

This thesis aims to find answers to the following research questions:

1. What are factors inducing farmer groups to start or stop bulking oilseeds?
  - a. What activities carried out by farmer groups are important?
  - b. What are possible reasons for farmer groups to bulk or not to bulk?
  - c. What are reasons for members not to bulk with their farmer group?
2. How do trust, individual risk and time preferences influence the choice of marketing channel by an individual farmer group member?

Data collection was done among twenty farmer groups in Northern Uganda, all member of the same cooperative of which bulking is a key activity. Both chairpersons of groups and members were interviewed. Although the cluster cooperative has bulking high on the agenda, some groups have not yet started or have stopped bulking. Furthermore, the cooperative was not always prepared or willing to buy the bulked products. Therefore, first, reasons for this instability of the bulking activity at the farmer group are explored. The main findings are that the omnipresent VSLA (Village Savings and Loans Association) activity in the groups is more an obstacle than a form of assistance for members to bulk. Not kept promises from the cooperative or other buyers concerning picking up bulked produce was also given as a reason to stop bulking. Also the level of trust in the cooperative is on average lower for groups that did not bulk. Jointly cultivating oilseed crops turned out to be the most practicable way to also collectively market the harvest. The main reason suggested for individual members not to bulk with the group was delay of payment.

For the two seasons for which data were collected, a very small number of farmer group members reported having sold oilseeds via their group. This raises even more doubt considering the popularity of collective marketing among individual members. At the individual level, the most important buyers turn out to still be traders and agents of a big processing company (Mukwano), for soya bean and sunflower respectively. Therefore, analysis at the level of individual farmers focuses on the factors that influence the probability of selling to a trader and to Mukwano agents, using logistic regression. Results from this analysis indicate that risk aversion correlates positively significantly with the probability to sell soya bean to a trader, until the log of distance to market is introduced. The latter variable keeps

correlating positively significantly with the dependent variable throughout all models. For sunflower, the discount rate (a measure of time preference) correlates positively with the probability to sell to a Mukwano agent and keeps its significance throughout all models. A second important determinant to sell to a Mukwano agent is whether the farmer has bought seeds from a Mukwano agent, which informally binds him to sell to that same agent. Trust in traders in general is not found to be significant, but there are signs that familiarity with the buyer is important, especially for the processor agent channel.

## 2 Oilseed production and marketing in Northern Uganda

### 2.1 Agriculture in Uganda

Agriculture is an important sector in Uganda, which can be illustrated by the 72 % of the working population engaging in agricultural activities in 2012/2013. In 2013, the sector accounted for 20.9% of the Gross Domestic Product (GDP). Traditional cash crops of Uganda are coffee, tea, cotton and tobacco (Uganda Bureau of Statistics, 2014). Northern and Eastern regions of Uganda accounted for about 60 % of cotton production in 2009. Opposed to other traditional cash crops, cotton production has been declining the previous years because of low prices, weather patterns and competition of alternative cash crops introduced in these regions, such as sunflower (Baffes, 2009). As major food crops, cereals (maize, millet, sorghum and rice) took up 30.6 % of total area planted, root crops (cassava, sweet potatoes, Irish potatoes) 23.4 %, pulses (beans, peas) 13.2 %, plantains 16.9% and oilseed crops (sunflower, groundnuts, soya bean and simsim) 15.9% (Uganda Bureau of Statistics, 2014).

### 2.2 The Northern Ugandan context

Despite significant poverty reduction narrowing the gap between this region and other Ugandan regions, Northern Uganda remains the poorest part of the country with 43.7% of the population living below the poverty line of 1 USD per person per day (MoFPED (Ministry of Finance Planning and Economic Development), 2014). Northern Uganda is divided in an Acholi and Lango region, the latter being the region in which Oyam and Lira, the districts considered in this thesis, are located.

The most important cause for Northern Uganda to still have an, although reduced, poverty gap to bridge with other parts of the country has been a civil war that has given rise to insurgencies for several years. This civil war started with the emergence of a rebel group called the Lord's Resistance Army (LRA) in Northern Uganda in 1986. This was right after president Tito Okello was overthrown by forces from the National Resistance Army ending the so-called 'Ugandan Bush war' and resulting in the appointment of the country's current president Museveni. The LRA, led by Joseph Kony, declares to be seeking to end both the Museveni government and the marginalization of the Acholi people. Over the years, their actions became a war against the Acholi themselves: from 1994 onwards Kony and his rebels attacked civilians, recruited (child) soldiers by force, stole resources and terrorized the Acholi population. Civilians fled to refugee camps. In 2003, the LRA started a series of attacks in the Lango region of which previously only the borders with the Acholi region were affected by the insurgencies. Peace talks have been going on since and the rebels have moved to the bush of North-eastern Congo.

Hostility has been little, although Insurgencies could rise up again, as the peace agreement has not been signed by Kony (Royo, 2008).

The above mentioned insurgencies have resulted in farmers not being able to work on their fields, because of their stay in refugee camps, reduced accessibility of supplies, deteriorated infrastructure and made the work of service providers more difficult. It also increased reluctance to store produce fearing theft, encouraging to sell at low prices (Aliguma, 2008). Nowadays, most people in the Lango region have returned from refugee camps and have reclaimed their lands from the bush.

Main crops grown in the Lango region are maize, finger millet, cassava, beans, simsim, pigeon peas, soya bean and groundnuts (Uganda Bureau of Statistics, 2014). In Lira, grain milling, wholesale and retail sales, brick making, carpentry and construction are other economic activities the population engages in. Lira town is the trade center of the Lango subregion. Animal husbandry is the main economic activity inhabitants of Oyam engage in next to crop cultivation.

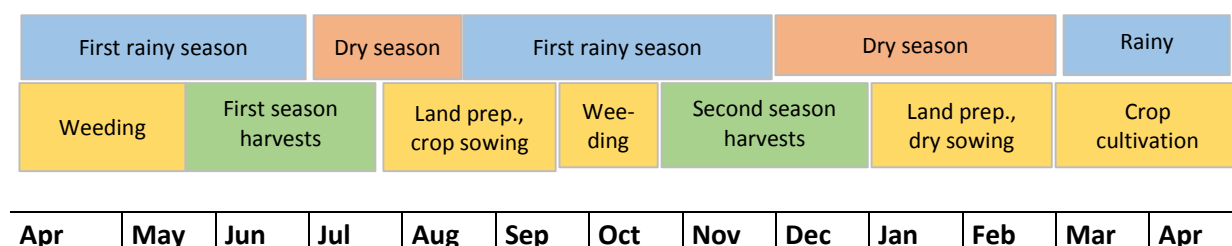
## 2.3 Oilseed production in Northern Uganda

In Northern Uganda, oilseed production has been promoted as a smallholder cash crop for import substitution. The oilseeds considered are sunflower, soya bean and simsim (sesame seed). Ugandan oilseeds are medium value cash crops with no strong market premium for quality and it is possible to store them to await higher market prices between harvests. Since 1991, Mukwano, a big processing company of cooking oil and other vegetable oil products, has been promoting sunflower cultivation in the area. This timing made the crop important for farmers who resumed farming after the before-mentioned Ugandan Bush war which lasted from 1981 to 1986. Moreover, Mukwano started contracting farmers and supplying them with hybrid seeds, which made sunflower a logical choice of cash crop to start cultivate (Turiho-Habwe, 1992). Although the oilseed sector has been affected by political instability and rebel activities in the 1980s and 1990s, since political stability has returned, major investments have been made by the public and private sector, in which again Mukwano played a pivotal role as market leader of sunflower (Belt et al., 2015; Schoonhoven-speijer & Heemskerk, 2009).

Simsim can be considered a cash crop to a lesser extent, as it is mostly used for domestic consumption. It is sometimes exported as grain to Europe, the Middle East and Asia. Simsim can also be considered as a crop that can be easily sold on the market when one is in need of ready cash. Soya bean and sunflower are the most interesting oilseed cash crops as they have more diverse marketing channels. Therefore I will mainly focus on the latter two crops in this thesis. Both sunflower and soya bean are crops that can be cultivated in the first and the second season. The first rainy season of Northern Uganda typically starts in March and ends around June and the second rainy season starts end of

August and ends in December (see Figure 1). Harvesting happens in the transition period from rainy to dry season. Sunflower is mostly grown in the second season, while the most important season for soya bean is the first season. Sunflower is known as a profitable but demanding crop for the soil, which causes many farmers to choose to only cultivate it once a year or, if twice a year, on a different plot of land (personal notes Oilseed Subsector Uganda Platform (OSSUP) quarterly meeting Lira hub, 2015).

**Figure 1** Bimodal seasonal calendar Uganda from FEWS NET, 2011



## 2.4 Demand and competition between buyers

Demand for oilseeds has grown due to higher demand for consumer products like cooking oil and production has herewith increased through area expansion, not intensification. Competition, mainly in price, between buyers has been increasing. Competing buyers are independent traders, agents for industrial processors (Mukwano and Mount Meru are the main companies involved in oilseed processing) and producer organisations (Vorley et al., 2015). This competition causes farmers to easily switch to buyers with a more attractive price and can negatively influence the willingness of farmers to invest in a relationship with one buyer (Schrader et al. 2015). Mukwano is still a price setter in the sunflower market, but is, also in this market, increasingly faced with more competing buyers. The buyer division for soya bean and sunflower respectively is reflected in the transaction details of the individual farmer group members in my sample. For soya bean, traders are by far the most popular channel to sell to (83.33% of all transactions). For sunflower, Mukwano agents are partners in a, though not convincing, majority of transactions (54.29%).

In a value chain study of the oilseed sector in Northern Uganda by IIED (International Institute for Environment and Development), it has been signalled that farmers see cooperatives as one marketing channel among many others. Fear of delay in payment and additional investments needed to supply good quality (in order to receive a better price) are barriers to enter this channel. Impatience of farmers as well as lack of good storage space and working capital from the cooperative's side to pay farmers in cash, seriously decrease the advantages cooperatives have over other marketing channels (Vorley et al., 2015). "Producer organisations generally appear to play a limited role in bulking and marketing of oilseeds. Only about one third of members choose to sell through their organisation. Even the most successful cooperatives in collecting significant volumes from farmers estimate that 40% of

members production is marketed through cash channels” (SNV & IFAD, 2014, p. 50). Despite these warnings, OSSUP (Oilseed Subsector Uganda Platform) and other NGOs actively encourage farmer groups and bigger cooperatives to start or continue bulking.

## 2.5 Cooperatives

Two examples of cooperatives in the oilseed sector in Uganda, assigned by UOSPA (Uganda Oilseeds Producers and Processors Platform) to become a cluster organization are the Alito Joint Christian Farmers’ Group and Acwec Omio Cooperative Society. Both cooperatives grew significantly over the last five years: the former from 62 subgroups to 141 and the latter from 7 to 160 subgroups (Bolhuis, 2010; Schoonhoven-speijer & Heemskerk, n.d., ICCO cooperation; Acwec Omio’s profile). Of the 160 groups under Acwec Omio, 70 groups are dormant. Data collection for this thesis focuses on farmer groups related to Acwec Omio.

Acwec Omio started in 1998 as a group of 15 internally displaced women who came together with the purpose of bulking produce and collective marketing to benefit from better prices. In 2009, they registered as a cooperative society and in 2010 they also started to accept male members. Financial support from USAID and IFDC together with membership contributions deducted from their oilseed revenue (by 2010 there were 250 members) helped building the main store step by step. In the main store sunflower soya bean, groundnuts, maize, simsim, beans and sorghum have been bulked. The cooperative mainly sells to the big oilseed processors in the region; Mukwano, Mount meru and Nile Agro. Prices processors pay to the cooperative are the same as those offered to individual farmers, but processors allegedly add 20% commission per kg for the cooperative’s service of bulking (interview M. Schoonhoven with chairperson Acwec Omio, 2015). Bringing the oilseed produce from the village to the main store is a challenge as hiring transport is expensive and the harvests of the members are not all ready the same time.

Membership numbers increased substantially in 2014 mainly because Acwec Omio received an agricultural loan from the UDB (Ugandan Development Bank) to divide into individual loans. Many farmer groups and individuals were convinced to join Acwec Omio to have a chance of receiving this loan for the first season of 2014.

The UDB also offered this loan to two other cooperatives that together with Acwec Omio signed a contract with Nile Agro to supply sunflower and soya bean, which Nile Agro would pick up *at no cost* from the collection points of members. This contract was also a precondition to receive the loan and was facilitated by OSSUP (SNV & IFAD, 2014).

Additionally, Acwec Omio has worked together with seed suppliers like Equator Seeds and Victoria Seeds in offering the members seeds on credit to repay after bringing their harvest to the store (notes M. Schoonhoven, OSSUP 4<sup>th</sup> quarter meeting 2014). Later this shifted to buying seeds in cash or Acwec Omio giving seeds for free to members joining trainings (personal notes from farmer group visits).

NGOs have also supported Acwec Omio significantly. AFSRT (Agency for Sustainable Rural Transformation) has offered seasonal trainings to members of Acwec Omio, often paired with improved seeds distribution (for free or to be bought). Furthermore, IFDC has provided Acwec Omio with carpets for members to dry their oilseeds on. The distribution of these carpets has been subject to confusion at the farmer group and individual member level (personal interview with Geoffrey Okello, field coordinator of Acwec Omio, 2015 & personal field notes visits of farmer groups 2015). These examples give ground to believe that NGOs find cooperatives a practical channel for offering trainings and support.



# 3 Literature and theoretical framework

## 3.1 Collective marketing by farmer groups

For trainings, extension services and agricultural loans, farmer groups are already seen as the perfect channel by both governments and NGOs, as it decreases their costs spent on transportation, while at the same time hopefully increases their outreach. The possible downside of this is that farmer groups are often initially formed with the main reason to access assistance of the government or NGOs, either in the form of seeds, fertilizer, tool gifts or loans. These farmer groups tend to rise and fall with the announcement of the coming of a loan, seeds or training (Schrader, 2015 & informal conversation with OPPO course participant).

It has become more and more common for farmer groups to, besides from input provision, information spreading and receiving extension services, engage in collective bulking and marketing (Shepherd, 2007). The goal of this collective marketing is to overcome transaction costs, gain a better price with a larger buyer, often in cooperation with a cluster cooperative (Devaux et al., 2009).

Criticisms have been raised on the high expectations of farmer group capacities to succeed in collective marketing. They have been encouraged to scale up too rapidly or to take up too many or overambitious activities (Chirwa et al., 2005). Existing marketing channels, like traders and middlemen should not be by-passed, as these are channels that can be seen as more sustainable and able to outlive projects. Existing channels may be more sustainable than new marketing channels that were set up within a project engaging groups with no previous capacities in sustaining a business. These groups are more seen as a development partner or even project themselves than as a business partner (Kindness & Gordon, 2001; Marter & Wandschneider, 2002).

Farmer groups can be seen as a conditional way forward to connect smallholders to the market. It is conditional, as the success of a farmer group depends on internal governance, clear economic objectives, market linkages and linkages with financial service providers. If all these factors are solid, this can result in member benefits that bond members to the group, causing a stable member base that can achieve successes (OPPO, 2015). The availability and timing of working capital and trust and transparency are other very important factors bringing success or failure to the collective marketing activity, as Olapade, Frölich, Hill-Vargas, & Maruyama (2014, p. 1) put it in the introduction to their paper on maize and coffee farmers: “Firstly, PO (producer organisations) sales procedures commonly cause substantial delays in payments which adversely affects cash constrained farmers and, secondly, PO members lack access to reliable information about the final sales prices that PO leaders negotiate when selling the members' harvest.”

Concluding, although mixed records exist concerning the success of collective marketing efforts by farmer groups and cooperatives, governments and donors have directed flows of aid, subsidies and other forms of support towards cooperatives to encourage activities of collective marketing and other market linking activities (collective buying of input f.e.). “It is even possible that external and in particular hard incentives may have been counterproductive in realizing sustainable collective marketing situations” (p. 528, Francesconi & Wouterse, 2015).

By whom the farmer group is initiated, streams of support and timing of payment are expected to influence the existence of collective marketing in a farmer group. Also trust is expected to play a role in the success and popularity of collective marketing among members.

## 3.2 Trust matters

The definition of trust that will be used throughout this thesis is the definition given by the Oxford Dictionary; ‘Firm belief in the integrity, ability or character of a person or thing’ (*Dictionary, O. E.*, 1989). This includes both the trust in the skills of a person, as well as in the integrity of a person, together with a more personalized aspect of trust: the character. As trust is here considered in the context of marketing, the integrity aspect of trust will be focussed on, for example in believing that a trader reports the fair price or that the farmer group leader will pay you the correct amount of revenue from your bulked produce. However, also the belief in the ability and character of a person contribute to the overall trust one has in a person and will be taken into account in measurements.

### 3.2.1 Trust within the group and in the leader

After a period of agricultural cooperatives collapses, due to political instability, liberalization of markets and mismanagement (Kwapong & Korugyendo, 2010), the concepts of cooperatives and collective marketing have gained renewed interest by NGOs, researchers and governments in Uganda and other African countries (World Bank, 2003; Berdegue, 2001; Collion and Rondot, 1998). For example, surrounding the Lira oilseed hub, Uganda, in 2004, more interest grew in group marketing since the farmer groups that were engaging in this activity had success and trustworthy and transparent leaders, in contrast with former experiences with corrupt cooperative officials (Otim-Ogong, Taiwo, & Agang, 2004). The historical background of corruption and elite capture has increased the importance of trust within farmer groups and between farmer groups and the cooperative significantly, especially in the decision of giving one’s valuable output in the hands of the leader(s) of the farmer group or the cooperative (Develtere, Pollet, & Wanyama, 2008; Enzama, 2013). ‘Trust, trustworthiness and reputation reduce enforcement costs and strengthen credible commitment for joint activities’ (Keefer & Knack, 2008 in Mujawamariya et al., 2013, p. 74).

In the study of Bernard et al., 2015, 73 Senegalese farmer groups engaging in rice, onion and groundnut production, were randomly assigned to treatments, one of which was a training in collective marketing for the farmer group leader. This was done because previous research already pointed out that, besides lack of financial means and technical capacities, members' perception of collective marketing and issues of coordination between members seem to represent important constraints for collective marketing. Leadership is one of the key elements in this coordination. Both the actual skills and relevant links to outsiders of the leader as well as trust in that leader are important (Arcand, 2002; Markelova, Meinzen-Dick, Hellin, & Dohrn, 2009). When there is not enough trust in the leader, members can fear not being paid at all or that increased prices that are offered through bulking will not be shared fairly. A positive treatment effect of the training was found on both trust in leaders and trust in members. Results also suggest a strong spillover effect on non-treated members for trust in trained leaders. Untrained members could be convinced that trained leaders have gained relevant skills and are less likely to privately capture rents. Evidence was also found for the specific relevance of trust in contributing part of one's output to the group. Farmers who supplied part of their output to the group were significantly more trusting than others who did not supply. Furthermore, the average share of farmers who contributed is positively correlated with the mean trust levels on the farmer group level. Trust in fellow members and in their commitment to the bulking activity plays a role in the belief that the minimum amount of produce will be reached to gain economies of scale and therewith in a members' decision to participate or not. Thus, it is hypothesized that trust in the group, members and cooperative has a positive influence on the prevalence of collective marketing in a group and on the amount of members that contribute to the oilseed stock of the group.

As was mentioned before, for soya bean, traders are the most frequently chosen marketing channel by members and for sunflower, Mukwano agents are involved in a slight majority of transactions. Therefore, the following theory and hypotheses will distinguish between the marketing of the two crops and the way the determinants correlate with choosing these different marketing channels.

### 3.2.2 Trust in the trader

Trust is not only important for collective activities by farmer groups. Every commercial transaction has in itself an element of trust (Arrow, 1972). As Mujawamariya et al. (2013) stress in their article on double side-selling in coffee cooperatives in Rwanda, members of cooperatives are still selling to local traders because of trust and loyalty they have towards these traders.

Depending on the nature of the transaction, trust can be a more or less important determinant of the transaction choice and based on different aspects. In an established farmer-trader relationship, trust in that trader can be more determinant than in a one-time spot transaction, as the success of future transactions are not threatened by this one-time transaction. Trust based on first impression and

reputation is a different kind of trust than trust based on repeated transactions. Sharing a social network could be a substitute for the importance of trust in the motives and skills of traders in general. If a trading relationship is established, trust is built and the farmer has the guarantee that the trader will buy when there is an overstock and vice versa the trader has the guarantee that the farmer will supply in case of a shortage. Traders offering loans also interlock farmers in an informal contract based on trust (Lyon, 2000). The importance of trust in farmer-trader relationship was also observed in the cassava value chain in Ghana by Lassen & Hanan (2013). In this case, traders that were considered trustworthy would be called by farmers to come and buy their harvest. Especially in transactions that do not involve direct payment of produce, which is less often the case with traders than with other buyers, trust in the trader is important. This trust is partly determined by knowing where that farmer is from and who his relatives are. In this way you can always find him if he does not follow up on his promise (Lassen & Hanan, 2013).

As quoted in Sorensen's case study of Ugandan maize traders (p2, 1999) 'A good trader must be very honest in business because you get many friends and therefore widens your trading network (...). If you establish yourself as honest they tend to recommend their friends to come to this honest store.' Due to the general lack of both institutional and personal trust in the Ugandan society, the issue of locating reliable trading partners cannot be taken for granted and needs to be actively searched for by traders, as well as by farmers (Sorensen, 1999). Given that, in Sub-Saharan Africa, most market transactions are beyond the influence of the law, product quality differs due to the use of many different varieties and there exists general lack of transparency, trust can be considered important in a trading relationship (Fafchamps, 2001). 'When it is difficult to identify reliable trading partners, relationships are valuable and economic agents may optimally choose to preserve them. Relationships become their own collateral' (Fafchamps, 2001, p. 117).

That the correlation between trust in traders and transaction choice may not be that straightforward, is shown in the economic model developed by Acemoglu & Wölitzky (2012). In this model, phases of distrust between trading parties may occur, on the contrary, in *repeated* interaction between traders from different groups due to the combination of imperfect information and product quality problems.

When a respondent has a higher level of trust in traders, it is expected that he will be more likely to also sell soya bean to a trader. Trust strengthens the commitment to sell to a certain trader. As the statements measuring the respondent's trust in traders were focused on traders in general, instead of on a trader the respondent regularly traded with, it is plausible to assume that the coefficient of the 'trust in trader' factor is not fully covering the trust the respondent has in familiar traders. However, the factor will correctly represent the attitude of a farmer towards traders in general, which also has

an expected positive correlation with the likeliness to sell to a trader. On the other hand, when a farmer trades with a familiar trader this may be the case, *because* this farmer does not trust traders in general and therefore finds it important to trade with a trader he does trust. In that case, familiarity can be a substitute for general trust in traders and is an omitted variable in the analysis.

There is no measure taken for trust in Mukwano agents but the trust in trader factor will be expected to increase the probability that a farmer sells to a trader, which also takes up a large part of the alternative buyers chosen in sunflower transactions, therewith expectantly decreasing the probability to sell to a Mukwano agent.

The theory mentioned above leads to the following hypotheses with respect to the role of trust in the trader and choice of marketing channel:

- Hypothesis 1.1: When a respondent has a higher **level of trust** in traders, it is expected that he will be more likely to also sell soya bean to a trader.
- Hypothesis 1.2: The **trust in trader factor** expectantly decreases the probability to sell sunflower to a Mukwano agent.

### 3.3 Risk aversion

Risk can be defined as a combination of danger and opportunity, representing the downside and the upside of risk (Damodaran, 2008). For risk to exist, uncertainty about potential outcomes from an experiment have to be combined with the fact that these outcomes matter in terms of providing utility (Holton, 2004 in Damodaran, 2008). Risk aversion is the reluctance of a person to accept a fair bargain. This is a bargain in which the certain outcome is equal to the expected revenue of the bargain. The more risk averse a person, the more reluctant he or she will be to accept bargains even when the expected revenue is higher than the certain outcome (Ray, 1998).

The oilseed market per se presents farmer with many risks; under conditions of cash scarcity, market and price uncertainty, high input costs, periods of high labour requirements and unpredictable harvests. The perception of risk for oilseed farmers is especially focused on the marketing of the crop; low and volatile market prices or no buyer. This risk is weighed against the high cost and uncertain quality of seeds or against the amounts of labour a farmer invests. Marketing channels have different roles in mitigating or invigorate these risks (Vorley et al., 2015).

The most prevailing reason for farmer group members to not contribute produce to the group store was that they considered it too risky to engage in collective marketing (price risk and risk of being dependent on others), or did not believe that it offered a better price than selling individually (Bernard et al., 2015).

Traders can mitigate perceived risks by quickly buying part of the farmers' output to avoid risks associated with storage and price fluctuations. They accept small quantities, are flexible on quality, come to the farm and offer cash. However, risks like cheating with manipulated weighing scales and the use of falsified money are especially associated with traders (Vorley et al., 2015). The expected relation between the level of risk aversion of a respondent and the probability the respondent will sell to a trader is positive. As for soya bean, selling to a trader is a common practice, doing so can be considered 'business as usual' and therefore not quite risky. Furthermore, as the transaction is on the spot and most of the time paid directly, the transaction is simple and does not involve risks like not receiving payment. Neither does it involve dependence on other farmers delivering their produce and the capability of the farmer group leader, like it is the case for transactions with the farmer group.

There are some signals that Mukwano is not mitigating uncertainties regarding price and demand but is even adding to price volatility, by abruptly transferring demand and price signals to the market. In the study of Vorley et al. (2015), farmers report that Mukwano drastically lowers the price once their supply conditions are met and, in general, the price offered by Mukwano agents is lower than expected and promised at harvest time. However, Mukwano itself states that farmers are always ensured of a market if they enter into a trading relationship with them and gain access to hybrid seeds, which yields higher output and higher prices. An on average higher price was found for farmers in my sample that bought hybrid seeds from Mukwano, with a difference of 54 UGX per kilo (0.02 USD). Yields, however did not differ significantly between farmers that bought seeds from Mukwano and other farmers. The expected correlation between the risk aversion factor and the probability of selling to a Mukwano agent is, thus, ambiguous.

Based on previous empirical evidence and theory, the following hypothesis concerning the role of risk aversion in the choice of marketing channel can be formulated:

- Hypothesis 2.1: The expected correlation between the **level of risk aversion** of a respondent and the probability the respondent will sell soya bean to a trader is positive.
- Hypothesis 2.2: The expected correlation between the **risk aversion factor** and the probability of selling sunflower to a Mukwano agent is ambiguous.

### 3.4 Time preference

Time preference is the relative valuation placed on a good at an earlier date compared with its valuation at a later date (Frederick, Loewenstein, & O'donoghue, 2002).

When you are young and healthy, your future is longer and if you are rich you can afford to postpone consumption of goods as you already have everything you need. This relates to the patience you have in receiving a remuneration. When someone is poor, the cash constraints of the present matter more than the promise of a better payment in the future. Also Brundtland, in the discussion of sustainable development suggests, almost by definition, that the poor have shorter time horizons and have no resources or willingness to invest in the future (WCED (UN), 1987). Although it is very intuitive, and therefore broadly accepted, that the wealthier (in terms of assets and income), the healthier, the younger and the better-educated you are, the lower your time preference is, evidence exists against this assumption. Moseley presents the common observed phenomenon in multiple papers in a variety of African contexts, of households who prefer to avoid decapitalization (liquidation of productive assets) in times of hardship and therefore cut back on food consumption, which can be seen as more future-oriented behavior (2001).

Various studies have shown that the trader channel has one clear advantage for farmers by most of the time performing cash payment, both in the oilseed market as well as in other markets (Chamberlin & Jayne, 2013; Schoonhoven-speijer, 2015; Sitko & Jayne, 2014; Vorley et al., 2015).

On the contrary, farmer groups and cooperatives tend to cope with issues of delay in payment and lack of working capital (Bernard et al., 2015; Olapade et al., 2014; Vorley et al., 2015). . Although Mukwano strives for efficiency in logistics and payments, the last years there has been a shift from Mukwano agents paying cash on delivery to the same agents issuing receipts to farmers for the volume delivered at the prevailing Mukwano price. These receipts are paid after the agent has delivered its bulked sunflower to Mukwano. This denotes the commencement of a shift of Mukwano from pre-financing its agents to recommending they get a loan themselves to buy sunflower harvest with cash. The most heard complaint about Mukwano agents was the delay in payment. This increases budgetary difficulties to bridge the gap between buying hybrid seeds from Mukwano and being paid at harvest. Delayed payments are an incentive for farmers to sell to traders paying cash (Vorley et al., 2015).

Cash payment plays a role in the decision to sell via the trader channel. More exogenously, time preference of a farmer can therefore also play a role in the decision to sell via the trader channel. The more a farmer appreciates and needs payment now over payment later, the more inclined that farmer can be to sell harvest as quickly as possible to an itinerant trader. At the time of harvest, some farmers have not had any other cash income since the beginning of the season, underpinning the actual patience a farmer has. The time preference a farmer has for the payment of his produce (the production side) is related to his other sources of income and his consumption patterns.

Time preference will be measured by constructing a discount rate applying a hyperbolic discounting model on the individual switching points resulting from reward-time pairs as will be explained in 4.3.1 Time preference elicitation. A discount rate describes the weights placed on rewards received at different points in time.

The empirical evidence and theory explored leads to the following hypothesis concerning the role of the discount rate in the marketing decision of sunflower and soya bean:

- Hypothesis 3.1: The expected correlation between the **discount rate** and the probability to sell soya bean to a trader is positive.
- Hypothesis 3.2: The expected correlation between the **discount rate** and the probability of selling sunflower to a Mukwano agent is negative.

### 3.5 Links between risk attitude, time preference and trust

It is claimed by several authors that risk attitude and time preference are in some way related (Anderhub, Güth, Gneezy, & Sonsino, 2001; Andreoni & Sprenger, 2012; Wölbert & Riedl, 2013; Zheng, 2013). 'The present is known while the future is inherently risky' (p. 3357, Andreoni & Sprenger, 2012). By performing new experiments, Anderhub et al. (2001) found a statistically significant negative correlation between the participants' degrees of risk aversion and their inherent discount factors (which are, other than discount rates, lower when discounting the future heavily). This suggests that risk averse agents tend to discount the future more heavily, which is in line with other research that found that introducing external uncertainty had the same effect on subjects' behavior as the increase of time delays (Keren (1995) in Anderhub et al., 2001). Also Zheng (2013) found that high risk aversion and high level of impatience are positively related.

The relation between presence of trust in a transaction and the risk of a transaction, has already been addressed by Williamson in 1975. The more often a previous interaction has taken place, the larger the possibility to rely on trust and the lower the risk of the transaction. Trust can play a role in minimizing the degree of uncertainty of a transaction (Williamson, 1975 in Lassen, 2013). This can result in, the more trust there is present in a transaction, the less influence the risk aversion of a respondent has on the decision to sell to a buyer. This type of trust caused by frequent encounters and familiarity is however not included in the measure of general trust in traders and can be seen as an omitted variable having a downwards effect on the risk aversion coefficient in the estimated logit models in chapter 6.

Measuring time preference can be distorted by feelings of distrust towards the buyer that is supposed to give you the higher amount of money after some time. This is in line with predictions by Lassen &



Hanan, 2013 that trust can be considered more important in a transaction in which the time of payment is not direct.

## 4 Data collection and methods

### 4.1 Research methods

During the data collection period between November 2015 and January 2016, multiple methods were used in order to complement each other to come to an answer to the research questions. Semi-structured interviews were held with chairpersons of twenty farmer groups. Out of the same farmer groups 118 individual farmer surveys were conducted (the aim was 6 members per farmer group which did not succeed in two cases). Collecting data on these two levels, gives the possibility to disclose discrepancies between answers given by the chairperson and by its members. Furthermore, the chairperson has often been the level of intervention for trainings by the cooperative and can be seen as the channel through which members hear about the cooperative and its activities. Capturing the opinion of the chairperson and the way he or she presents his group, can offer important insights into the stage the farmer group is in and the attitude the group has towards the cooperative and bulking. Lastly, in relatively small groups, chairpersons are often also the main coordinator of the bulking activity, making them the persons to consult to discover the details of their collective marketing efforts.

Additionally, two open interviews were held, one with a field officer of Acwec Omio and one with the treasurer of Acwec Omio. Ultimately, observations were made during all field visits, two OSSUP (Oilseed Subsector Uganda Platform) meetings and one meeting of a new cooperative, of which some farmer groups that were still officially member of Acwec Omio, had become a member.

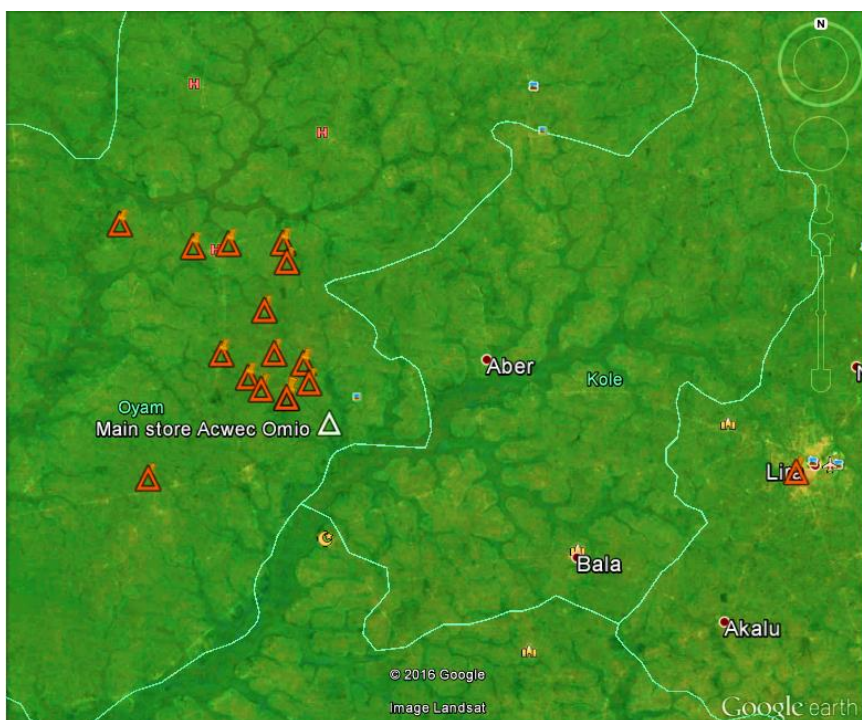
For the semi-structured interview the researcher always asked the questions, with the help of a translator, in order to be able to ask further questions when needed. In the beginning, the surveys were conducted by one research assistant under close supervision of the researcher to make sure no questions were accidentally skipped or misinterpreted. The last 48 surveys were conducted with the help of two research assistants. The research assistant that had done all the surveys up to that point conducted the last surveys independently and the second research assistant was accompanied by the researcher.

For the surveys and semi-structured interviews, respondents were first gathered at a central place, often being the compound of the chairperson. All data collection was done one-by-one to prevent bias in the response. Especially questions on trust were important to ask privately. If other members or the chairperson were also listening, answers to these questions could have shown high levels of social desirability bias.

## 4.2 Sample

After testing the survey with six farmer group members and the semi-structured interview with two farmer group leaders, a selection of 20 farmer groups was made. This selection was based on a list of non-dormant farmer groups provided by the cooperative. Out of this list all groups were selected with a member-range of 15 to 35 members. A random selection of 20 groups out of these groups was made. After this random selection still several groups were replaced by other randomly selected groups as the former could not be reached within time and budget constraints. Nineteen groups were located within the Oyam district (see Figure 2). This is the district in which the main store of Acwec Omio is located. One group was located within Lira town, approximately 33 kilometres from the main store of Acwec Omio.

**Figure 2** Location of participating farmer groups



From 16 out of the 20 farmer groups GPS coordinates were gathered.

Out of each of these 20 groups six members were randomly selected based on a member list of the cooperative. These names were forwarded to the chairperson of a group in advance. In some cases, randomly selected members were absent or unwilling to participate, in which case they were replaced by other members of the same group.

Of each group the current chairperson was interviewed using a semi-structured format of questions (see annex A1). In one case, the former chairperson of a group was interviewed as he was still indicated as the chairperson in the list of Acwec Omio. He had been the chairperson for a long time and he was convinced he would be able to answer the questions the most completely.

## 4.3 Survey and semi-structured interview

The survey for individual farmer group members is based on a baseline survey conducted in Senegal among farmer group members marketing in groundnuts (Bernard et al., 2011). In the annex the complete survey can be found (A2). In this chapter attention will be paid to the way some important variables were measured in this survey. The semi-structured interview with the chairperson of the group is partly based on a survey conducted by Mirjam Schoonhoven among oilseed traders in Lira in 2015. Also the format for this interview can be found in the annex (A1).

### 4.3.1 Time preference elicitation

Time preference was measured using a realistic scenario wherein the farmer would deliver his sunflower output to a trader. This trader will either pay a relatively low amount of money now or an increasingly higher amount of money within one month (see Table 1). During the test phase of the surveys it turned out to be very important to keep insisting that the trader will certainly come back with the money after one month. The best method to convince the respondent that the trader would certainly come back with the money was to tell him it was a familiar trader that lived in the same village who he could meet on a daily basis. If, earlier in the survey, the respondent mentioned selling to a trader that he or she often sold to, this trader would be mentioned as the trader in the scenario.

The above mentioned challenges causes the discount rate constructed from these reward-time pairs<sup>2</sup> to not only represent time preference but also risk aversion because of low trust in traders. This is a practical example of the interconnectedness of these concepts and therefore the difficulty of measuring them separately. Furthermore, 67 respondents never preferred waiting one month in the given range of offers made by the trader, so no switching point was found for these. However, increasing the offers for the future payment would have made the scenario less realistic (more than 1300 UGX (0.45 USD) per kg sunflower), potentially causing other biases in the answers of the respondents.

**Table 1** Time preference question in survey

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Imagine that you just harvested 600 kg of sunflower seeds that you plan to sell completely. A familiar trader that you trust, comes to offer you to buy your produce, at the following conditions: You deliver him your produce right now, and he offers to pay you either now, or within 1 month. You can be sure that the trader will pay you at these dates. Imagine that you do not have another choice than to sell to this trader.

It is very sure this familiar trader will pay the respondent; the trader will give the respondent something very important to him and he will not receive it back unless he pays the respondent within one month!

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<sup>2</sup> Following the widely used hyperbolic model  $V=A/(1+kD)$ , in which  $V$  is the present value,  $A$  is the future amount,  $D$  is the delay and  $k$  is the discount rate. From this follows  $k=(A-V)/V$ , when  $D=1$  (month in this case) (Hardisty, Thompson, Krantz, & Weber, 2013)

Either 600,000 UGX in total NOW	OR	Or 600,000 UGX in total WITHIN ONE MONTH
Either 600,000 UGX in total NOW	OR	Or 620,000 UGX in total WITHIN ONE MONTH
Either 600,000 UGX in total NOW	OR	Or 640,000 UGX in total WITHIN ONE MONTH
Either 600,000 UGX in total NOW	OR	Or 660,000 UGX in total WITHIN ONE MONTH
Either 600,000 UGX in total NOW	OR	Or 680,000 UGX in total WITHIN ONE MONTH
Either 600,000 UGX in total NOW	OR	Or 700,000 UGX in total WITHIN ONE MONTH
Either 600,000 UGX in total NOW	OR	Or 720,000 UGX in total WITHIN ONE MONTH
Either 600,000 UGX in total NOW	OR	Or 740,000 UGX in total WITHIN ONE MONTH
Either 600,000 UGX in total NOW	OR	Or 760,000 UGX in total WITHIN ONE MONTH
Either 600,000 UGX in total NOW.	OR	Or 780,000 UGX in total WITHIN ONE MONTH

#### 4.3.2 Risk attitude elicitation

It was attempted to measure risk attitudes using five statements which were to be answered using a Likert scale of 4. The option of neutrality was not given to urge people to make a decision. In Table 2 the five statements are presented, the first two mean to represent risk loving behaviour and the last three risk averse behaviour. During the surveys all the statements were perceived as very convincing. For the farmers the risk loving and risk averse statements did not seem to contradict each other. For the risk loving statements, the benefit of taking risks is not clearly accompanied by the downside of taking risks, which causes almost everyone to completely agree with the statements (see Figure 3).

**Table 2** Statements eliciting risk attitude

	Completely agree	Mostly agree	Mostly disagree	Completely disagree
I take huge risks to make a lot of money				
I try new things, also when I am not certain what the outcome will be.				
I only invest in something when I am very sure that it will make a good profit				
Investing in new varieties is very risky and I'd rather not do it				
I prefer to invest in something safe with little earnings instead of in something risky where I can earn a lot but lose everything as well				

**Figure 3** Graphic display of Likert-scale answers to risk averse statement and risk loving statement; no negative correlation between the groups of answers



**Table 3** Polychoric correlation matrix

	Risk loving statement 1	Risk loving statement 2	Risk averse statement 1	Risk averse statement 2	Risk averse statement 3
Risk loving statement 1	1				
Risk loving statement 2	.59136159	1			
Risk averse statement 1	.38424543	.70931927	1		
Risk averse statement 2	.30724015	.61889601	.71803433	1	
Risk averse statement 3	-.03588509	.26263847	.33565489	.26721374	1

Looking into the data, it is confirmed that there is no negative correlation between answers to the risk loving statements and answers to the risk averse statements (see Table 3). This results in the need to

exclude the risk loving questions from further analysis and only using the degree of risk aversion for the rest of the data analysis.

### 4.3.3 Measuring trust

The measures of trust are based on the survey among Senegalese farmer group members from Bernard et al. (2011), as mentioned previously. These statements (see Table 4-8) were generally perceived as unambiguous and it was made sure they were posed privately to avoid any bias.

**Table 4** Statements measuring trust in group

Do you know where the money of the group is kept?	Yes/no
Do you know where the account books of the group are?	Yes/no
Do you have a good idea of the current amount of financial resources of the group?	Yes/no
My group is open to changes : we meet regularly in a general assembly to discuss future directions that we would like to give to our activities	Completely agree/Mostly agree/Mostly disagree/Completely disagree
This year, you have attended how many group meetings?	All of the group meetings/Most of the group meetings/Less than half of the group meetings/None of the group meetings

**Table 5** Statements measuring trust in chairperson

	Completely agree	Mostly agree	Mostly disagree	Completely disagree
The farmer group chairperson is capable of negotiating better prices for our products than I am capable myself				
The chairperson defends the interests of the group as much as his/her personal interests				
The chairperson is capable of identifying trustworthy buyers				
If I invest my money or my products in the group, it will be used effectively				
The chairperson of the group constantly tries to take the best decisions possible for all the members together				

Not regularly enough, the chairperson of the group passes on information concerning the state of the group activities

**Table 6** Statements measuring trust in the cooperative

	Completely agree	Mostly agree	Mostly disagree	Completely disagree
I know the board members of Acwec Omio personally				
Acwec Omio is capable of negotiating better prices				
Acwec Omio defends the interests of my group correctly				
Not regularly enough, Acwec Omio passes on information about their activities to the farmer groups				
If I invest my money or my products in Acwec Omio it will be used effectively				

**Table 7** Statements measuring trust in fellow members

Have you already lent a sum of more than 50,000 UGX to a member of your group?	Yes/no
Most of the members in my group are trustworthy	Completely agree/Mostly agree/Mostly disagree/Completely disagree
The other members of the group only try to satisfy their personal interests	Completely agree/Mostly agree/Mostly disagree/Completely disagree
I can trust my fellow group members to look after my land when I'm gone for 2 months	Completely agree/Mostly agree/Mostly disagree/Completely disagree
If I randomly chose a member of your group to, instead of you, take a decision on the marketing of your produce, would you let him make the decision?	Completely agree/Mostly agree/Mostly disagree/Completely disagree
My parents knew and trusted the family of my group members	Completely agree/Mostly agree/Mostly disagree/Completely disagree

**Table 8** Statements measuring trust in traders

Most of the traders are trustworthy	Completely agree/Mostly agree/Mostly disagree/Completely disagree
-------------------------------------	---



The weighing scales of traders can be trusted	Completely agree/Mostly agree/Mostly disagree/Completely disagree
I can trust a trader when he promises to pay me later	Completely agree/Mostly agree/Mostly disagree/Completely disagree
Familiar traders often help me with credit when I have an emergency not related to my production	Completely agree/Mostly agree/Mostly disagree/Completely disagree
My parents viewed most traders as trustworthy	Completely agree/Mostly agree/Mostly disagree/Completely disagree

Concluding, measuring time preference and risk attitude is challenging and important lessons can be learned from this fieldwork. One lesson learnt is that it is needed to make the time preference measure less intertwined with trust in traders and the risk that exists that the trader will not come back with the money. Making it less intertwined would mean to present the reward-time pairs not in a marketing situation in which there is output exchanged for the amount of money but more as a gift.

A possible alternative to the used statements to measure risk attitude is to create vignettes describing risk averse or risk loving behaviour (informal conversation with Fleur Wouterse, October 2015). After reading a vignette one should then ask the respondent to compare himself with the person described in the vignette. This could offer the possibility of a better understanding of risk attitude by the respondent and herewith an answer more related to the attitude of the respondent himself than related to the persuasiveness of the risk statement.

# 5 Farmer groups and bulking practices

In this chapter the factors inducing farmer groups to start or stop bulking will be explored. Data from semi-structured interviews with twenty chairpersons of farmer groups will be used to explore these factors. To have a complete understanding of the background of the farmer groups it is important to first describe the activities that are central to the farmer groups and the way they came into existence in the first place. Then, the reasons for bulking or no bulking will be explored, together with the reasons for individual members not to want to engage in collective marketing. Lastly, bulking practices will be linked with the relationship of the group and its members with the cluster cooperative.

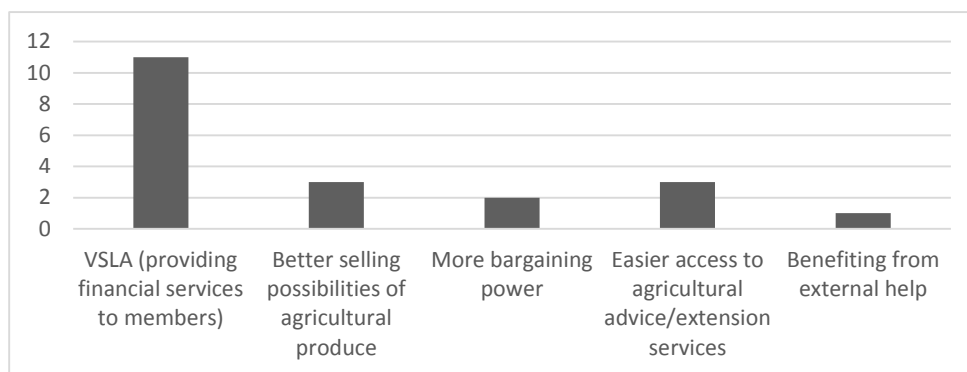
## 5.1 Background of the farmer groups

Most frequently VSLA (Village Savings and Loan Association) was given as most important reason to start the farmer group (see Figure 4). This reason was most often given when the initiative of forming the group came from an NGO or with the first chairperson of the group.

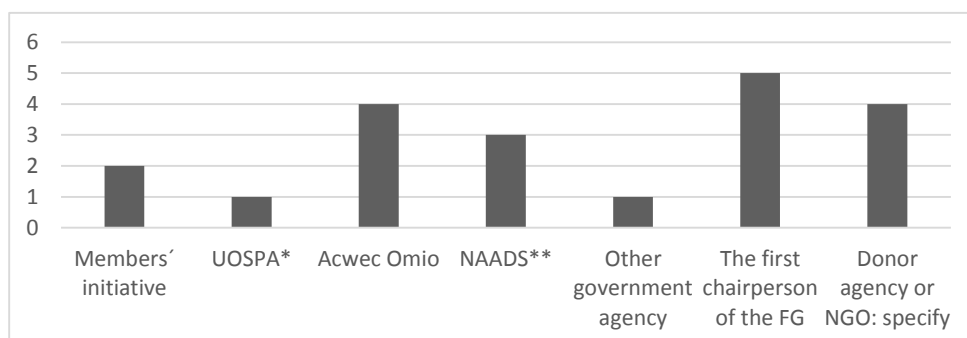
When the initiative of forming the farmer group laid with Acwec Omio, the most important reason was 'better selling possibilities of agricultural products'. This suggests that at least the two groups that reported this, joined Acwec Omio with the purpose of bulking their products for the cooperative. One of these groups did bulk 30 bags of sunflower in the second season of 2014 and sold it to a trader (see first row in table annex A5). The chairperson reported that these 30 bags were gathered from 25 members. However, none of the five members of this group that were interviewed, reported selling their oilseed produce through the group or was aware of the group using a store to bulk oilseeds.

For nine of the farmer groups the initiative came from an actor outside of the value chain; a government agency or an NGO (see Figure 5). This can promote inclusion but can also create dependency on external help (Schrader, 2015). Four of the farmer groups were initiated after Acwec Omio was actively looking for more cluster groups in 2010, 2013 and 2014 respectively, giving trainings and promising access to improved seeds or agricultural loans (from the UDB). Although Acwec Omio is an actor from within the value chain, the way of promoting membership of Acwec Omio did create high 'helping' expectations of access to seeds, output market and credit. These expectations turned out to be difficult to meet. The remaining seven were self-organized by either members or by the first chairperson of the farmer group. Although initiated by NAADS, one group was chaired by a trader, an actor from within the value chain, who interconnected bulking output with guaranteeing VSLA loans. Members sold to their chairperson because they trusted him and sometimes they offered their products as a guarantee of the loan received via VSLA.

**Figure 4** Reasons for establishing the farmer group



**Figure 5** Initiative of farmer group creation



\*UOSPA stands for the Uganda Oil Seed Producers and Processors Association, which has been active as an umbrella association for all actors in the oilseed value chain since 1994 and is responsible for public extension services since 2001.

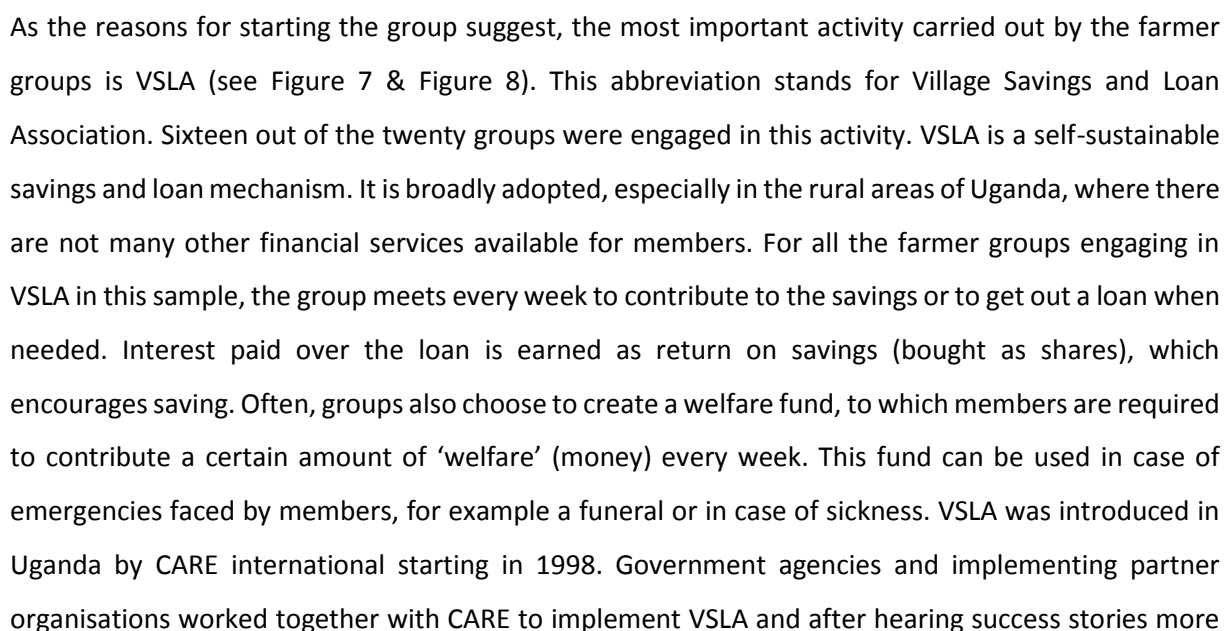
\*\*NAADS stands for National Agricultural Advisory Services and is part of the Ministry of Agriculture, Animal, Industry and Fishery

Eleven of the chairpersons of the groups had another official responsibility besides being the chairperson of the group. Examples of these official responsibilities are chairperson of the LC1 (Local Council village level), clan leader or woman leader in the church. Also being a trader was viewed as an official responsibility. One chairperson was in the board of a new cooperative that was formed in July 2015 and another chairperson was the chair of a producers' association with multiple groups that subscribed to Acwec Omio altogether. Without having applied stratified sampling, the distribution of female and male chairpersons was exactly 50/50.

Except for one group, all chairpersons have been leading the farmer group ever since its establishment (see annex A3). This suggests rigidity in leadership. Some farmer groups did have elections but the chairpersons in place were re-elected. The longer a chairperson is in place, the more trust can be built between him/her and the other members. This is also supported by the fact that trust in the chairperson has generally scored very high with several indicators used in the survey among members (see Figure 6).

Response	Percentage
Completely agree	82
Mostly agree	27
Mostly disagree	2
Completely disagree	2

**Figure 7** The bigger the word the most often mentioned as farmer group activity

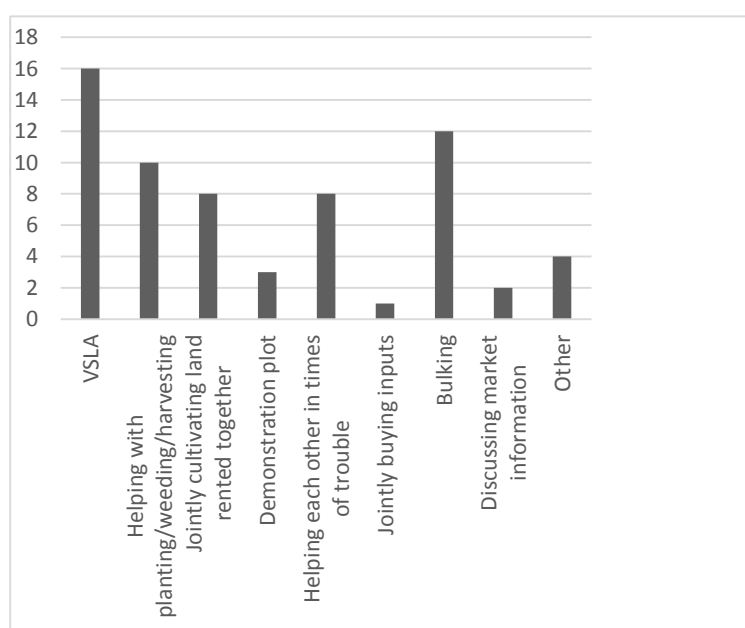


organisations adopted the approach (CARE Uganda, n.d.). The groups in this sample have either received a VSLA training of a government agency or an NGO, after starting the group for other reasons, or were encouraged to form a group to practice VSLA by a government agency or NGO.

Thus, the main focus of most farmer groups is providing financial services to members. Loans can either be used to buy agricultural inputs or rent land, but are also very often used to pay school fees. Ton, Opeero & Vellema (2010) give an example from a farmer group engaging in sunflower production for which VSLA has helped farmers to access improved varieties of seeds and has enabled farmers to borrow while awaiting the sale of their bulked products to bigger buyers.

In my sample of farmer groups, being able to pay school fees through participation in VSLA is the most frequent response to the question what benefits the farmer group has brought the members. This suggests that loans and savings have been mainly used for payments related to the household and not for production investments. One chairperson pointed out that, thanks to VSLA ‘people could borrow money when the crops were still on the field’, implying that VSLA was a way to smoothen their consumption over the year. Only one chairperson mentioned cultivation as a domain VSLA was used for. VSLA is not perceived as a way to be able to wait for better prices *after* harvest but to be able to cover expenditures such as school fees during cultivation. As a visitor of the OSSUP meeting for cooperatives said: ‘Farmers are so patient, they plant, they weed, and eventually they harvest without earning, at time of harvest they really need cash’ (personal notes OSSUP meeting 24-11-2015). Especially during the Christmas season, VSLA groups want people to pay back their loans in cash. There is no time to bulk and sell the produce through the cooperative (field notes M. Schoonhoven, 2014).

**Figure 8** Activities of farmer groups



An activity occasionally performed by some farmer groups is cultivating together with the eventual goal of selling the harvest together. In two of the farmer groups joint planting and weeding was done because they were offered a demonstration plot by Acwec Omio in 2013/2014. Six other chairpersons reported ever having rented land to cultivate crops together. Besides one farmer group renting land for maize cultivation (lastly in 2007), there was a farmer group that rented two acres in 2013 to cultivate simsim with a plan in mind. They bulked the simsim in the house of the chairperson and sold it when the prices were better. The revenue they used to buy local breed chicken. Together they now own 250 chicken and they wish to increase the amount to start selling them. Soya bean, simsim or sunflower were cultivated and sold together by the remaining farmer groups who had reported to have rented land as a group before 2014.

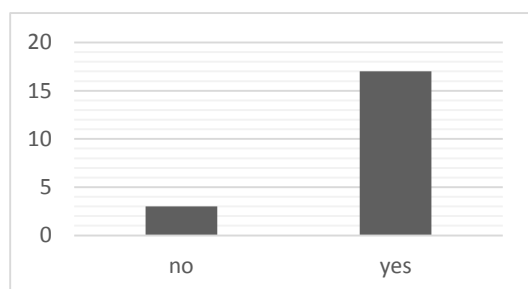
Two farmer groups reported to have rented land the first season of 2015. One group had rented land from the money earned with helping in the gardens of members that had some money at hand. They cultivated soya bean and sold the harvest to a trader. The chairperson of the other group that had rented land for the first season of 2015 was in the hospital during that period so he did not know what they cultivated nor who they sold it to. It seems that, when jointly planted, weeded and harvested, there are less barriers to jointly sell the oilseed produce and to store to await a better price.

## 5.3 Bulking practices of oilseeds by farmer groups

### 5.3.1 Manifestation of bulking oilseed grains

The manifestation of bulking oilseed grains is highly dependent on the season, whether the farmer group has rented a store and on who gave or sold members the seeds for planting and if this was via the group. Concerning the dependence on the season, it is more common to grow sunflower in the second season than in the first season and vice versa for soya bean. This results in less bulking of sunflower in the first season and less bulking of soya bean in the second season (see annex A5-A8). If the farmer group rents a store, it is normally used for bulking one type of oilseed grain at a time. This makes the organization of bulking less complicated and the store is often not big enough to bulk two different oilseed grains. Furthermore, specifically in the first season of 2015, the rains came too late, which resulted in lower or failed oilseed harvests and postponed the moment of harvesting. This resulted in less enthusiasm for bulking in this season as by the time of harvest farmers were very much in need of immediate cash.

**Figure 9** Oilseed bulking by farmer groups; has the group ever bulked any oilseed?



As Figure 9 shows, seventeen out of the twenty farmer groups in the sample of farmer groups have bulked one or multiple oilseeds in the past. For some it was only once, some continued for multiple seasons. Except for a one-off activity by a group that grew simsim on collectively rented land, simsim has only been bulked on a regular basis by the group of traders (also referred to as ‘senior’ farmers) located in Lira town. Simsim is a crop that many farmers prefer to sell individually when they need ready cash to, for example, pay back their loan in VSLA. There are three reasons for selling simsim in order to generate cash. First, simsim can ‘fetch good money’ (Mirjam Farmer interview Acwec Omio, 2013), up to 4500 UGX (1.55 USD) per kg in the second season of 2014 (data from individual farmer survey 2015/2016). Second, it is easily sold on the local market, as buying it to roast and grind for simsim paste for consumption is very common in the Lango sub region of Uganda. And third, simsim is more prone to pests and diseases, making the supply less stable which is not desirable for bulking (private conversation with research assistant Patricia Atim holding a diploma in agriculture).

### 5.3.2 Determinants of bulking

Why the farmer group started bulking oilseeds was not directly asked to the chairperson but some reported having had a training on the importance of bulking by the cooperative or decided to bulk because crops were grown on collectively rented land with the aim of sharing the revenues among members.

The three farmer groups that had never bulked any oilseed were heterogeneous in characteristics. One group was established in 2014 after actively being motivated by cooperative staff to apply for the agricultural loan offered by the Ugandan Development Bank via the cooperative. Included in the group were 15 traders that mainly focused on their own business and wanted to access the individual loan to invest in their private business. They did not practice VSLA in this group, the group only came together twice a year to discuss market information. The remaining two groups that had never bulked, did not have any members that were trader. One group was established in 2002 and started as a traditional dance group, after which they grew into a farmer group as they were supported with trainings by both NAADS and another NGO and started VSLA.

For the seasons considered in this study, twelve out of the twenty groups did report to have bulked either soya bean or sunflower. Striking is, that it seems that groups with a male chairperson show a significantly higher percentage of having bulked in these seasons (see annex A4). This is in some way in line with Barham & Chitemi (2009) who found that farmer groups with a greater ratio of male to female leaders were more likely to improve their market situation (through collective marketing or entering into contracts with agribusiness). As expected, sunflower was the most popular crop to bulk in the second season of 2014 (9 groups) and soya bean in the first season of 2015 (5 groups).

From the details on these bulking activities (see annex A5-A8), it can be concluded that, next to the cooperative, Mukwano agents and traders were the main marketing channels. Conforming with Vorley et al., 2015, most groups considered the cooperative as just one of the possible marketing channels, which they test on the same criteria as they tested other buyers. Namely, the price, the time of payment and whether the buyer is ready to buy when the crops of members were harvested. The latter appears to specifically be relevant in the case of the cooperative as buyer. Multiple groups reported that the cooperative was not willing or able to buy oilseeds in the first season of 2015. Correspondingly, the chairperson of the cooperative has admitted that more working capital is needed to be able to provide members with cash payment at the moment of bulking (interview M. Schoonhoven with chairperson of Acwec Omio, 2015). In line with the strategy of Mukwano, selling bulked produce to Mukwano agents is dependent on whether the members had bought seeds from the company.

The payment to the members was always direct, except for one group that experienced delay in payment from the cooperative's side. This suggests that, in the cases of direct payment, there was no time delay of payment *after* the output was loaded in the vehicle of the buyer. This does not rule out that there was no delay in payment at all. The time delay can still have started *before* this transaction, by having to wait for buyers to pick up the produce or because of no simultaneous harvesting times, as suggested under reasons given for side-selling by members. Percentages of members that have bulked with the farmer group widely vary and are often guessed by the chairperson and can be biased because of socially desirable answers given. At any rate, there is an evident discrepancy between these percentages and the number of randomly selected members per farmer group that reported selling a certain oilseed through the group (see annex A5-A8).

Notable is that the only group of which multiple members report having sold via the group is the group of which the chairperson is a trader and the 'group store' is his own personal store. Though members reported also having sold sunflower and soya bean in the first season of 2015 via him, this trader and group leader did not report having bulked produce from his members in that respective season hinting to recall bias as his members were only a small part of his suppliers.



Whether members' levels of different types of trust correlate with the practice of bulking oilseeds in the seasons considered was tested by comparing means of the trust factors between individuals that were associated with a farmer group that did bulk and individuals that were associated with a farmer group that did not bulk (see Table 9). Doing so, results in the conclusion that only the level of trust in the cooperative significantly differs between the two groups. When there exists more trust in the cooperative, the competence of the board in negotiating better prices and the motives of the board are viewed more positively, which is measured directly by the trust statements (see Table 6). This suggests that members also have more trust in the fact that the cooperative can buy the produce they bulk. It can also, indirectly mean that a group feels strengthened by the support of a bigger organisation, making bulking less risky. Lastly, it was observed that the cooperative was more trusted when the group recently received seeds or training via the cooperative. These seeds could have been planted collectively and then bulked in the relevant seasons. Although insignificant using the correct tests (taking into account equal or unequal variances and skewness of distribution), the trust in group and trust in members factors display a relatively lower average for the members of groups that did not bulk. However, the trust in chairperson factor displays a reverse case; members of groups that did not bulk have a relatively higher average level of trust. Because of a small amount of groups considered, research among more farmer groups is needed to draw valid conclusions about a relation between trust and bulking practices of farmer groups.

**Table 9** Mean comparisons of trust factors between groups that bulked and groups that did not

	Group bulked oilseeds in 2014/2015	Group did not bulk oilseeds in 2014/2015	Equality test <sup>3</sup>
N	70	44	
<i>Trust in Acwec Omio factor</i>	.214	-.340	-3.410*** (welch)
N	71	46	
<i>Trust in Group factor</i>	0.006	-0.010	-0.479
<i>Trust in Chairperson factor</i>	-0.062	0.095	0.975
N	71	47	
<i>Trust in Members factor</i>	0.016	-0.025	-0.342

<sup>3</sup> T value of t-test

### 5.3.3 Challenges of bulking

The main reason given by chairpersons for bulking to be challenging is late payment for the oilseed products. This late payment has multiple sources. The first is that it takes time for all the members to gather their produce in one place, as not all members harvest at the same time. The second cause is that farmers need to wait for the produce to be picked up by the cooperative or another buyer. The third reason is that especially Acwec Omio does not always pay directly when picking the produce, but after some weeks. Members prefer to be paid directly in cash when they have harvested. Then, there is the issue that the cooperative or other buyers offer the same prices for the bulked produce as buyers offer farmers at the farm gate. To roughly check this conviction, averages of farmer group prices reported by the chairperson and averages of prices received via individual marketing channels at the farm gate were compared for soya bean and sunflower respectively (see Table 10). No equality test could be performed, due to great uncertainty surrounding the actual number of members that were involved in bulking with the farmer group. Table 10 does seem to confirm that the prices do not differ significantly between bulked produce and not bulked produce. Only the price range is wider for prices offered at the farm gate via individual marketing channel.

**Table 10** Average prices for bulked produce at farmer group store and individual marketed produce at farm gate

	Average price for bulked produce	Average price via individual marketing channel & at farm gate
<i>Sunflower</i>	931.91	914.87
<i>N</i>	8 (groups)	39 (individuals)
<i>Min</i>	800	600
<i>Max</i>	1200	1200
<i>Soya bean</i>	1185.71	1193.47
<i>N</i>	7 (groups)	75 (individuals)
<i>Min</i>	1000	700
<i>Max</i>	1300	2400

Many farmers fear transport costs. These can also be incurred when bulking locally. This requires cash that is not there when the harvest has to be sold. It is seen as a waste of money if the alternative exists that traders come to your doorstep to buy your produce (personal field notes). Lack of transport *possibilities* is a related challenge, which can partly be explained by this inability or reluctance of paying transport costs. The simple fact that the group does not own storage space is the most often quoted

challenge with collective marketing by individual members (see Table 11). This underlies, however, that the farmer group is also not willing or able to invest in storage space.

**Table 11** Challenges with collective marketing according to individual members

Challenge	Freq.	Perc.
The members of the group are not motivated enough to work together, there is a lack of cohesion or discipline	1	0.85
There is a problem of trust or transparency between the members of the group and the chairperson	4	3.39
The group does not own enough financial capacities to respond to the credit needs of the members	1	0.85
The group does not own enough financial capacities to allow members to wait upon the sale of their produce (store for better price later)	3	2.54
There is a problem of transport possibilities for the group	17	14.41
The group does not have storage space	56	47.46
The group lacks linkages with input providers, buyers, credit providers	1	0.85
There is a problem of trust or transparency between the members of the group and Acwec Omio Cooperative	4	3.39
Other	31	26.27
N	118	

Some farmer groups stopped bulking collectively. The reasons described by the chairpersons include there turned out to be 'no market' (or as variation on this: nobody bought the bulked produce) or Acwec Omio did not come to pick the produce. For one group an NGO handed over free simsim seeds and promised to also buy the grains, making the group wait passively instead of looking for buyers themselves. The promise was broken and this greatly discouraged them to bulk again. This observation supports the belief that NGOs involving themselves in buying produce can jeopardize the sustainability of the bulking activity and desired income improvements of farmers as also warned for in Shepherd (2007). Anecdotal stories of bulking that did not bring better prices or bigger buyers, brings farmer groups not to have a big common ground to persist bulking. The oilseed output is precious and, for many members with no non-farm activities this constitutes their main cash income. Therefore, they find it difficult to bring their output into the group when stories they hear about collective marketing are negative.

#### 5.3.4 Bulking rules of farmer groups

On the farmer group level, there were no rules present for members against selling to other channels. For one group, a rule was in place stating when a member received seeds under the group from an organization, that member should sell via the group. If one insisted on selling that produce individually,

next season he would not have access to seeds offered to the group by organisations. The group of which the chairperson was a trader had the rule of always bringing your produce to the store of the leader if you had a loan with VSLA. Arguments for not having any rules in place were that you would scare members away and that one has to bulk with members that are willing, not forced. Some members only join the group to participate in VSLA and do not want anything to do with the bulking activity.

## 5.4 The cluster cooperative

### 5.4.1 Bulking oilseeds by the cooperative: challenges and rules

Farmer groups are one of the channels through which the cooperative procure oilseeds. Other channels are traders selling to the cooperative and non-members or individual members that bring their produce directly to the main store if they are nearby. Concerning the marketing, for soya bean and sunflower Acwec Omio has had contracts with Nile Agro, but they also sell on the spot to other processors. Nile Agro has taken care of transporting the oilseeds from the smaller stores to their processing plant. In other cases, tippers are claimed to be rented to transport the bulked output from the farmer groups to the main store.

Rules concerning saving one's oilseed produce to sell to the cooperative are not actively implemented. To convince farmers to bulk with the cooperative, they lobby in the form of giving out small soft loans to farmers. Field officers try to convince especially *men* not to side sell but excuses like 'my seeds did not germinate' are unavoidable. The male field officer who was interviewed assumed that men take all the decisions on the marketing. However, the female treasurer of the cooperative claimed that more and more women take their share of the cash crop and individually decide who to market to. For the coming year, the treasurer of the cooperative mentioned that they were planning to charge individual farmers with a fine if they deliver less produce than their demand of seeds implied. When this fine would not be paid, they would be dismissed from the cooperative (interview treasurer of Acwec Omio, November 2015). One farmer group had already made notice of this rule, but as they were not given seeds by them, they assumed this rule did not apply for them.

Some chairpersons of groups mentioned that it was written in the constitution of the cooperative that if you receive seeds or a loan from the cooperative, you have to sell through them. Vice versa, it was sometimes claimed the cooperative would not give you seeds, carpets or training if you sell to other channels (interviews with chairpersons of farmer groups, treasurer and field officer of the cooperative, 2015/2016).

### 5.4.2 Relationship of farmer groups with Acwec Omio

Trust in the cooperative of members of groups that recently bulked was significantly higher than the

trust in the cooperative of members of groups that did not (see Table 9). This nicely illustrates the importance of trust in a higher level organisation involved in bulking itself and supporting you as a group for having common ground for bulking. The year in which a farmer group became a member of Acwec Omio shows a significant difference in mean between the farmer groups that bulked in the two agricultural seasons considered, and the farmer groups that did not (see annex A4). Not surprisingly, the sign of the difference suggests that the groups that did not bulk, became member of the cooperative, on average, later than the groups that did bulk as a group. Assuming that longer membership means that the relationship with the cooperative has grown more established, one could argue that the farmer group has better access to inputs and trainings, offering more secure ground to explore other collective activities. Before 2013 the possibility of receiving an individual agricultural loan (from the UDB) had a less prominent role in the decision to join the cooperative, leaving expectations of membership a bit more open and not merely focused on access to credit. Nevertheless, there is no clear association with the duration of the membership and actually selling bulked produce to the cooperative (see Table 12).

Half of the groups in this sample were approached by the cooperative to join them, instead of vice versa. One strategy of increasing the member base of the cooperative seemed to be calling groups for a training. These trainings included a variety of topics (agronomic practices, post-harvest handling or financial and group management) and were mostly given by an NGO who considered it helpful to provide trainings through the cooperative. During these trainings, seeds were sometimes distributed and membership was suggested to involve more invitations to trainings and more access to (free) seeds. Related to these actions, one chairperson reported that being offered a demonstration plot of soya bean was the main reason to join the cooperative.

Another approach by the cooperative to recruit members was visiting groups to announce that they were going to hand out individual agricultural loans and that, if they became a member, the farmer group members could apply. The promotion was done by the chairperson of the cooperative or the cooperative's field officers. Access to inputs and access to credit have been the most important reasons to join the cooperative, with or without persuasion of the cooperative itself. The chairperson of the cooperative thinks that the loan from the Uganda Development Bank the cooperative received to distribute to farmers, has made more members to bulk at the main store (interview M. Schoonhoven with chairperson of Acwec Omio, 2015). Mean comparison of the number of members that received an agricultural loan from the cooperative between groups that bulked and groups that did not bulk, does not confirm this belief (see annex A4).

**Table 12** Year in which farmer group became a member of Acwec Omio

	Freq.	Percent	Sold bulked produce to cooperative
1996 ( <i>chairperson herself</i> )	1	5.26	Yes
2007	1	5.26	No
2008	1	5.26	No
2010	1	5.26	Yes
2011	1	5.26	No
2012	1	5.26	No
2013	7	36.84	No
2014	6	31.58	Yes
N	19*		

\*One chairperson was not aware that her group was member of the cooperative

Some aspects of the relation of the groups with the cluster cooperative give reason to doubt the level of ownership and control members have over the cluster cooperative. First, there is only one group that has representatives in the board of Acwec Omio. Secondly, membership fees are most frequently only paid when a member applies for a loan. This hints that there is especially no feeling of ownership of the cooperative among members that did not apply for a loan, nor among members that did not receive a loan in the end. Talking to the chairpersons, meetings like a General Assembly where all members are invited seem to be covered in ambiguity. Some say there have never been any general meetings, some say all members meet two to three times a year. In between these two extremes, some chairpersons claim that they, as executive members have been called for trainings. Common ground can be found for the statement that 2015 was very quiet in terms of meetings or trainings. Reasons that are given for this lack of general meetings are 'members are too scattered' or 'members are too many to come at once'. These aspects point towards another possible indirect reason for members not to bulk via the farmer group for the cluster cooperative. Lack of ownership and control gives rise to unattached or negative feelings towards the cooperative, making it more likely that members sell via other channels if the cooperative cannot offer better prices or quicker payment.

For the three different groups that sold their bulked sunflower or soya bean produce to Acwec Omio (see Table 12), the relationship with the cooperative would be expected to be good. The chairperson of the one group that sold soya bean for 1300 UGX (0.45 USD) per kilo to the cooperative did consider the relation good and was friends with the daughter of the cooperative leader. He was convinced that the price the cooperative offered to him and his members was always 20% higher than the price offered by other buyers. Communication about trainings was good and carpets (donated by IFDC to the cooperative), to dry the oilseeds on, were already given to this group. However, this chairperson was also the only person who reported that his members had to wait some weeks for the payment of their soya bean output.

The other two sunflower bulking groups that did sell to the cooperative, were less positive about the

cooperative. In the second season of 2014 one group, member of the cooperative since 2014, still had the conviction that 'if you sell to the cooperative, benefits will come back to the members'. However, questions regarding the transparency of the cooperative arose when they were not invited for trainings or any general meeting. The final group reported to have sold sunflower to Nile Agro (processing company) via Acwec Omio because of the good price (900 UGX (0.31 USD) per kg). After this season, however also the attitude from this group towards the cooperative changed. The chairperson claimed he and his members suspected corruption. When they would be invited for a meeting with an NGO via the cooperative, the transport allowances were never directly given to the members, suggesting that the board members kept some of the money for themselves. Also lack of transparency regarding the buying and selling prices of the cooperative had raised scepticism with this group. After sharing this concern, the chairperson reported not to be called for any meeting anymore.

Reporting a good relation with the cooperative mainly corresponds to recently having received a training, demonstration plot, a loan or inputs. The five groups that were positive also received information on the cooperative's activities in time and four were active in bulking. The most heard disappointment in the cooperative was that, despite paying application fees, loans were not given out. Also rigidity in leadership and lack of member involvement in the board were reasons for groups not to be enthusiastic about the relationship with the cooperative. These complaints likely influenced the decision not to sell the bulked products to the cooperative, unless they had a better price and offered direct payment. Complaints, concerning the relationship, directly linked to bulking oilseeds with the cooperative were not numerous. Only the group of traders from Lira reported to have stopped selling to the cooperative because the cooperative did not have a secured buyer anymore. The relation was portrayed as a pure buying-selling relationship, no feelings of friendship, only together for business. Another group did not trust the price that the cooperative paid for their produce to be the real price the cooperative would have received from the buyer. Nevertheless, regarding reasons for members to side-sell, the cooperative is still held responsible, especially because of their delay in payment. One chairperson claimed that in the second season of 2014 his members held their output individually in their houses to sell to Acwec Omio but the cooperative did not come to pick it up. Costs of transporting the produce to the main store themselves were too big of an obstacle as the price they offered was not even better than the price local traders offered.

**Table 13** Mean comparison of trust in Acwec Omio cooperative grouped by chairpersons that had a negative/positive attitude towards the cooperative

	Negative attitude by chairperson towards cooperative	Positive attitude by chairperson towards cooperative	Equality test <sup>4</sup>
N	85	29	
<i>Trust in cooperative factor</i>	-.2658401	.7791865	-6.050***

Despite other discrepancies, the opinion of the chairperson about the relationship with Acwec Omio matches with the trust its members have in the cooperative. Grouped by the attitude of the chairperson towards the cooperative (labelled as positive or negative), a Wilcoxon-Mann-Whitney test was performed on a factor derived from five statements measuring the trust of individual members in the cooperative (measured on a four point Likert-scale) (see Table 13).

## 5.5 Factors inducing bulking activity by farmer groups

Although more than half of the groups reported to have bulked oilseeds in the seasons considered in this study, VSLA is considered the most important activity of the farmer groups. In line with other studies on collective marketing, late payment is one of the main challenges concerning the collective marketing efforts of the groups (Develtere et al., 2008; Mujawamariya et al., 2013; Verhofstadt & Maertens, 2014; Vorley et al., 2015). Details on the transactions of the bulked oilseeds, in the seasons considered, suggest that the delay in payment is not necessarily caused by the cooperative delaying in payment after the produce has been picked up (see annex A5-A8). This does not totally dismiss the role of the cooperative as delay in payment by the cooperative was experienced by the groups that had decided to stop bulking or that sold their bulked produce through other channels than the cooperative. The delay can, furthermore, be caused by differences in harvesting times of members and the time the produce of members stays in the store of the farmer group until a suitable buyer is found.

Bulking oilseeds is perceived the most natural and effortless if the oilseeds were jointly cultivated from seeds that were given to or bought by the group. While more research is needed into the governance between the cooperative and the farmer groups, my results suggest that the relation between the groups and the cooperative is not stable and prone to misunderstandings between the two actors. Ownership and control by members is generally low. This results in the cooperative being more seen as just another possible channel to sell produce to, rather than the only channel because of the benefits it brings back to members. Supporting the importance of trust between the cooperative and the members for the incidence of bulking, the level of trust in the cooperative correlates positively

<sup>4</sup> Due to skewness of distribution of factor z-value of Wilcoxon-Mann-Whitney test is given



with the presence of bulking in a group.

## 6 Channel choice: Traders and Mukwano agents

Because of the challenges the farmer groups continue to face concerning collective marketing, selling via the group has not been popular. Instead, individual marketing channels are chosen. From the data gathered in this research, it can be concluded that the biggest share of oilseed transactions is done between farmers and traders or Mukwano agents directly. Soya bean transactions are dominated by traders (see Table 14), while, for sunflower produce, Mukwano agents are the most frequent buyers (see Table 15). Because of the differences in buyer variation between the oilseed crops, the factors influencing the marketing of both crops will be analyzed separately, prior to discussing the similarities and differences between the marketing practices of the two cash crops. Summary statistics on the variables included in the analyses can be found in annex A9.

**Table 14** Frequency table of soya bean buyers sold to by farmers

	Frequency	Percentage
<i>Mukwano agent</i>	7	6.86
<i>small processing company</i>	1	0.98
<i>Trader/middlemen</i>	85	83.33
<i>Fellow farmers</i>	5	4.90
<i>Acwec Omio (via farmer group)</i>	1	0.98
<i>Farmer group (they sell to buyer)</i>	3	2.94
<i>N</i>	102	

**Table 15** Frequency table of sunflower buyers sold to by farmers

	Frequency	Percentage
<i>Mukwano agent</i>	38	54.29
<i>Mount Meru</i>	1	1.43
<i>Small processing company</i>	2	2.86
<i>Trader/middlemen</i>	22	31.43
<i>Fellow farmers</i>	2	2.86
<i>Farmer group (they sell to buyer)</i>	5	7.14
<i>N</i>	70	

## 6.1 Empirical framework

### 6.1.1 The model

As the dependent variable is binary for both groups of soya bean and sunflower transactions a logistic model will be estimated to explore correlations between determinants and the probability of selling to a certain buyer. Although neither the probit nor the logit model has any particular advantage (Amemiya, 1981), logit estimates will guide the interpretation. Probit estimates have also been considered to check for model specific outcomes.

Each observation has an individual probability that  $Y_i = 1$ ,  $p_i$ , which we assume depends on the explanatory variables. This probability is not directly observed, the only thing observed are  $N$  observations on  $Y_i$  taking values of 0 or 1. By maximizing the log likelihood, the smallest possible deviance between the observed and predicted values of  $Y$  can be found, resulting in an estimated model.

A coefficient of the model are the rates of change in the 'log odds' ( $\log(\frac{p_i}{1-p_i})$ ) as the corresponding independent variable changes. These coefficients can be transformed to the odds ratio by taking  $e^{\beta_i}$ , indicating the change in odds in the multiplicative scale for a unit increase in the corresponding independent variable holding other variables at certain value. This ratio is especially intuitive for dichotomous independent variables. For example, when the odds ratio effect of gender (male=1) would be 1.25, it says that, holding the other predictor variables at a fixed value, the odds of selling to a trader are 25% higher for men than for women.

For soya bean transactions,  $Y_i = 1$  if a farmer has sold to a trader and  $Y_i = 0$  if a farmer has sold to another buyer. For sunflower transactions, in which  $Y_i = 1$  if a farmer has sold to a Mukwano agent and  $Y_i = 0$  if a farmer has sold to another buyer. For estimation we use the following general model format:

$$\text{logit}(p_i^c) = \log\left(\frac{p_i^c}{(1-p_i^c)}\right) = \beta_0^c + \beta_1^c * RA_i + \beta_2^c * TT_i + \beta_3^c * T_i + \beta_4^c * FG_i + \beta_j^c X_i^c$$

In which

$c = so$  (soya bean) or  $su$  (sunflower),  $i = 1, \dots, n$  &  $j = 1, \dots, k$

$RA_i$  = risk aversion factor,  $TT_i$  = trust in trader factor,  $T_i$  = discount factor

$FG_i$  = farmer group fixed effect

$X_i^c$  = vector of crop specific control variables

In the following two sections, the key variables, control variables and fixed farmer group effects will be clarified.

### 6.1.2 Key variables and expected correlations

#### *Trust in trader*

When a respondent has a higher level of trust in traders, it is expected that he will be more likely to also sell soya bean to a trader. This results in an expected positive correlation between the trust in trader factor and the probability to sell soya bean to a trader ( $p_i^{so}$ ) and an expected negative correlation between the variable and the probability to sell sunflower to a Mukwano agent ( $p_i^{su}$ ). As explained in 3.2.2 Trust in the trader the 'trust in trader' factor is not measuring the trust the respondent has in familiar traders, but only in the integrity and motives of traders in general. This kind of trust also has an expected positive correlation with the likeliness to sell to a trader. It however needs to be kept in mind that, when a farmer trades with a familiar trader this may be the case *because* this farmer does not trust traders in general and therefore finds it important to trade with a trader he does trust. Furthermore, the fact that transactions with traders are often characterized by direct payment might make the coefficient of trust less significant, as there is no need for trust in the trader to return with the money.

#### *Risk aversion*

The expected relation between the level of risk aversion of a respondent and the probability the respondent will sell soya bean to a trader is positive ( $p_i^{so}$ ). Traders are known for buying produce quickly, avoiding risks associated with storage and price fluctuation over time. The expected correlation between the risk aversion factor and the probability of selling sunflower to a Mukwano agent ( $p_i^{su}$ ) is ambiguous. On the one hand the certainty of an output market, higher yields and higher prices<sup>5</sup> are factors supporting risk mitigation by Mukwano. On the other hand, the reported drastic reductions in price and price volatility caused by Mukwano show risks associated with selling to a Mukwano agent.

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<sup>5</sup> Intuitively, price is an important factor in the decision which buyer to sell to, however there is no significant difference between the prices offered by traders or Mukwano agents and the prices offered by other buyers. There is a significant positive price difference between the farmers that bought hybrid seeds from Mukwano and those that did not. Secondly, if price would be included in the model a counterfactual should be present: which price would one have received if one would have sold to another buyer in the same area? As there are too little transactions in which another buyer is involved, especially when comparing prices within the farmer group, it is not possible to create a credible counterfactual and price will not be included in the model. For soya bean, prices were significantly lower at the farm gate than at any other location. For sunflower, prices did not significantly differ between the farm gate and other locations. However, it is beyond the scope of this research and the data available to draw valid conclusions on these differences.

### *Discount rate*

As traders are known for offering direct cash relief, the discount rate's correlation with the probability to sell soya bean to a trader ( $p_i^{so}$ ) is expected to be positive. Also, including the discount rate can control for hidden time preference aspects of the risk aversion factor's correlation with the dependent variable. The expected correlation between the discount rate and the probability of selling sunflower to a Mukwano agent ( $p_i^{su}$ ) is negative as the most heard complaint about Mukwano agents was the delay in payment (Vorley et al., 2015).

#### 6.1.3 Control variables

Although the contract farming scheme of Mukwano, in the strict sense has disappeared (Ton et al., 2010), in one way a Mukwano agent still binds farmers to him by giving a free basin when one buys seeds from him and promising washing soap if the farmer sells his output back to him (informal conversations during surveys 2015, Vorley et al., 2015). Furthermore, efficiency in logistics and payments are the strategy of Mukwano to remain a dominant buyer. The fact that the hybrid seeds Mukwano is selling have a different appearance than other varieties of sunflower in the area has been an effective way to detect 'side-selling' farmers. After 2007, Mukwano lost its monopolistic position as hybrid sunflower seeds seller, input dealers and traders also took up the opportunity to buy and sell these seeds. Mukwano is, however, still the dominant channel for hybrids and prefers buying sunflower grown from these seeds (Ton et al., 2010). Thus, having bought seeds from a Mukwano agent will likely increase the probability of selling to a Mukwano agent ( $p_i^{su}$ ).

The dummy representing whether the respondent himself is a trader is introduced to capture the effect of being involved in trading yourself on your marketing decision. It likely filters out noise in the correlation between the trust in trader factor and the dependent variable and can check whether traders are more likely to sell to traders or to other buyers. The possibility of a trader being more likely to sell produce to a processing company, Acwec Omio or Mukwano is plausible, as traders are still important 'side' suppliers of Mukwano and Acwec Omio to supplement their supply (Vorley et al., 2015). On the other hand, a trader could sell its own produce to bigger traders based in town or to a befriended trader, when he is not involved in bulking soya bean that specific season. The expected correlation between this variable and the probability to sell soya bean to a trader ( $p_i^{so}$ ) is thus ambiguous. For sunflower, the variable might be associated positively with selling to a Mukwano agent ( $p_i^{su}$ ), as traders are still important suppliers for Mukwano (Vorley et al., 2015).

To control for possible household and individual characteristics effects and season, these are included in the second model of both sunflower and soya bean transactions. For the sunflower model, having another income source is an extra binary variable to function as a proxy indicating if a farmer has more

or less liquidity constraints to buy hybrid seeds from Mukwano at time of planting. This variable is thus expected to have a positive correlation with the probability to sell sunflower to a Mukwano agent ( $p_i^{su}$ ).

As traders are associated with farm gate sales (Fafchamps & Hill, 2005) aspects influencing the location of sale need to be controlled for in both sunflower and soya bean models. The decision to sell at the farm gate likely correlates with the distance to the market, the transport possibilities of the farmer and the quantity that is being sold. These variables affect selling decisions through their effect on transportation costs. To capture transportation costs, these variables will be included in model 3. Distance to market is expected to have a positive correlation with the probability to sell soya bean to a trader ( $p_i^{so}$ ). The bike and motor bike dummy are expected to have a negative sign. For sunflower transactions the expected signs of coefficients are more ambiguous.

For smaller quantities the threshold of travelling to another place of transaction than the farm gate is lower as it can be transported either by foot or per bicycle (Fafchamps & Hill, 2005). Larger quantities are more difficult to transport but as with a larger quantity the expected revenue also increases, the expected revenue can become worth the transportation costs. The traders' center (where 12.9% of the soya bean transactions to traders took place) is often located closer than the market (field observations). On the other hand, traders accept small quantities relatively easier than other buyers (Vorley et al., 2015). The correlation between the Log of quantity and the probability to sell soya bean to a trader ( $p_i^{so}$ ) can, thus, be both positive and negative. The log of quantity transacted can capture the indirect effect of quantity, via the place of transaction, on the probability of selling to a trader. This variable is added in the fourth model. It might be that farmers sold lower amounts of sunflower to Mukwano agents, as they demand a higher quality, lowering the output that is good enough to sell to them. Thus, a negative correlation is expected between the log quantity and  $p_i^{su}$ . There is little reason to expect that quantity is endogenous to the marketing channel (Fafchamps & Hill, 2005), as most often the quantity sold in one transaction was equal to the total amount of soya bean or sunflower sold in the relevant season.

To account for other omitted variable bias, a farmer group fixed effect has also been considered in both soya bean and sunflower models. However, because of the ratio between observations and independent variables becoming too low, the models turn unstable. Odds ratios are unrealistically high and observations were dropped. Still, the qualitative effects of the variables remain consistent with the other models.

Instead of the FG fixed effect in model 5 three relevant group variables included, putting a lighter group control on the model. Two variables are dummies for the presence of one or more traders or one or more Mukwano agents. If familiarity is an important part of a marketing decision, one would expect

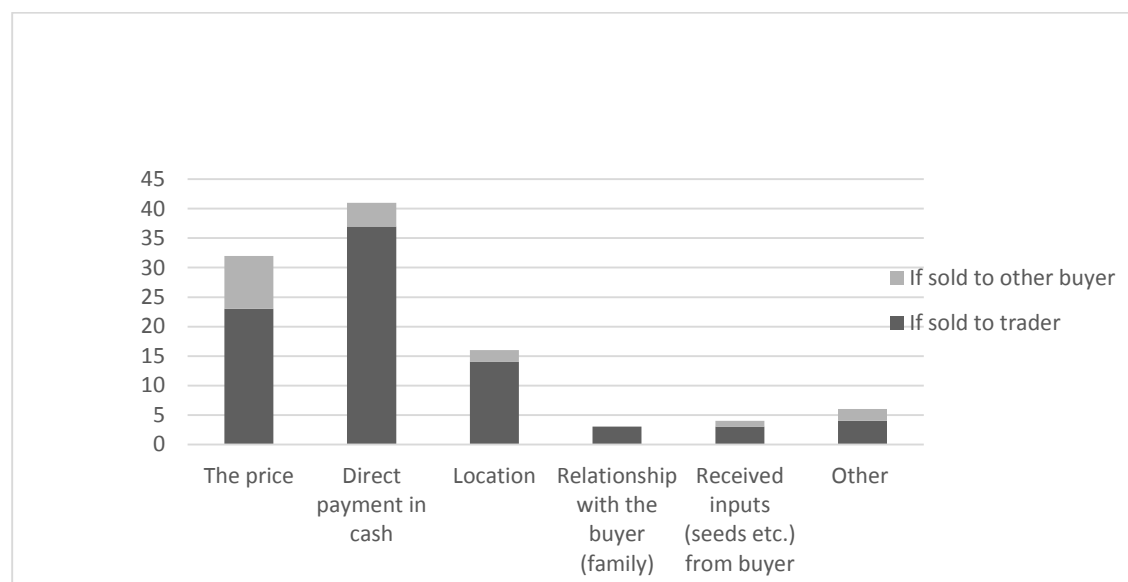
the variable for the presence of one or more traders to have a positive effect on the probability to sell soya bean to a trader ( $p_i^{so}$ ). As a nuance, traders in groups are not necessarily involved in trading soya bean every season, neither do Mukwano agents. With the presence of Mukwano agent, it might be expected that farmers in that group are more inclined to sell their sunflower to a Mukwano agent (the expected correlation with  $p_i^{su}$  is positive) and also sell their soya bean to this Mukwano agent (Mukwano agents account for 41.18 % of the soya bean transactions to *other buyers*). Thus, the expected correlation with  $p_i^{so}$  is negative. Lastly, a dummy indicating whether the group of the respondent was bulking soya bean or sunflower in the respective season is introduced to measure the effect of the presence of a clear other option (selling via the group) on the probability to sell to a trader or Mukwano agent.

## 6.2 Soya bean results

### 6.2.1 Individual reasons given for selling soya bean to trader

As reason to sell soya bean to a trader, most frequently direct payment in cash is given (see Figure 10). Performing a chi-square test comparing the time of payment between the two groups (traders vs. other buyers) gives evidence (significant on a 90% confidence level) that the actual time of payment is more often direct when one has sold to a trader compared to selling to when one has sold to any other buyer (see annex A10).

**Figure 10** Soya bean: reasons to sell to trader vs. reasons to sell to other buyer



To put this comparison into perspective, in both groups together, the majority of soya bean transactions was done in cash (over 92 % of all transactions). Looking into the different buyers and the time farmers were paid, it reveals that only for transactions with traders and the farmer group, it occurred that the time of payment was not direct. Mukwano agents, processing companies, fellow

farmers and even the cooperative (one observation), were all reported to have paid for the soya bean output directly to the farmer. The low group sample of farmers that sold to other buyers, covering the three cases in which one sold via the farmer group and receiving no direct payment, makes the mean comparison prone to overestimation. Moreover, it cannot be shown that the discount rate of individuals differs between the group that sold to traders and the group that sold to other buyers (see annex A10). Still, direct payment of the trader remains a valid reason to choose him as a buyer. Likely there is no thorough comparison made between buyers but selling to a trader is decided at the very moment a trader passes by the farm gate and is offering direct cash relief.

### 6.2.2 Model results

Table 18 displays the coefficients and odds ratios of the five logit models considered. The first model only includes the variables of interest. Though not both significant, the risk aversion factor and trust in trader factor have the expected signs as proposed in 6.1.2 Key variables and expected correlations.

The risk aversion factor has a significant positive correlation with the probability to sell to a trader. This illustrates that traders are viewed to be mitigating certain risks of price and storage by quickly buying produce after harvest, accepting smaller quantities and offering cash payment.

The insignificance of the trust in trader factor is not very surprising, because it measures the trust in the integrity of all traders, not necessarily in a familiar trader. Focusing on traders in general does make the variable more exogenous, but does apparently not correlate significantly with the probability to sell to a trader. Perhaps trust is less important in the decision to sell to a trader as the transaction is often characterized by direct payment, leaving less need for the conviction that you can trust a trader to return with money. Familiarity sometimes is a precondition for trust (Luhmann (1979) in Gefen, 2000). Familiarity is measured via the question whether a farmer has regularly traded with the buyer in question. Viewing familiarity as a substitute for trust, the relative importance of familiarity in the decision to sell to a trader is considered in Table 16. If the buyer was a trader, an established relationship was significantly less frequently pointed out than if the buyer was another actor. Still, for half of the transactions for which this information is present, the farmer had regularly traded with the trader, suggesting that familiarity with the buyer is not unimportant but cannot be captured in the model without creating issues of endogeneity.

**Table 16** Regularly traded with soya bean buyer compared between both groups

	Sold to trader	Sold to other buyer	Equality test <sup>6</sup>
--	----------------	---------------------	----------------------------

<sup>6</sup> Pearson's chi-square is given for categorical variables, level of significance is based on Fischer's exact test as the sample is small.



N	77	13	
<i>Regularly traded with buyer (in %)</i>	50.65	84.62	5.1968**

\*\*  $p < 0.05$

Throughout all models, the raw coefficient of the discount rate is negative but not significantly different from zero. Contradicting other studies, the Pearson correlation coefficient between risk aversion factor and discount rate is negative. This suggests that a higher level of risk aversion is associated with a lower level of time preference. Excluding the risk aversion factor from the model, does not make the coefficient of the discount rate significantly different from zero and the negative sign remains. Despite the theory and empirical evidence in other studies raising the expectation of a significant positive effect of the discount rate on the probability to sell to a trader, no evidence is found for this relation. However, the outcome of this variable should be treated with caution as over half of all respondents did not show a switching point in the given range of payment options, resulting in measurement errors.

In the first model, being a trader corresponds significantly with being less likely to sell to a trader. This confirms the first expectation that traders tend to sell to bigger buyers than themselves, which are more likely processors or cooperatives than other traders. When standard control variables are introduced (model 2), the most notable is the change in significance in the 'respondent is trader' dummy. This most likely happened because of the wealth index now explaining some of the variation first explained by the dummy<sup>7</sup>.

Introducing proxies for transport costs (model 3) results in the risk aversion factor to lose all significance. The Pearson correlation coefficient of risk aversion and the log of distance to market in minutes is 0.225. Thus, log of distance to market has stronger and overlapping explanatory power with the measure of risk aversion. Nguyen & Leung (2009) in their study on risk behavior of Vietnamese fishermen, also find that the closer the fisherman lives to the market (measured in kilometers), the less risk averse he is. They suggest that this correlation can be explained by the fact that living close to the market frequently exposes the respondent to the uncertainties of business activities, familiarizing her to income fluctuation. Although farming and fishing are different types of occupation, this argument can also hold for farmers living closer to the market.

<sup>7</sup> Traders tend to be wealthier, tested using a t test on the wealth index grouped by dummy of respondent being a trader

The Log distance to the market keeps having a significant positive coefficient throughout the rest of the models. It can be argued that the more remote a farmer is located, the more attractive it is for him to sell to a trader, either at the farm gate or at the traders' center (see Table 17), often closer by than the market. This is in line with the observation that more transactions with traders occur at the farm gate than transactions with other buyers (see annex A10) and with other literature on the topic (Fafchamps & Hill, 2005).

**Table 17** Places of soya bean transactions

	Sold to trader	Sold to other buyer
<i>Farm gate</i>	69 (81.18%)	6 (35.29%)
<i>Traders' center</i>	11 (12.94%)	4 (23.53%)
<i>Local market</i>	3 (3.53%)	3 (17.65%)
<i>Store of agent (Mukwano)</i>	-	4 (23.53%)
<i>Collection point of group/ FG store</i>	1 (1.18%)	-
<i>Other</i>	1 (1.18%)	-
N	85	17

Seemingly contradicting is that having at least one bicycle as a household significantly correlates with higher probability of selling to a trader. Because of the disproportionate size of observations that do not own any bicycle as a household, the odds ratio is implausibly high throughout all models, thus, not too much value needs to be given to this correlation. However, selling to a trader is not necessarily equivalent to selling at the farm gate (see A10) and the other transport proxy variable has already controlled for the effect of distance to the probability of selling to a trader. With a bicycle one has the possibility to carry relatively small amounts of produce to the traders' center but can still decide to sell at the farm gate, because of opportunity costs among other considerations.

Signs and magnitudes of all the coefficients remain roughly the same when the Log of quantity transacted is included in the logit. The coefficient of log of total quantity transacted is positive but not significant. The location part of the decision to sell to a trader is apparently already captured well enough by the Log distance to market.

Model 5 adds three group level control variables that are expected to be influencing the dependent variable. Because of overfitting, the odds ratios are unreasonably high. Adding these controls makes the wealth index to have a significant negative correlation with the probability of selling to a trader, while in the previous models only showing an insignificant negative correlation. Having at least one Mukwano agent in your group correlates positively with the probability of selling to a trader. Having at least one trader in the group, on the other hand, negatively correlates with the probability of selling to a trader. Related to this, remarkable is that from the farmers that sold their soya bean output to a Mukwano agent, 85.71 % did not have a Mukwano agent in their group. Both of these findings combat the expectation that a farmer is inclined to sell to the buyer he is in a group with. However, bulking soya bean is voluntary for Mukwano agents and their role in the soya bean value chain is more similar to a trader than to an agent. Transport costs and commission is not paid by the company and the agents are free to sell to other buyers (interview chairperson of Mukwano site-coordinators, M. Schoonhoven 2016). This lowers the expectation that Mukwano agents in the group must be buying soya bean or shows that they might be viewed as soya bean traders. Whether the group has bulked soya beans in the relevant season, negatively correlates with the probability of selling to a trader. Thus, having an evident other marketing option could incline a farmer to choose another buyer (of which the farmer group is an option) than a trader.

Because of too little variation within farmer groups, a robustness check including FG fixed effects turned out not to be adding value to the analysis or as a robustness check. A different robustness check was done by comparing the probit coefficient estimates with the logit coefficient. The probit estimates are similar to the logit estimates. The magnitude of the coefficients is different because of the different transformations the two models use, but the qualitative correlations remain the same for the different models, suggesting that the model interpretation is not dependent on the use of one specific parametric model.

To summarize, the level of risk aversion, a farmer has, correlates positively with the probability of selling to a trader, but loses importance when controlled for variables measuring distance to the market and transport possibilities. The hypothesis that the discount rate will positively correlate with the probability to sell soya bean to a trader cannot be proven and the sign of its coefficient is negative but not significantly different from zero. Trust in trader does have the expected positive sign but is not significantly different to zero, leaving us to also reject that hypothesis. Distance to the market keeps correlating positively with the probability of selling to a trader, implying that farmers that are more remote are more likely to sell their soya bean to a trader. Before controlling for wealth, a farmer that was a trader himself showed less likeliness to sell to a trader. A surprising result is the negative correlation between having at least one trader in the group versus the positive correlation of having

at least one Mukwano agent in the group with the probability of selling to a trader. This counters the expectation that a farmer is inclined to sell to a buyer he is familiar with. When the group was bulking, the probability of selling to a trader decreased, as more marketing options came into reach.

**Table 18** Logit results for Sold to Trader(=1) of soya bean transactions

	Coeff. (1)	Odds Ratio (1)	Coeff. (2)	OR (2)	Coeff. (3)	OR (3)	Coeff. (4)	OR (4)	Coeff. (5)	OR (5)
<i>Risk aversion factor</i>	0.871*** (0.294)	2.388	0.820** (0.344)	2.270	0.307 (0.473)	1.360	0.240 (0.484)	1.271	0.766 (0.697)	2.151
<i>Trust in trader factor</i>	0.048 (0.326)	1.049	0.320 (0.375)	1.377	0.183 (0.431)	1.200	0.206 (0.437)	1.229	0.293 (0.658)	1.340
<i>Discount rate</i>	-0.280 (0.667)	0.755	-0.560 (0.758)	0.571	-0.748 (0.843)	0.473	-0.767 (0.856)	0.464	-2.432+ (1.559)	0.088
<i>Respondent is trader</i>	-1.500** (0.718)	0.223	-1.251+ (0.844)	0.286	-1.010 (1.006)	0.364	-1.020 (1.022)	0.361	-0.491 (1.446)	0.612
<i>Season 2014</i>			-0.373 (1.065)	0.689	-0.153 (1.234)	0.858	-0.038 (1.263)	0.962	3.415+ (2.093)	30.430
<i>Respondent is male</i>			0.537 (1.176)	1.711	1.088 (1.271)	2.968	1.097 (1.266)	2.996	0.223 (1.542)	1.249
<i>Respondent is household head</i>			-1.094 (1.289)	0.335	-1.613 (1.377)	0.199	-1.607 (1.389)	0.200	-1.122 (1.568)	0.326
<i>Age of respondent</i>			0.012 (0.032)	1.012	0.027 (0.038)	1.027	0.024 (0.039)	1.025	0.010 (0.067)	1.010
<i>Household size</i>			-0.002 (0.816)	0.998	-0.113 (0.202)	0.893	-0.101 (0.203)	0.904	-0.043 (0.265)	0.958
<i>Amount of children in household that go to school</i>			0.422* (0.244)	1.525	0.387 (0.287)	1.472	0.388 (0.286)	1.474	0.495 (0.377)	1.641
<i>Wealth index</i>			-0.681 (0.578)	0.506	-0.930 (0.773)	0.394	-1.088 (0.837)	0.337	-2.184* (1.224)	0.113

Table continues on next page

Table 18 continued

	Coeff. (1)	OR (1)	Coeff. (2)	OR (2)	Coeff. (3)	OR (3)	Coeff. (4)	OR (4)	Coeff. (5)	OR (5)
<i>Log distance to market in minutes</i>					1.239** (0.559)	3.453	1.236** (0.557)	3.443	1.758** (0.797)	5.798
<i>Household has at least 1 bicycle</i>					2.344+ (1.482)	10.427	2.380+ (1.504)	10.808	4.243+ (2.640)	69.600
<i>Household has motorcycle</i>					0.307 (1.305)	1.360	0.163 (1.334)	1.177	-0.688 (1.633)	0.503
<i>Log quantity sold in transaction</i>							0.192 (0.326)	1.211	-0.218 (0.436)	0.804
<i>At least 1 trader in group</i>									-3.208+ (2.002)	0.040
<i>At least 1 Mukwano agent in group</i>									4.618* (2.504)	101.280
<i>Farmer group bulked soya bean in respective season</i>									-2.511** (1.197)	0.081
<i>Intercept</i>	2.150*** (0.568)	8.584 (4.873)	1.398 (1.497)	4.047 (6.057)	-5.053+ (3.113)	0.006	-6.136* (3.716)	0.002	-2.714 (5.940)	0.066
<i>N</i>	102		102		101		101		101	
<i>LR <math>\chi^2</math></i>	14.088		22.241		30.353		30.697		50.687	
<i>Prob &gt; <math>\chi^2</math></i>	0.007		0.023		0.007		0.010		0.000	
<i>Pseudo R<sup>2</sup></i>	0.153		0.242		0.332		0.335		0.554	

+ p<0.15 \* p<0.10 \*\* p<0.05 \*\*\* p<0.01. Standard errors in parentheses. Number of observations decreases with 1, as one respondent could not indicate the distance to the market in minutes.

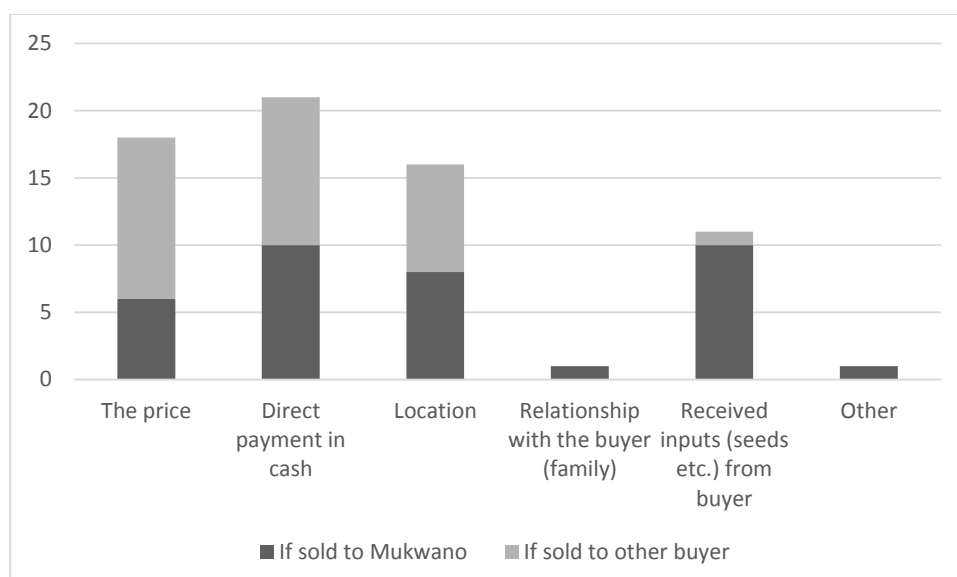
## 6.3 Sunflower results

The processing company Mukwano is a big player and price setter in the sunflower market (Vorley et al., 2015). This is reflected by the fact that 54.29 % of the sunflower transactions in the seasons considered were done with Mukwano agents. Therefore, in the logistic regression performed with data from sunflower transactions, a different dependent variable will be used than for the soya bean logit. The dependent variable focused on will be a binary variable taking the value of 1 if the transaction was made with a Mukwano agent and 0 if the transaction was made with another buyer. First, reasons given for selling to a Mukwano agent will be displayed, followed by a discussion of the results.

### 6.3.1 Individual reasons given for selling sunflower to Mukwano agent

In the case of sunflower marketing, the most important reasons, given by farmers, to sell to Mukwano agents are direct payment and having received inputs from the agent (see Figure 11). Choosing a trader as marketing channel was supported by location or direct payment as arguments, similar to the reasons to sell soya bean to a trader. Cross-checked with the relevant data, it does not show that transactions with a Mukwano agent or another buyer significantly differ in terms of time of payment. This can be partly explained by the fact that a large part of the transactions to another buyer were with a trader (see Table 15). Cross-checking the 'received inputs from buyer' reason, a chi square test shows that farmers that have sold to a Mukwano agent have also more frequently bought seeds from Mukwano than farmers that have sold to another buyer (see annex A11).

**Figure 11** Sunflower; reasons to sell to Mukwano agent vs. reasons to sell to other buyer



### 6.3.2 Model results

Table 21 displays the coefficient estimates and odds ratios of the logit model demonstrating the dichotomous choice between selling sunflower to a Mukwano agent or to another buyer.

The hypothesis that the discount rate negatively correlates with the probability to sell to a Mukwano agents needs to be fully rejected. The discount rate is significantly positively correlated with the probability of success, suggesting that Mukwano does offer efficiency in payments as they strive. Due to measurement errors, this coefficient however needs to be taken with a grain of salt.

The risk aversion factor is ambiguous and unstable over the different models, implying that risk aversion is not a decisive factor in the choice between selling to a Mukwano agent or another buyer. This can indicate that risks associated with the two buyer groups may be different in nature but similar in magnitude. Moreover, as familiarity with the Mukwano agent is present in 89.47% of the sunflower transactions (see Table 20), this has a downward pressure on the risk aversion factor, as familiarity reduces the perceived risks (Williamson, 1975 in Lassen, 2013). Another explanation is that having bought hybrid seeds from Mukwano already captures the major determinant of risk reduction by Mukwano. By doing a t-test on mean risk aversion factor by group, it is proven that farmers that have bought hybrid seeds from Mukwano are on average more risk averse than other farmers (see Table 19). This is in line with findings from Abebe, Bijman, Kemp, Omta, & Tsegaye (2013) who find that input market uncertainty regarding quality and supply of seeds is more important than output market uncertainty for Ethiopian potato farmers to participate in an input-receiving and contract-like relation with a buyer. Performing the logistic regression without the *Bought seeds from Mukwano* dummy results in a slightly more positive but still not significant risk aversion coefficient, thus the positive correlation between buying hybrid seeds from Mukwano and the risk aversion level is not totally explaining the insignificance. Ambiguity of the risk aversion factor is not rejected for sunflower transactions.

**Table 19** Risk aversion factor compared between farmers that bought hybrid seeds from Mukwano and farmers that did not

	Bought sunflower seeds from Mukwano	Did not buy sunflower seeds from Mukwano	Equality test <sup>8</sup>
N	52	18	
<i>Risk aversion factor</i>	0.235	-0.463	-2.910***

The trust in trader factor remains positive throughout the models represented in Table 21, but is not significantly different from zero until the three group variables are introduced. This sign is different than expected. Perhaps having more trust in traders displays a more business-oriented attitude of a farmer which makes him a more likely candidate to sell to a Mukwano agent, a representative of a big company and to buy its hybrid seeds. As there is no measure of trust in Mukwano agents available, we

<sup>8</sup> T value of t-test



can only investigate the importance of familiarity by comparing frequencies of positive answers to the question whether a farmer has regularly traded with the buyer in question between the two groups of buyers (see Table 20). This shows a significantly higher frequency of reporting regular trade with a Mukwano agent than with another buyer. A positive prior trading interaction with a Mukwano agent is possibly one of the factors influencing the decision to sell to that Mukwano agent for a sequential season.

**Table 20** Regularly traded with sunflower buyer compared between Mukwano agents and other buyers

	Sold to Mukwano agent	Sold to other buyer	Equality test <sup>9</sup>
N	38	27	
<i>Regularly traded with buyer (in %)</i>	89.47	62.96	6.565**

\*\*  $p < 0.05$

As expected, having bought seeds from a Mukwano agent positively adds to the probability of selling the sunflower output to a Mukwano agent as well. The significance of this positive coefficient, especially in the first model, supports the conviction that a processor can bind farmers to him by supplying them with inputs (Vorley et al., 2015). On an 85 % confidence level, in model 1 being a trader is positively associated with the probability of selling to Mukwano, underpinning the fact that traders are important suppliers for Mukwano.

Controlling for several household and individual characteristics and season results in the inability to reject the null hypothesis that all of the coefficients are equal to zero at a 90% confidence level (see Table 21: Prob> $\chi^2$  model 2). The only control variable that is slightly significant is the size of the household having a positive effect. Adding the controls does not change the coefficients of interest much, suggesting that whatever effects these variables are controlling for, it has little to do with the relationship between the significant variables of interest and selling to a Mukwano agent. The parameter estimate of being a trader turns insignificant, again due to introduction of the wealth index.

As the places where Mukwano agents close transactions are more variable, adding distance and transport variables does not add much explanatory value to the model and do not give significant coefficients. These controls do not change the coefficients of the variables of interest.

<sup>9</sup> Pearson's chi-square is given for categorical variables, level of significance is based on Fischer's exact test as the sample is small.

Considering the results for model 4, a control for the Log of quantity traded results in the expected negative correlation between this variable and the dependent variable, because of the quality requirements of the output by the company. However, the coefficient is not significant. The coefficients of the key variables stay roughly the same.

Also for sunflower, the number of observations drop when introducing a FG fixed effect and coefficient estimates become larger. Both the most basic and the model with standard controls are estimated, after which adding distance and transport variables resulted in non-concavity of the model. The change that catches the eye, is that the discount rate loses significance in the model with controls and a farmer group fixed effect (see annex A12). This puts some question marks to the robustness of the estimated effect of the discount rate on the variable of interest. To put a lighter group control and to explore some possible group characteristics influencing the decision to sell to a Mukwano agent, three relevant group variables are appended in model 5. Having at least one trader in the group is significantly negatively correlated with the probability of selling sunflower to a Mukwano agent. This gives signs of a higher competition between traders and Mukwano agents on the sunflower market. However, having at least one Mukwano agent in the group is, to a lesser and insignificant extent, also negatively associated with selling to a Mukwano agent, which is counterintuitive but not too problematic because of its insignificance. Another change in coefficients by adjusting the model for group variables is the positive correlation with the trust in trader factor that becomes significant. However, the coefficient of this factor is not robust, as the coefficient turns negative when the stronger FG fixed effect is introduced.

Another check for robustness can be done by comparing the coefficient estimates of the logit with the estimates of a probit. All signs are the same over all the models, thus, the interpretation is not dependent on the type of probability model is used.

Concluding, for farmers to sell to a Mukwano agent, having received seeds from this agent is a factor that weighs heavily in the decision. Also the farmers that have a higher time preference, measured by the discount rate, are more inclined to sell to a Mukwano agent, supporting the success of the strategy of efficient payment by Mukwano. However, this correlation should be taken with a grain of salt because of the measurement errors related to the discount rate and the fact that it loses significance when FG fixed effects are considered. Transport and distance constraints are not as important in this decision as for selling soya bean to a trader. This is underpinned by the observation that selling at the farm gate is not significantly more frequently experienced with Mukwano agents than with other buyers (see annex A11). Regarding group variables, the presence of at least one trader in the group negatively influences the probability of selling to a Mukwano agent.

**Table 21** Logit results for Sold to Mukwano agent (=1) of sunflower transactions

	Coeff. (1)	OR (1)	Coeff. (2)	OR (2)	Coeff. (3)	OR (3)	Coeff. (4)	OR (4)	Coeff. (5)	OR (5)
<i>Risk aversion factor</i>	0.080 (0.313)	1.084	-0.116 (0.383)	0.891	-0.002 (0.460)	0.998	-0.007 (0.475)	0.993	-0.049 (0.508)	0.952
<i>Trust in trader factor</i>	0.374 (0.317)	1.453	0.391 (0.372)	1.478	0.396 (0.386)	1.486	0.550 (0.412)	1.734	0.815* (0.466)	2.260
<i>Discount rate</i>	1.209** (0.601)	3.350	1.660** (0.726)	5.258	1.647** (0.738)	5.193	1.460* (0.751)	4.307	1.139+ (0.785)	3.123
<i>Bought seeds from Mukwano agent</i>	1.198* (0.639)	3.313	1.198+ (0.737)	3.313	1.116+ (0.764)	3.053	1.245+ (0.774)	3.472	1.341+ (0.869)	3.822
<i>Respondent is trader</i>	1.140+ (0.764)	3.126	0.776 (0.904)	2.174	0.822 (0.940)	2.276	1.232 (1.004)	3.428	1.312 (1.049)	3.712
<i>Season 2014</i>			-0.186 (0.890)	0.830	-0.312 (1.039)	0.732	0.450 (1.228)	1.568	0.618 (1.296)	1.855
<i>Respondent is male</i>			-0.349 (0.957)	0.706	-0.251 (1.014)	0.778	-0.363 (1.052)	0.695	0.529 (1.192)	1.698
<i>Respondent is household head</i>			-0.443 (0.975)	0.642	-0.661 (1.036)	0.516	-0.336 (1.094)	0.714	-0.880 (1.175)	0.415
<i>Age of respondent</i>			0.002 (0.028)	1.002	0.012 (0.031)	1.012	0.005 (0.032)	1.005	0.001 (0.033)	1.001
<i>Household size</i>			0.326+ (0.214)	1.386	0.336+ (0.217)	1.400	0.295 (0.229)	1.344	0.263 (0.254)	1.301
<i>Amount of children in household that go to school</i>			-0.104 (0.245)	0.901	-0.156 (0.246)	0.856	-0.109 (0.257)	0.897	-0.061 (0.286)	0.941
<i>Wealth index</i>			-0.047 (0.563)	0.954	-0.145 (0.632)	0.865	0.044 (0.663)	1.045	0.132 (0.720)	1.141
<i>Household has other income source</i>			1.027 (0.742)	2.793	0.990 (0.773)	2.691	1.182+ (0.813)	3.262	1.496* (0.881)	4.464

Table continues on the next page

Table 21 continued

	Coeff. (1)	OR (1)	Coeff. (2)	OR (2)	Coeff. (3)	OR (3)	Coeff. (4)	OR (4)	Coeff. (5)	OR (5)
<i>Log distance to market in minutes</i>					-0.455 (0.491)	0.635	-0.337 (0.495)	0.714	-0.315 (0.519)	0.730
<i>Household has at least 1 bicycle</i>					0.651 (1.420)	1.917	0.483 (1.398)	1.621	-0.107 (1.456)	0.898
<i>Household has motorcycle</i>					-0.578 (1.143)	0.561	-0.087 (1.204)	0.917	0.320 (1.307)	1.376
<i>Log quantity sold in transaction</i>							-0.518 (0.433)	0.596	-0.585 (0.471)	0.557
<i>At least 1 trader in group</i>									-1.610* (0.886)	0.200
<i>At least 1 Mukwano agent in group</i>									-1.073 (0.833)	0.342
<i>Farmer group bulked sunflower in respective season</i>									0.984 (1.268)	2.674
<i>Intercept</i>	-1.479** (0.636)	0.228**	-3.594* (1.877)	0.027*	-2.455 (3.172)	0.086	-0.206 (3.690)	0.814	1.712 (4.180)	5.540
<i>N</i>	70		70		69		69		69	
<i>LR <math>\chi^2</math></i>	11.594		19.391		20.087		21.599		26.033	
<i>Prob &gt; <math>\chi^2</math></i>	0.041		0.111		0.216		0.201		0.165	
<i>Pseudo R<sup>2</sup></i>	0.120		0.201		0.211		0.227		0.273	

\* p<0.15 \* p<0.10 \*\* p<0.05 \*\*\* p<0.01. Standard errors in parentheses. Number of observations decrease because of missing value in variables added

## 6.4 Comparison of sunflower and soya bean marketing channels

In this section, soya bean and sunflower marketing channels will be compared, considering the market environment, the popularity and the factors influencing the choice of marketing channel for both crops.

Sunflower and soya bean are both cash crops that can be cultivated twice a year. Soya bean transactions were largely dominated by traders, while sunflower output was more often sold to Mukwano agents. This reflects the difference in market environment between the two crops. Trade in soya bean is more open and less tied to a specific variety, causing it to be a more competitive market, in which traders have an advantage of being efficient buyers. Mukwano has a more price setting role in the sunflower market and binds many farmers to them via providing hybrid seeds and forming farmer groups coordinated by site coordinators. Because of the prominent presence of sunflower buying Mukwano agents, also in the villages, less farmers are inclined to sell to traders.

Soya bean is a more popular crop than sunflower to grow among the farmers in this sample. This is probably because of the conviction of sunflower being very demanding for the soil and the more common practice of *buying* seeds to cultivate this crop. Together with the dominance of Mukwano's hybrid sunflower seeds that cannot be re-used, this makes sunflower a more costly crop to grow. 94.29% of all farmers who were involved in sunflower marketing were also involved in soya bean marketing, implying that crop rotation promoted by Mukwano is followed up. For the farmers that involved in soya bean marketing, 64.71% were also involved in sunflower marketing. While, if a farmer sold soya bean to a Mukwano agent, it was generally the case<sup>10</sup> that he also sold his sunflower output to a Mukwano agent, this does not work the other way around: if a farmer has sold his sunflower output to a Mukwano agent, it is not evident that he also sells his soya bean output to the same agent<sup>11</sup>. Thus, certainly not all Mukwano agents, to whom sunflower was sold, were buying soya bean or were successful in convincing the farmer to also sell his soya bean produce to him.

The main difference in factors that turn out to be important in the marketing decision of soya bean and sunflower is that for selling sunflower to a Mukwano agent distance to the market plays a way less prominent role than in the case of soya bean transactions with traders. For sunflower, the seed provider is more important in determining the marketing channel. In the case of soya bean, it was only reported twice that a farmer had actually bought seeds for his soya bean cultivation. However, consistent with the shown importance of input supply by Mukwano to determine the chosen marketing channel, the farmer that bought soya bean seeds from a Mukwano agent, also sold the soya

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<sup>10</sup> 85.71% of all farmers selling soya bean to a Mukwano agent also sold their sunflower output to that agent.

<sup>11</sup> 15.79% of all farmers selling sunflower to a Mukwano agent also sold their soya bean to that agent.

to Mukwano. Moreover, risk aversion was a more determining factor in choosing to sell soya bean to a trader than in choosing to sell sunflower to a Mukwano agent, likely because for the latter the influence of risk aversion is already captured in having bought seeds from the agent, also decreasing the perceived risks via input security and familiarity with the buyer. Time preference surprisingly played a more important and positive role in choosing Mukwano agents for sunflower transactions. Unlike previous empirical data suggested, Mukwano agents are efficient in payment of this sample of farmers and this is a stimulant to sell to them.

Additionally, it should be kept in mind that the estimated coefficients are not the ultimate coefficients, because of the small sample size and having an unbalanced sample of the dependent variable in the case of soya bean (85/17). While adding more control variables to the model, the model becomes unstable, due to too few cases with respect to model complexity.

# 7 Conclusion and discussion

Popular discourse among non-governmental organizations and researchers is that collective marketing is an effective mechanism to improve smallholders' access to the market through lowering of transaction costs and economies of scale (see for example Hazell et al., 2007, Kaganzi et al., 2009, Robbins et al., 2004). Farmer groups and cluster cooperatives are seen as important actors to bring this activity to a success. Despite aid and subsidy flows, other kinds of support and training directed towards cooperatives to stimulate collective marketing (Francesconi & Wouterse, 2015), this activity has not yet been massively adopted by farmer groups under cooperatives because of challenges remaining (Barham & Chitemi, 2009). Criticisms have been raised concerning the high expectations of farmer group capacities to succeed in collective marketing and stressing the advantages of existing marketing channels like traders.

In this thesis an effort has been made to discover the factors influencing the incidence of bulking by farmer groups under a cooperative that has collective marketing as one of its core activities. Furthermore, factors correlating with the choice of marketing channel by individual farmer group members were explored, concentrating on risk aversion, trust and time preference. As case study are chosen the farmer groups active in oilseed production under Acwec Omio, a cooperative in Oyam, Northern Uganda. Ugandan oilseeds are medium value cash crops with no strong market premium for quality and it is possible to store them to await higher market prices between harvests. The farmer group was very rarely the marketing channel chosen by members, shifting the focus of the econometric analysis of transactions with traders and Mukwano agents.

First, conclusions will be drawn on the factors explaining the incidence of bulking by farmer groups. As one of the reasons for bulking not to work out is the hesitancy of individual members to contribute but choose to individually sell to other buyers, this leads us to the conclusion on determinants of individual choice of marketing channel. Sunflower and soya bean channels of marketing will be considered consecutively.

## 7.1 Bulking by farmer groups

Collectively marketing oilseeds is perceived the most natural and effortless if the oilseeds were jointly cultivated from seeds that were given to or bought by the group. This cultivation took place on land from one of the members or on land that was collectively rented. Thus, this is not strictly bringing individually cultivated output together to increase bargaining power but is an overall collective activity. This appears to be met with less opposition, as it does not solely puts a risk on one's individual income

source, but is seen as an income source that is extra. However, this joint cultivation is not continuously performed as an activity, mainly when the season is good or when seeds are given for free.

VSLA is considered the most important activity of the farmer groups in the sample of farmer groups. 80% of the groups is involved in this activity. The loans attained from this system are mainly used for payments related to household consumption or school fees and not for production investments or covering expenditures while waiting for revenue from bulked oilseeds. After harvest, there often is pressure to repay loans in cash, clashing with the activity of bulking which implies waiting for cash a longer period after harvesting. Especially during the Christmas season, which often converges with second season harvests, VSLA groups want members to pay back their loans quickly, resulting in a preference for less time consuming individual marketing.

This brings us to the conviction many chairpersons shared; that late payment is one of the main challenges concerning the collective marketing efforts of the groups. This is in line with other studies on collective marketing (Develtere et al., 2008; Mujawamariya et al., 2013; Verhofstadt & Maertens, 2014; Vorley et al., 2015). The delay can be caused by differences in harvesting times of members and the time the produce of members stays in the store until a suitable buyer is found. Also delay in payment from the cooperative side can be causing the problem and this can even induce the group to stop the activity as it was primary advised by that same cooperative to do. Because of this delay in payment, the weather pattern can also influence the incidence of bulking. This can be illustrated by the fact that less groups bulked in the first season of 2015 because of late rains postponing harvests, resulting in even more direct cash needs of members.

Corresponding with statements of chairpersons, we find some objective evidence that the average price offered for the bulked produce does not significantly differ from the average price offered by other buyers at the farm gate. As many farmers report to fear transport costs that can also be incurred when bulking locally, this equality of prices is a great discouragement to engage in bulking. The lack of price difference between collectively and individually marketed produce challenges other studies that find that cooperatives successfully realize on average higher prices for their members than individually marketing farmers (Bernard et al., 2015; Shiferaw, Obare, & Muricho, 2008; Vargas-Hill, Bernard, & Dewina, 2008; Wollni & Zeller, 2006). Most farmer groups did not bulk the produce with the bigger cooperative but sold the produce independently. Therefore, a possible explanation of the price equality given for bulked produce and individually marketed produce is that not enough output was gathered to realize a good bargaining position in order to receive a higher price.

Through being able to share transport costs and demand higher prices or better contracts collectively, it is said that collective marketing can contribute to better prices and market conditions for farmers



(Carley, 1969; Robbins et al., 2004). Sharing transport costs however, first of all needs members that are willing to still pay some transport costs. Furthermore, the success of demanding higher prices depends on the relative patience of the farmer group compared to the buyer, which is often lacking.

As farmer groups are member-driven, reasons for groups to stop bulking as a whole coincide with individual reasons not to bulk with the group. Broken promises of expected buyers discourage bulking activities. Anecdotal stories of bulking failures by other groups can also be a reason to not start bulking in the first place. Furthermore, the data suggest that the average trust the members of a group have in the cluster cooperative is lower for groups that are not currently bulking. This supports other studies stressing that the presence of trust in a group is very important for the success of collective marketing (Bernard et al., 2015; Olapade et al., 2014; Shiferaw et al., 2011). It differs in the stressing that lack of trust in an engaged second-level organization (the cooperative) discourages a whole group to bulk, not only individuals.

Despite the need for more focused research into the governance between the cooperative and the farmer groups, my results suggest that the relation between the groups and the cooperative is not stable and prone to misunderstandings between the two actors. Misunderstandings on services and goods that were expected in exchange of membership, lower the trust in the cooperative and the willingness to cooperate. Also, the sense of ownership and control is low among farmer group members. This results in the cooperative being more seen as just another possible channel to sell produce to, rather than the only and best channel because of the benefits it brings back to members. The groups that sold to the cooperative either had a chairperson that was friends with the board members, received inputs and trainings or did at that point still believe in the credo that 'when you sell to the cooperative, the benefits come back to the members'. From the farmers' point of view, this marketing decision makes sense when all (dis)advantages are taken into account. However, on a longer term this can be a problem for the cooperative by reducing secured supply flows and undermining the validity of the cooperative as an organisation allegedly owned by its members (Mujawamariya et al., 2013). This legitimacy is further undermined by the practice of the cooperative buying from non-members and traders. Although the cooperative all farmer groups were member of, is not representative for other oilseed cooperatives in the Northern Ugandan region, this example can warn for lack of member involvement and ownership and the collapse of collective marketing it could cause.

A shortcoming of this research is that the side of the board of the cooperative is mainly not taken into account, leaving out their side of the story. Some statements in this thesis could be nuanced by the perspective of the board and their survival strategies. However, the long-term sustainability of a cooperative is built on the trust and support of its members.

## 7.2 Determinants of individual choice of marketing channel

Soya bean grains were mostly sold to traders while sunflower output was mostly sold to Mukwano agents. This reflects the difference in market environment between the two crops. The soya bean market knows more buyer competition, while the sunflower market is still dominated by Mukwano, a big processing company. Mukwano remains to have a price setting role in the sunflower market and binds many farmers to them via providing hybrid seeds and forming farmer groups coordinated by site coordinators. Thus, for sunflower marketing, because of the prominent presence of sunflower buying Mukwano agents also in the villages, less farmers are inclined to sell to traders.

### 7.2.1 Hypothesis 1.1: When a respondent has a higher level of trust in traders, it is expected that he will be more likely to also sell soya bean to a trader

Trust in traders does show the expected positive sign but does not play a significant role in the decision to sell to a trader. This is likely due to the type of trust that was measured. Trust in the motives of traders in general was asked and is influenced by prejudice on traders seeking to exploit the farmer, also narrated by cooperatives and local NGOs. Likely more important in the decision to sell to a trader is the familiarity and network shared with that trader, as pointed out by several authors before me (Bromley & Chavas, 1989; Fafchamps, 2001; Sorensen, 1999). Testing a proxy for this familiarity gives that this familiarity is more important for transactions to other buyers than for transactions with a trader. Thus, the hypothesis that trust in traders increases the probability to sell soya bean to a trader is rejected.

### 7.2.2 Hypothesis 2.1: The expected correlation between the level of risk aversion of a respondent and the probability the respondent will sell soya bean to a trader is positive.

This hypothesis can be accepted. For soya bean transactions, the level of risk aversion a farmer has, correlates positively with the probability of selling to a trader. That selling to a trader is business as usual in the soya bean sector can be part of the explanation. This result is in line with the theory that traders successfully mitigate some risks of storage and price by quickly purchasing produce after harvest and by offering cash as proposed in Vorley et al. (2015). This effect, however, loses importance when controlled for variables measuring distance to the market and transport possibilities. A possible explanation is given by Nguyen & Leung (2009); being closer located to the market a farmer is more subjected to business uncertainties, making him less risk averse.

### 7.2.3 Hypothesis 3.1: The expected correlation between the discount rate and the probability to sell soya bean to a trader is positive.

Though the sign of the coefficient is positive as expected, the hypothesis needs to be rejected, as the relation is not significant. This is surprising due to the emphasis many authors and also farmers

themselves lay on the advantage of cash payment offered by traders. Cash payment also mitigates risk, which gives risk aversion more explanatory power for the choice of marketing channel. However, the discount rate does contain measurement errors, so if it would have been measured in a less erroneous way it might have shown an effect.

#### 7.2.4 Other important determinants of selling soya bean to a trader

The most consistent significant correlation throughout all models is the distance to the market correlating positively with the probability of selling to a trader. This implies that farmers that are located more remotely are more likely to sell their soya bean to a trader. In line with this result, the location of the transaction is more often the farm gate when it involves a trader than when it involves another buyer. Furthermore, this result is supported by other studies linking remoteness to the incidence of farm gate sales with buyers often being itinerant traders (Enzama, 2013; Fafchamps & Hill, 2005).

Before controlling for wealth, a farmer that was a trader himself showed less likeliness to sell to a trader, supporting the expectation that traders choose buyers, bigger than fellow traders, to sell to.

All group variables included in the final model had significant coefficients. Having a trader in the group correlates negatively with the probability to sell to a trader, while having a Mukwano agent in the group correlates positively, which is counterintuitive. This gives rise to suspect that when farmers are also trader or Mukwano agent, they do not necessarily seek their customers within their own farmer group. This could be to prevent mixing personal with business relationships, which can be illustrated by the quote of a Ugandan maize trader: "It seems better to make friends (i.e. business friends/partners) with strangers because they are less mindful about your gains and less likely to develop jealousy" (Sorensen, 1999, p. 27). Another explanation is that not all Mukwano agents buy soya bean, as it is voluntary and less linked to Mukwano (no commission nor transport compensation received) or linked to this, that the Mukwano agents in the group are viewed as soya bean traders instead of agents.

#### 7.2.5 Hypothesis 1.2: The trust in trader factor expectantly decreases the probability to sell sunflower to a Mukwano agent

This hypothesis needs to be rejected. The trust in trader factor shows an insignificant but positive correlation with the probability to sell to a Mukwano agent, which is opposite of what was expected. One reason for this differing correlation is that having more trust in traders displays a more business-oriented attitude of a farmer. This makes him a more likely candidate to sell to a Mukwano agent, a representative of a big company and to also buy its hybrid seeds. Comparing a proxy for familiarity with buyer between farmers that sold sunflower to Mukwano and farmers that sold to other buyers,

shows that for a significantly higher percentage of the farmers selling to a Mukwano agent, familiarity is present (89.47% vs 62.96%). Thus, a positive prior trading interaction with a Mukwano agent is a likely factor influencing the decision to sell to that Mukwano agent for a sequential season.

#### 7.2.6 Hypothesis 2.2: The expected correlation between the risk aversion factor and the probability of selling sunflower to a Mukwano agent is ambiguous

The risk aversion factor plays an insignificant role in the decision to sell to a Mukwano agent. After controlling for individual, household characteristics and season, the coefficient is negative. Price fluctuations caused by Mukwano versus higher prices and a secured market if one has bought Mukwano seeds does not provide a clear expectation for the influence of risk aversion on the probability to sell to Mukwano. The results suggest that risk aversion per se might not play that much of a role in sunflower production compared to soya bean, as more risks are already taken by growing sunflower in the first place. It is a costly and demanding crop in the eyes of many farmers (Vorley et al., 2015).

Moreover, the high presence of familiarity between the farmer and the Mukwano agent reduces the perceived risks (Williamson, 1975 in Lassen, 2013). Another explanation is that having bought hybrid seeds from Mukwano already captures the major determinant of risk reduction by Mukwano. By doing a t-test on mean risk aversion factor by group, it is proven that farmers who have bought hybrid seeds from Mukwano are on average more risk averse than other farmers involved in sunflower marketing. This is in line with findings from Abebe, Bijman, Kemp, Omta, & Tsegaye (2013) who find that input market uncertainty regarding quality and supply of seeds is more important than output market uncertainty for farmers to participate in a contract-like relation with a buyer.

#### 7.2.7 Hypothesis 3.2: The expected correlation between the discount rate and the probability of selling sunflower to a Mukwano agent is negative.

Surprisingly, in the sunflower context, the discount rate does have a significant positive impact on the probability to sell to a Mukwano agent, while Mukwano agents are less celebrated for their direct payments. Mukwano does strive for efficiency in payments and seems to have convinced farmers they are successful in this. This correlation should still be taken with a grain of salt because of the measurement errors related to the discount rate.

#### 7.2.8 Other important determinants for selling sunflower to a Mukwano agent

The supply of hybrid seeds by Mukwano agents is very important in determining the marketing channel in the case of sunflower transactions. The binary variable indicating whether or not the respondent had bought seeds from Mukwano correlates significantly positively with the probability of selling sunflower to a Mukwano agent. This exemplifies that providing inputs can help in creating a reciprocal relationship between a farmer and an agent (Vorley et al., 2015).

Regarding group variables, the presence of at least one trader in the group negatively influences the probability of selling to a Mukwano agent significantly, which does confirm the expectation that a farmer prefers to sell sunflower to a familiar buyer. It is claimed that sunflower farmers are more business-minded because of the investment that is needed to grow the crop (Vorley et al., 2015). Therefore, the familiarity with a trader in the case of sunflower might be more based on a business relation than a personal relation giving more ground to sell to the trader in the group and not to a Mukwano agent.

### 7.3 Main lessons

Before encouraging groups to start bringing their individual produce together, it is important to explore possibly more favoured and more sustainable combinations of collective marketing with other activities such as joint cultivation. The income generated from this joint cultivation can be viewed as extra and therefore be less subject to impatience in waiting for payment. By selling or giving seeds to the chairpersons of group or starting demonstration plots for members to jointly work on, the cooperative already anticipates this preference of the groups. It is up to the chairperson and the group then to decide to jointly cultivate the bought seeds or not. Also the distribution of the demonstration plot's work and harvest needs to be democratically decided on.

For bringing together members' produce to become less time consuming and to reach economies of scale and bargaining power through having control over a bigger part of the oilseed supply, the crop cultivation and harvesting periods of members of the same group need to be more simultaneously planned. This needs to be combined with trust in other members and the group to really commit to this collective marketing activity. Only then, simultaneous harvesting can have positive consequences. Contradictory, to reach higher prices for individually marketed produce, harvesting times need to vary to prevent excess of supply dropping the price.

Secondly, if the cooperative wants to have more secured supply from its members, working capital needs to be better mobilized on the side of the cooperative, via contracts with buyers or loans for the cooperative to be able to offer the cash payment farmers desperately want. Also more transparency and trust is needed between the cooperative and its farmer groups. Important for bulking to be a rational choice is that there is a significant price difference between the bulked produce and individual marketed produce. If this for any reason cannot be realized, it might be better to accept that existing individual marketing channels are there for a reason and they do not per se exploit farmers but also cover costs (search and transportation costs) that otherwise need to be covered by the farmer group or cooperative. In one way traders, agents and other buyers can be seen as enablers of farmers to become the best in their profession, without 'wasting' time marketing their produce. Collective

marketing can work and realize higher prices for members (Bernard et al., 2015; Shiferaw et al., 2008; Vargas-Hill et al., 2008; Wollni & Zeller, 2006), but if this is not realized, individual marketing channels need not to be neglected or ignored but rather worked together with.

As shown in this thesis, risk averse farmers tend to sell soya bean to traders and impatient farmers sunflower to Mukwano agents. For collective marketing to become the chosen channel for these farmers, storage and price risks need to be mitigated and direct payment needs to be strived for.

Due to offering cash payment and buying at the farm gate, reducing risks of storage and price, the trader channel is resilient and will stay, however much cooperatives and some NGOs try to eliminate its importance. Related to this topic, an interesting paper has already been written by Sitko & Jayne (2014) called 'Exploitative Briefcase Businessmen, Parasites, and Other Myths and Legends: Assembly Traders and the Performance of Maize Markets in Eastern and Southern Africa'. In this paper, they conclude that direct state marketing interventions aiming to 'improve farmers' access to markets' undermine the importance of the assembly trading sector and are counterproductive. Cooperatives can learn from traders and traders can learn from cooperatives, if only they saw across their prejudices about each other.

Mukwano agents bind farmers to them by supplying hybrid sunflower seeds and promising soap upon the sale of the grains. This does give farmers a higher price but, as hybrid seeds cannot be re-used, it forces them to buy seeds every season they want to plant sunflower. However, Mukwano agents are also successful in satisfying impatient farmers, who need quick money for their other businesses or for household-related expenditures.

## 7.4 Limitations and further research

This thesis does not close the debate on collective marketing as a tool for market access. Neither can it say that one buyer is better than the other buyer. In this thesis, the opinion of chairpersons of farmer groups and its members about collective marketing has come forward and have been complemented by more objective measures of transaction details, household and individual characteristics, trust, time preferences and risk attitudes.

Time preference and risk attitude could have been measured differently. The time preference measure would have been less intertwined with risk aversion and trust in traders if a pure gift approach in the reward-time pairs would have been followed. Risk attitude might have been measured better using vignettes of persons performing either risk averse or risk loving activities. Creating a story and then asking how the respondent relates to this story might have made the answer less sensitive to the convincing tone of the statement.

The small sample size is an important shortcoming of the study. The risk of type II errors is big, which means that the null hypothesis of some coefficients may have failed to be rejected, while they should have been rejected. However, observations during field visits and qualitative interviews have increased the possibility to understand the research area and to draw a more complete picture.

Although it was interesting to explore the trust farmers have in traders in general, more thorough research could be done on the trust and relationships farmers have with traders they regularly trade with. Do they share the same kinship and family, are they related through friendship or only through business or both? Fafchamps (2001) finds that buying and selling to family members is rare among traders. More research is needed on the relationship between traders and farmers to come to more effective and inclusive interventions to improve farm household income.

As the title of this thesis illustrates, consumption and marketing decisions are largely intertwined for farmers with their main income source being crop revenue. Timing of loan take outs and repayments, school fees payment deadlines and price fluctuations are suggested to analyze simultaneously in further research, as these cash needs are the reason farmers cannot wait for their output to be collectively marketed.

Further research is needed to be able to look more into the factors inducing individual farmer group members to sell via the farmer group or to side-sell. For this type of research it is suggested to first make a list of farmer groups that certainly have collective marketing as one of their activities. As differences in group characteristics are certainly interesting and important in the decision of members to side sell, it will be worthwhile to use stratified sampling, including groups with different amounts of traders as member, levels of external involvement and location.

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# Annex

## A1 Semi-structured interview with chairperson format

Wageningen University

Collective marketing

Interview with chairperson of farmer group

Introduction

Hello. First, we would like to thank you that you want to participate in this research. Your participation is very useful for us. I am Patricia Atim and I am conducting this research in cooperation with Djuna Buizer. She is a master student at a university in the Netherlands, the Wageningen University, department of Development Economics. She is here to conduct research about oilseed farmer groups under the Acwec Omio cooperative. In the next hour and a half, I will pose you some questions. The questions are about your farmer group (sub group of Acwec Omio) and its collective oilseed marketing practices. Your participation is completely voluntary, and you do not need to answer any questions you do not wish to answer. All information given by you will be treated completely confidential. These questions are for research purposes only, and answers will NOT be reported back to Acwec Omio or to the farmer group members. Your participation in answering these questions is very much appreciated. Before we begin, do you have any questions for me?

Note: Could you help me distinguish between the Acwec Omio cooperative and farmer group services/activities each time to get a clear view of the responsibilities?

*For researcher: write everything down what is being said also when not a direct answer to a question; this is needed for proper understanding.*

NAME OF FARMER GROUP ON FG LIST: ----- CODE OF FARMER GROUP ON FG LIST -----

SAMPLE INFORMATION				<i>Can be filled in after interview</i>	
1.	District		7.	In which language was the survey mainly/completely performed?	
2.	Subcounty		8.	Other language used	
3.	Parish		9.	Time	
4.	Village		10.	Date	
5.	Name of chairperson (lead farmer)		11.	Other references (meeting place/main road)	
6.	Telephone number of chairperson				

CR01	Is the respondent a man (=1) or a woman (=0) observe	
CR02	What is your age ?	
CR03	What is your level of education? See CODE CR03	
CR04	What district are you originally from ? See CODE CR04	
CR05	Do you exercise an official responsibility in the village or somewhere else (ex. : village chief, religious chief, church, soldier, etc.)? [1=Yes, 2= No]	
BACKGROUND OF FARMER GROUP		
BG01	In what year has this farmer group been set up? (not per se for direct farming/marketing purposes, can be as VSLA, theatre group etc.)	
BG02	What was the main reason for establishing this group? See CODE BG02	
BG03	On whose initiative was the FG established ? See CODE BG03	
BG04	Did the FG receive any external help for its establishment (also credit & extension services)?	
BG05	If yes : From whom ? See CODE BG05	
BG06	If yes : Of which type ? See CODE BG06	
BG08	How many years has your farmer group been member of Acwec Omio?	
BG09	What was the main reason for joining Acwec Omio ? See CODE BG09	
BG10	Since when have you been the chairperson of this farmer group?	
BG11	What other board members do you have (treasurer, secretary)?	
BG12	What committees do you have within the farmer group? (extra roles like coordinator, key keeper?	

BG13	How often do you meet with the treasurer and secretary?				
BG14	How often do you meet with most of the members? (VSLA or other purposes)				
BG15	How many members does your group have ?				
BG16	How many of these members are women ?				
BG17	How many members did your group have at its origin ?				
BG18	From what district are most members originally ?				
BG19	Do you have members that are also :				
BG20	Trader : if yes, how many ?				
BG21	Mukwano agent : if yes, how many ?				
BG22		Entrance fee	Shares	Annual membership fee	
	Individual farmer group				
	How many members have paid this?				
	Acwec Omio Cooperative				
	How many members have paid this?				
BG23	Did you as a chairperson collect the fees ? Yes/no				
BG24	If no, why not, who did? If yes, how ?				
BG25	What is the range of land sizes your members cultivated (in acres) last year?				
BG26	What is the range of acres your farmers individually devoted to oilseeds (sunflower, soya bean, simsim) last year ?	Sunflower	Soya bean	Simsim	
BG27	What is the range of yearly income you estimate for an individual member ?				

BG28	What is the range of ages you have in your farmer group ?									
BG29	What collective activities do you have as a farmer group? (anything : for example VSLA, weeding, ploughing)									
BG30	What are the main benefits you are experiencing as a farmer group?									
BG31	What main challenges are you facing as a farmer group ?									
	BULKING PRACTICES/STORE									
BP01	When did you as a group start bulking oilseeds ? (year)	Sunflower	Soya bean	Simsim						
BP02	Since October 2014 did the farmer group use a store to bulk its oilseed produce ? (not ministore of Acwec Omio) Yes/no									
BP03	What kind of store?	Store owned by farmer group		Rented store			Store voluntarily offered for use by member			
BP04	What volume fits in the store (+measurement unit see code BP04)									
BP05	Since October 2014, for how many months per year have you rented it?									
BP06	For how many UGX/month?									
BP07	Who is keeping the store? ( <i>ask further, is this member also a trader/agent ?</i> ) see code BP07									
BP08	How long can the produce stay in the store before the quality decreases?	Sunflower	Soya bean	Simsim	Sunflower	Soya bean	Simsim	Sunflower	Soya bean	Simsim



BP09	What measures do you take to maintain the quality of the bulked produce?				
BP10	What is the distance from this store to the main store ?				
Over the last 12 months, have you had any of the following problems with your subgroup members?					
		a. 1. Yes 2. No	b. How often? See code BP11-16		
BP11	Bad quality of bulked products				
BP12	Disagreement over measuring system				
BP13	Attempt to renegotiate agreed upon price				
BP14	Delivery after agreed upon date				
BP15	Partial delivery				
BP16	No delivery				
BP17	Since October 2014, have you been victim of theft in your FG store? 1. Yes. 2. No				
BP18	What was the value of the stolen goods or money? UGX/bags/kg specify				
BP19	Were your members involved in the theft? 1. Yes 2.No 3. Not sure/cannot tell				
	Since October 2014 I would like to ask you about your FGs bulking practices.				
BP20	1 Bulk yes=1, no=0	2 Volume (+ measurement unit, see CODE BP04)	3 From how many members did you bulk produce ?	4 What was the price that the individual	5 Did you buy output from non-members/middlemen ?
	6 Sold to, see CODE BP20.6 :				

						farmer member received ?				
		Season 2 2014	Season 1 2015	Season 2 2014	Season 1 2015	Season 2 2014	Season 1 2015	Season 2 2014	Season 1 2015	
Sunflower										
Soya bean										
Simsim										
	7 Did you as a group/your members receive installment? If yes, how much (UGX) ?		8 How long did it take until your members got paid? See CODE 20.8		9 Why did you choose for this channel ? see Code 20.9		10 Who transported the produce from the bulking place ?	11 With what mode of transport was the produce transported ?		12 What was the amount of costs the FG incurred ?transportation
	Season 2 2014	Season 1 2015	Season 2 2014	Season 1 2015	Season 2 2014	Season 1 2015				
Sunflower										
Soya bean										
Simsim										
BP21										
QUALITY OF PRODUCE DELIVERED TO STORE										
QP01	What rules are there in place within your farmer group on quality at the moment of bulking? (not properly dried, mixed with dirt) <i>Be specific</i>									
QP02	What do you do when the quality of delivered produce is not good enough ?									
QP03	What rules are there in place in Acwec Omio on quality and how do they control for this quality? <i>Be specific</i>									

QP04	What do they do if the quality of the delivered produce is not good enough ?	
QP05	Do you have different levels of quality/quantity that you sell to different buyers? (f.e. smaller quantities to traders, bigger quantities to Acwec Omio, better quality to Acwec Omio)  If yes, to whom do you sell these different qualities? For sunflower, simsim and soya separately	

	Sunflower		Soya bean			Simsim	
	In the last 12 months could you tell us about the inputs and services you have accessed <b>as a group</b> and from whom. See CODE services/inputs						
	Credit	Seeds	Fertilizer	Pesticides	Extension services	Bags/sacks	Tarplets
From whom?							
Cash/credit/free							
From whom?							

Cash/credit/free							
From whom?							
Cash/credit/free							
MARKETING CHANNELS OF MEMBERS							
SS01	Do your members sometimes sell to other buyers than Acwec Omio Cooperative?						
SS02	How much percent of their production of the following crops do you estimate your members sold via other channels the last 12 months?						
	Sunflower	Soyabean	Simsim				
SS03	Why do you think your members individually side-sell?						
SS04	Do you think there is a difference between women and men in their selling behaviour? If yes, what kind of difference? <i>ask further if not understood</i>						
SS05	What rules and consequences are there in place in your farmer group on this selling to other channels?						

SS06	What rules and consequences are there in place at Acwec Omio on side-selling by farmers/farmer groups?					
SS07	Did you as a farmer group sell to other buyers than the Acwec Omio cooperative the last 12 months? If yes, why?					
SS08	If yes, what oilseed, to whom, what volume and what price?					
ASSETS OWNED BY THE GROUP						
	1	2	3	4	5	6
	Type (see CODE A1-A3)	Price when bought (UGX)	New/second hand	Capital used to buy asset (loan, grant, group savings)	If a loan or grant: who did you receive it from?	If loan: How did you pay back the loan?
A1						
A2						

A3						
	If land owned/rented					
A4	How many acres					
A5	Where do you use it for as a group?					
TRANSPORT						
T1	If motor cycles owned					
T2	If yes, how many?					
T3	How do you use them?					
T4	If no, how do you transport the produce of farmers to the FG store/main store? (individually, Acwec Omio etc.)					
PERCEPTIONS RELATION WITH ACWEC OMIO						
AO1	How do you view the relation with Acwec Omio (communication, bulking, payment, services, input distribution)?					
AO2	How often are there meetings with all members of Acwec Omio?					
AO3	Are there representatives of your farmer group in the board?					
	UDB LOAN					
UDB1	How many of your members applied for a loan from Acwec Omio last year?					
UDB2	How many members received the loan?					
UDB9	Is everything paid back to Acwec Omio?					

	About the current season (second season 2015):					
EH1	1 How much are you expecting to bulk as a group after harvesting + measurement unit (see CODE BP04):	2 Who are you planning to sell to: see code BP20.6	4 What is the price per kg you are expecting to get?	5 Why this channel? Code BP20.9		
Sunflower						
Soya bean						
Simsim						

## Codes

### CODE CR03

1. No formal schooling
2. Some primary schooling
3. Completed primary
4. Some secondary schooling
5. Completed secondary
6. Above secondary

### CODE CR04 Lango districts or outside

1. Alebtong
2. Amolatar
3. Apac
4. Dokolo
5. Kole
6. Lira
7. Oyam
8. Otuke
9. Outside

### CODE BG02

1. VSLA (providing financial services to members)
2. Better selling possibilities of agricultural production
3. More bargaining power
4. Helping each other with planting/ploughing/harvesting
5. Better access to inputs
6. Access to agricultural tools
7. Better access to external credit
8. More transport possibilities
9. Easier access to agricultural advice/extension services
10. Transform production to get a better price
11. Benefiting from external help
12. Other: specify

### Code BG03

1. Members' initiative
2. VODP
3. UOSPA
4. Acwec Omio
5. District cooperative promotion office
6. NAADS
7. Other government agency
8. The first chairman of the PO
9. Donor agency or NGO; please specify
10. Other
11. Code BG05
12. VODP
13. UOSPA
14. Acwec Omio
15. District cooperative promotion office
16. NAADS
17. Other government agency
18. Donor agency or NGO; please specify
19. Union
20. Private investor



21. Other

CODE BG06

1. Grant (kind/cash)
2. Loan (kind/cash)
3. Guarantee against credit default
4. Infrastructure/tool gift
5. Free access to storage facilities
6. Community mobilization
7. Extension (training on production, storage and post-harvest activities, VSLA)
8. Leadership/group management training
9. Other

Code BG09

1. Economies of scale
2. Making farming a business
3. Need for better management
4. Access to transport
5. Access to collective marketing services
6. Better selling possibilities of agricultural production
7. Better access to inputs
8. Access to agricultural tools
9. Easier access to (external) credit
10. Easier access to agricultural advice (extension services)
11. Transform production to get a better price
12. Benefiting from external help
13. Other: specify

CODE BP04 Measurement units

1. Sunflower bag (50 kg)
2. Sunflower bag (60 kg)
3. Sunflower bag (70 kg)
4. Soya bean bag (100 kg)
5. Soya bean bag (110 kg)
6. Soya bean bag (120 kg)
7. Simsim bag (100 kg)
8. Simsim bag (110)
9. Simsim bag (120 kg)
10. Kg
11. Tons

CODE BP07

1. Member (voluntary)
2. Member (paid)
3. Hired storekeeper
4. Lock and key

CODE BP11-16

1. All members
2. Most members
3. Half of the members
4. Some members
5. No members

CODE BP20.6 :

1. Mukwano agent
2. Nile Agro

3. Mount Meru
4. Equator Seeds Limited
5. Ngetta Tropical Holdings
6. small processing company
7. Acwec Omio
8. Trader/middlemen
9. Other

#### CODE BP20.8

1. Payment is in cash
2. We have to wait a few days to a week for the payment
3. We have to wait more than one week for the payment
4. We have to wait for more than one month for the payment

#### CODE BP20.9

1. The price
2. Direct payment in cash
3. Received inputs (seeds etc.) from buyer
4. Location
5. Relationship with the buyer (family)
6. Receiving services from the buyer
7. Commitment or contract with the buyer
8. The buyer accepts low quality produce
9. Other

#### CODE services/inputs:

1. Mukwano agent
2. Nile Agro
3. Mount Meru
4. Equator Seeds Limited
5. Ngetta Tropical Holdings
6. small processing company
7. Acwec Omio
8. Trader/middlemen
9. VODP
10. OSSUP
11. UOSPA
12. Other

#### CODE A1-A3

1. Weighing scale
2. Moisture meters
3. Spears to pierce bags
4. Bags
5. Processing equipment
6. Bank account
7. Ox cart
8. Oxen
9. Land
10. Bicycle
11. Motor cycle
12. Other

**A2** Survey format individual farmer group member (link to excel)

Year	Month	Day	Event	Location	Notes
1999	1	1	New Year's Day	London, England	First day of the year
1999	1	2	Boxing Day	London, England	Second day of the year
1999	1	3	Monday	London, England	Third day of the year
1999	1	4	Tuesday	London, England	Fourth day of the year
1999	1	5	Wednesday	London, England	Fifth day of the year
1999	1	6	Thursday	London, England	Sixth day of the year
1999	1	7	Friday	London, England	Seventh day of the year
1999	1	8	Saturday	London, England	Eighth day of the year
1999	1	9	Sunday	London, England	Ninth day of the year
1999	1	10	Monday	London, England	Tenth day of the year
1999	1	11	Tuesday	London, England	Eleventh day of the year
1999	1	12	Wednesday	London, England	Twelfth day of the year
1999	1	13	Thursday	London, England	Thirteenth day of the year
1999	1	14	Friday	London, England	Fourteenth day of the year
1999	1	15	Saturday	London, England	Fifteenth day of the year
1999	1	16	Sunday	London, England	Sixteenth day of the year
1999	1	17	Monday	London, England	Seventeenth day of the year
1999	1	18	Tuesday	London, England	Eighteenth day of the year
1999	1	19	Wednesday	London, England	Nineteenth day of the year
1999	1	20	Thursday	London, England	Twentieth day of the year
1999	1	21	Friday	London, England	Twenty-first day of the year
1999	1	22	Saturday	London, England	Twenty-second day of the year
1999	1	23	Sunday	London, England	Twenty-third day of the year
1999	1	24	Monday	London, England	Twenty-fourth day of the year
1999	1	25	Tuesday	London, England	Twenty-fifth day of the year
1999	1	26	Wednesday	London, England	Twenty-sixth day of the year
1999	1	27	Thursday	London, England	Twenty-seventh day of the year
1999	1	28	Friday	London, England	Twenty-eighth day of the year
1999	1	29	Saturday	London, England	Twenty-ninth day of the year
1999	1	30	Sunday	London, England	Thirtieth day of the year
1999	1	31	Monday	London, England	Thirty-first day of the year
1999	2	1	Tuesday	London, England	First day of February
1999	2	2	Wednesday	London, England	Second day of February
1999	2	3	Thursday	London, England	Third day of February
1999	2	4	Friday	London, England	Fourth day of February
1999	2	5	Saturday	London, England	Fifth day of February
1999	2	6	Sunday	London, England	Sixth day of February
1999	2	7	Monday	London, England	Seventh day of February
1999	2	8	Tuesday	London, England	Eighth day of February
1999	2	9	Wednesday	London, England	Ninth day of February
1999	2	10	Thursday	London, England	Tenth day of February
1999	2	11	Friday	London, England	Eleventh day of February
1999	2	12	Saturday	London, England	Twelfth day of February
1999	2	13	Sunday	London, England	Thirteenth day of February
1999	2	14	Monday	London, England	Fourteenth day of February
1999	2	15	Tuesday	London, England	Fifteenth day of February
1999	2	16	Wednesday	London, England	Sixteenth day of February
1999	2	17	Thursday	London, England	Seventeenth day of February
1999	2	18	Friday	London, England	Eighteenth day of February
1999	2	19	Saturday	London, England	Nineteenth day of February
1999	2	20	Sunday	London, England	Twentieth day of February
1999	2	21	Monday	London, England	Twenty-first day of February
1999	2	22	Tuesday	London, England	Twenty-second day of February
1999	2	23	Wednesday	London, England	Twenty-third day of February
1999	2	24	Thursday	London, England	Twenty-fourth day of February
1999	2	25	Friday	London, England	Twenty-fifth day of February
1999	2	26	Saturday	London, England	Twenty-sixth day of February
1999	2	27	Sunday	London, England	Twenty-seventh day of February
1999	2	28	Monday	London, England	Twenty-eighth day of February
1999	2	29	Tuesday	London, England	Twenty-ninth day of February
1999	2	30	Wednesday	London, England	Thirtieth day of February
1999	2	31	Thursday	London, England	Thirty-first day of February
1999	3	1	Friday	London, England	First day of March
1999	3	2	Saturday	London, England	Second day of March
1999	3	3	Sunday	London, England	Third day of March
1999	3	4	Monday	London, England	Fourth day of March
1999	3	5	Tuesday	London, England	Fifth day of March
1999	3	6	Wednesday	London, England	Sixth day of March
1999	3	7	Thursday	London, England	Seventh day of March
1999	3	8	Friday	London, England	Eighth day of March
1999	3	9	Saturday	London, England	Ninth day of March
1999	3	10	Sunday	London, England	Tenth day of March
1999	3	11	Monday	London, England	Eleventh day of March
1999	3	12	Tuesday	London, England	Twelfth day of March
1999	3	13	Wednesday	London, England	Thirteenth day of March
1999	3	14	Thursday	London, England	Fourteenth day of March
1999	3	15	Friday	London, England	Fifteenth day of March
1999	3	16	Saturday	London, England	Sixteenth day of March
1999	3	17	Sunday	London, England	Seventeenth day of March
1999	3	18	Monday	London, England	Eighteenth day of March
1999	3	19	Tuesday	London, England	Nineteenth day of March
1999	3	20	Wednesday	London, England	Twentieth day of March
1999	3	21	Thursday	London, England	Twenty-first day of March
1999	3	22	Friday	London, England	Twenty-second day of March
1999	3	23	Saturday	London, England	Twenty-third day of March
1999	3	24	Sunday	London, England	Twenty-fourth day of March
1999	3	25	Monday	London, England	Twenty-fifth day of March
1999	3	26	Tuesday	London, England	Twenty-sixth day of March
1999	3	27	Wednesday	London, England	Twenty-seventh day of March
1999	3	28	Thursday	London, England	Twenty-eighth day of March
1999	3	29	Friday	London, England	Twenty-ninth day of March
1999	3	30	Saturday	London, England	Thirtieth day of March
1999	3	31	Sunday	London, England	Thirty-first day of March
1999	4	1	Monday	London, England	First day of April
1999	4	2	Tuesday	London, England	Second day of April
1999	4	3	Wednesday	London, England	Third day of April
1999	4	4	Thursday	London, England	Fourth day of April
1999	4	5	Friday	London, England	Fifth day of April
1999	4	6	Saturday	London, England	Sixth day of April
1999	4	7	Sunday	London, England	Seventh day of April
1999	4	8	Monday	London, England	Eighth day of April
1999	4	9	Tuesday	London, England	Ninth day of April
1999	4	10	Wednesday	London, England	Tenth day of April
1999	4	11	Thursday	London, England	Eleventh day of April
1999	4	12	Friday	London, England	Twelfth day of April
1999	4	13	Saturday	London, England	Thirteenth day of April
1999	4	14	Sunday	London, England	Fourteenth day of April
1999	4	15	Monday	London, England	Fifteenth day of April
1999	4	16	Tuesday	London, England	Sixteenth day of April
1999	4	17	Wednesday	London, England	Seventeenth day of April
1999	4	18	Thursday	London, England	Eighteenth day of April
1999	4	19	Friday	London, England	Nineteenth day of April
1999	4	20	Saturday	London, England	Twentieth day of April
1999	4	21	Sunday	London, England	Twenty-first day of April
1999	4	22	Monday	London, England	Twenty-second day of April
1999	4	23	Tuesday	London, England	Twenty-third day of April
1999	4	24	Wednesday	London, England	Twenty-fourth day of April
1999	4	25	Thursday	London, England	Twenty-fifth day of April
1999	4	26	Friday	London, England	Twenty-sixth day of April
1999	4	27	Saturday	London, England	Twenty-seventh day of April
1999	4	28	Sunday	London, England	Twenty-eighth day of April
1999	4	29	Monday	London, England	Twenty-ninth day of April
1999	4	30	Tuesday	London, England	Thirtieth day of April
1999	4	30	Wednesday	London, England	Thirty-first day of April
1999	5	1	Thursday	London, England	First day of May
1999	5	2	Friday	London, England	Second day of May
1999	5	3	Saturday	London, England	Third day of May
1999	5	4	Sunday	London, England	Fourth day of May
1999	5	5	Monday	London, England	Fifth day of May
1999	5	6	Tuesday	London, England	Sixth day of May
1999	5	7	Wednesday	London, England	Seventh day of May
1999	5	8	Thursday	London, England	Eighth day of May
1999	5	9	Friday	London, England	Ninth day of May
1999	5	10	Saturday	London, England	Tenth day of May
1999	5	11	Sunday	London, England	Eleventh day of May
1999	5	12	Monday	London, England	Twelfth day of May
1999	5	13	Tuesday	London, England	Thirteenth day of May
1999	5	14	Wednesday	London, England	Fourteenth day of May
1999	5	15	Thursday	London, England	Fifteenth day of May
1999	5	16	Friday	London, England	Sixteenth day of May
1999	5	17	Saturday	London, England	Seventeenth day of May
1999	5	18	Sunday	London, England	Eighteenth day of May
1999	5	19	Monday	London, England	Nineteenth day of May
1999	5	20	Tuesday	London, England	Twentieth day of May
1999	5	21	Wednesday	London, England	Twenty-first day of May
1999	5	22	Thursday	London, England	Twenty-second day of May
1999	5	23	Friday	London, England	Twenty-third day of May
1999	5	24	Saturday	London, England	Twenty-fourth day of May
1999	5	25	Sunday	London, England	Twenty-fifth day of May
1999	5	26	Monday	London, England	Twenty-sixth day of May
1999	5	27	Tuesday	London, England	Twenty-seventh day of May
1999	5	28	Wednesday	London, England	Twenty-eighth day of May
1999	5	29	Thursday	London, England	Twenty-ninth day of May
1999	5	30	Friday	London, England	Thirtieth day of May
1999	5	31	Saturday	London, England	Thirty-first day of May
1999	6	1	Sunday	London, England	First day of June
1999	6	2	Monday	London, England	Second day of June
1999	6	3	Tuesday	London, England	Third day of June
1999	6	4	Wednesday	London, England	Fourth day of June
1999	6	5	Thursday	London, England	Fifth day of June
1999	6	6	Friday	London, England	Sixth day of June
1999	6	7	Saturday	London, England	Seventh day of June
1999	6	8	Sunday	London, England	Eighth day of June
1999	6	9	Monday	London, England	Ninth day of June
1999	6	10	Tuesday	London, England	Tenth day of June
1999	6	11	Wednesday	London, England	Eleventh day of June
1999	6	12	Thursday	London, England	Twelfth day of June
1999	6	13	Friday	London, England	Thirteenth day of June
1999	6	14	Saturday	London, England	Fourteenth day of June
1999	6	15	Sunday	London, England	Fifteenth day of June
1999	6	16	Monday	London, England	Sixteenth day of June
1999	6	17	Tuesday	London, England	Seventeenth day of June
1999	6	18	Wednesday	London, England	Eighteenth day of June
1999	6	19	Thursday	London, England	Nineteenth day of June
1999	6	20	Friday	London, England	Twentieth day of June
1999	6	21	Saturday	London, England	Twenty-first day of June
1999	6	22	Sunday	London, England	Twenty-second day of June
1999	6	23	Monday	London, England	Twenty-third day of June
1999	6	24	Tuesday	London, England	Twenty-fourth day of June
1999	6	25	Wednesday	London, England	Twenty-fifth day of June
1999	6	26	Thursday	London, England	Twenty-sixth day of June
1999	6	27	Friday	London, England	Twenty-seventh day of June
1999	6	28	Saturday	London, England	Twenty-eighth day of June
1999	6	29	Sunday	London, England	Twenty-ninth day of June
1999	6	30	Monday	London, England	Thirtieth day of June
1999	6	30	Tuesday	London, England	Thirty-first day of June
1999	7	1	Wednesday	London, England	First day of July
1999	7	2	Thursday	London, England	Second day of July
1999	7	3	Friday	London, England	Third day of July
1999	7	4	Saturday	London, England	Fourth day of July
1999	7	5	Sunday	London, England	Fifth day of July
1999	7	6	Monday	London, England	Sixth day of July
1999	7	7	Tuesday	London, England	Seventh day of July
1999	7	8	Wednesday	London, England	Eighth day of July
1999	7	9	Thursday	London, England	Ninth day of July
1999	7	10	Friday	London, England	Tenth day of July
1999	7	11	Saturday	London, England	Eleventh day of July
1999	7	12	Sunday	London, England	Twelfth day of July
1999	7	13	Monday	London, England	Thirteenth day of July
1999	7	14	Tuesday	London, England	Fourteenth day of July
1999	7	15	Wednesday	London, England	Fifteenth day of July
1999	7	16	Thursday	London, England	Sixteenth day of July
1999	7	17	Friday	London, England	Seventeenth day of July
1999	7	18	Saturday	London, England	Eighteenth day of July
1999	7	19	Sunday	London, England	Nineteenth day of July
1999	7	20	Monday	London, England	Twentieth day of July
1999	7	21	Tuesday	London, England	Twenty-first day of July
1999	7	22	Wednesday	London, England	Twenty-second day of July
1999	7	23	Thursday	London, England	Twenty-third day of July
1999	7	24	Friday	London, England	Twenty-fourth day of July
1999	7	25	Saturday	London, England	Twenty-fifth day of July
1999	7	26	Sunday	London, England	Twenty-sixth day of July
1999	7	27	Monday	London, England	Twenty-seventh day of July
1999	7	28	Tuesday	London, England	Twenty-eighth day of July
1999	7	29	Wednesday	London, England	Twenty-ninth day of July
1999	7	30	Thursday	London, England	Thirtieth day of July
1999	7	31	Friday	London, England	Thirty-first day of July
1999	8	1	Saturday	London, England	First day of August
1999	8	2	Sunday	London, England	Second day of August
1999	8	3	Monday	London, England	Third day of August
1999	8	4	Tuesday	London, England	Fourth day of August
1999	8	5	Wednesday	London, England	Fifth day of August
1999	8	6	Thursday	London, England	Sixth day of August
1999	8	7	Friday	London, England	Seventh day of August
1999	8	8	Saturday	London, England	Eighth day of August
1999	8	9	Sunday	London, England	Ninth day of August
1999	8	10	Monday	London, England	Tenth day of August
1999	8	11	Tuesday	London, England	Eleventh day of August
1999	8	12	Wednesday	London, England	Twelfth day of August
1999	8	13	Thursday	London, England	Thirteenth day of August
1999	8	14	Friday	London, England	Fourteenth day of August
1999	8	15	Saturday	London, England	Fifteenth day of August
1999	8	16	Sunday	London, England	Sixteenth day of August
1999	8	17	Monday	London, England	Seventeenth day of August
1999	8	18	Tuesday	London, England	Eighteenth day of August
1999	8	19	Wednesday	London, England	Nineteenth day of August
1999	8	20	Thursday	London, England	Twentieth day of August
1999	8	21	Friday	London, England	Twenty-first day of August
1999	8	22	Saturday	London, England	Twenty-second day of August
1999	8	23	Sunday	London, England	Twenty-third day of August
1999	8	24	Monday	London, England	Twenty-fourth day of August
1999	8	25	Tuesday	London, England	Twenty-fifth day of August
1999	8	26	Wednesday	London, England	Twenty-sixth day of August
1999	8	27	Thursday	London, England	Twenty-seventh day of August
1999	8	28	Friday	London, England	Twenty-eighth day of August
1999	8	29	Saturday	London, England	Twenty-ninth day of August
1999	8	30	Sunday	London, England	Thirtieth day of August
1999	8	31			

**A3** Descriptive statistics of background variables of farmer groups.

	N	Mean	St. Dev.	Min	Max
<i>Age of chairperson</i>	20	47.4	10.12761	26	67
<i>Year establishment</i>	20	2008.8	6.014019	1989	2014
<i>Chairperson since:</i>	20	2008.8	6.014019	1989	2014
<i>Number of members in beginning</i>	20	22.45	8.98815	5	38
<i>Current number of men</i>	18	14.38889	7.333556	5	30
<i>Current number of women</i>	18	17.77778	10.18393	0	40
<i>Number of members on list of Acwec Omio</i>	20	25.4	5.461829	15	34
<i>Number of members told by chairperson</i>	20	33	11.16856	21	60
<i>Number of members that are also traders</i>	20	3.75	8.309	0	36
<i>Number of members that are also Mukwano agent</i>	20	.35	.7451598	0	3
<i>Individual farmer group entrance fee</i>	19	4968.421	6194.357	0	20000
<i>Number of members that paid entrance fee</i>	13	35.38462	10.98134	25	60
<i>Minimum acres sunflower</i>	19	1.894737	1.242521	0	5
<i>Maximum acres sunflower</i>	19	3.578947	2.610147	0	10
<i>Minimum acres soya bean</i>	20	2.3	1.218282	1	5
<i>Maximum acres soya bean</i>	20	3.9	2.552604	1	10
<i>Minimum acres simsim</i>	20	1.125	.559017	0	2
<i>Maximum acres simsim</i>	20	1.3	.7145112	0	3
<i>Minimum yearly income of members</i>	18	1183333	935728.7	200,000	4,000,000
<i>Maximum yearly income of members</i>	18	1950000	1868390	200,000	8,000,000

<i>Minimum age of members</i>	19	22.68421	6.137794	15	38
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Observations are not always 20 because sometimes the chairperson did not know the answer to the question.

#### A4 Mean comparisons of groups that recently bulked and groups that did not

<b><i>Continuous variables (mean)</i></b>	Bulked oilseeds in 2014/2015	Did not bulk oilseeds in 2014/2015	Equality test <sup>12</sup>
<i>N</i>	12	7	
<i>Member of Acwec Omio since year</i>	2010.417	2013.429	1.938*
<i>N</i>	12	8	
<i>Year of establishment of farmer group</i>	2008.167	2009.75	0.155
<i>N</i>	12	8	
<i>Number of members that are traders</i>	4.583333	2.5	-0.922
<i>N</i>	12	8	
<i>Number of members that are Mukwano agents</i>	.5	.125	-1.072
<i>N</i>	12	8	
<i>Group size</i>	31.375	34.08333	0.355
<i>N</i>	12	8	
<i>Number of members that received UDB loan in 2014</i>	1.833333	1.625	-0.044
<i>N</i>	12	7	
<i>Average size of land devoted to oilseeds by members</i>	3.104167 (.4313236)	2.571429 (.5740268)	-0.7453
<i>N</i>	11	8	
<i>Range in ages (unequal variances)</i>	37.45455	38.25	0.1115

<sup>12</sup> Wilcoxon Mann-Whitney test was performed for continuous variables with a skewed distribution and equal variance. Welch's criterion for the t-test was used for the variable Range in ages, as for this variable equal variances could not be assumed. Z values given if WMW test was performed, t values given if t test was performed. Pearson's chi-square is given for categorical variables, level of significance is based on Fischer's exact test as the sample is very small.

	(2.880542)	(6.523994)	
<b>Categorical variables (%)</b>			
<i>N</i>	12	8	
<i>Gender of chairperson (1=male)</i>	66.67	25	3.333*
<i>Reason establishment (1=other reason than VSLA)</i>	58.33	25	2.1549
<i>Initiative (1= from within group)</i>	33.33	37.50	0.0366
<i>Reason for joining cooperative (1=related to bulking and selling produce)</i>	25	25	0.0000

\*p=0.10, standard errors in parentheses. Observations are not always 20 because sometimes the chairperson did not know the answer to the question.

**A5** Sunflower bulking activity second season of 2014: every row represents a different farmer group

1. What kind of store	2. Volume (in bags of 70 kg)	3. Price per kg 1	4. Price 2	5. How many members?	6. % of total number of members	7. Number of members reported selling via the FG	8. Did you buy output from non-members/middlemen?	9. Buyer 1
Store voluntarily offered for use by member	30	900		25	83%	0	no	Trader/middleman
Rented store	107	1200		8	22%	0	yes	Mukwano agent
Rented store	34	1000		8	27%	0	yes	Mukwano agent
In store of chairperson that is trader	500	950		21	100%	4	yes	Trader/middleman
Rented store	250	850	900	20	35%	0	yes	Acwec Omio
Store voluntarily offered for use by member	114	800		25	100%	1	no	UOSPA
Rented store	120	800	900	23	100%	0	Yes	Mukwano agent
All individually stored	500	900		20	33%	0	Yes	Acwec Omio
Store voluntarily offered for use by member	15	1000		7	30%	0	No	Trader/middleman

10. Buyer 2	11. Payment	12. Why did you choose for this channel?	13. Who transported the produce from the bulking place?
	Direct	Received services from buyer	Trader/middleman
	Direct	Seeds were bought from Mukwano agent	Members
	Direct	Better price and seeds were bought from Mukwano	Mukwano
	Direct	It was given in cash (good to pay back loans from VSLA)	Chairperson as trader (deducts transport costs from total revenue of bags)
Mount Meru	Direct	If you sell to the cooperative the benefit comes back to the members. Trader, because Acwec Omio was not willing to buy any more.	Acwec Omio/Trader
	Direct	UOSPA gave the group seeds and training.	UOSPA
Trader/middleman	Direct	No other agent with better price	Mukwano
	Direct	Good price	Nile Agro
	Direct	Problem with paying school fees, cash offered by trader was needed	Trader

**A6** Sunflower bulking activity first season 2015: every row represents a different farmer group

1. What kind of store	2. Volume (in bags of 110 kg)	3. Price per kg (UGX)	4. From how many members did you bulk produce?	5. % of total number of members	6. Number of members bulked via group in survey	7. Did you buy from non-members?
Store of new cooperative the group is member of	40	900	1 (chairperson)	2%	0	No, the cooperative did
8. Buyer	9. Payment	1. Why did you choose this channel	11. Who transported the produce?			
Oyam Agri Cooperative	Direct	Acwec Omio was not bulking.	Oyam Agri Cooperative			

**A7** Soya bean bulking activity second season 2014: every row represents a different farmer group

1. What kind of store	2. Volume (in bags of 110 kg)	3. Price per kg (UGX)	4. From how many members did you bulk produce?	5. % of total number of members	6. Number of members bulked via group in survey	7. Did you buy from non-members/middlemen?	8. Buyer
Rented store	30	1000	3	8%	0	no	Trader/middleman
Rented store	20	1200	4	13%	0	no	Agrocluster Group
Store voluntarily offered for use by member	197	1200	30	120%	0	No	Some agent
Rented store	85	1400 decreased to 1200	does not know	.	0	No	Mukwano agent
9. Payment	10. Why did you choose this channel?		11. Who transported the produce from the bulking point?				
Direct	They knew this trader		Members				
Direct	Better price		Agrocluster group				
Direct	Best price		Agent				
Direct	Good price and in cash		Mukwano				



**A8** Soya bean bulking activity first season 2015: every row represents a different farmer group

1. What kind of store	2. Volume (in bags)	3. Price per kg (UGX)	4. How many members did you bulk from?	5. % of total number of members	6. Number of members bulked via group in survey	7. Did you buy output from non-members?	8. Buyer	9. Payment
Rented store	150	1300	50	100%	0	yes	Acwec Omio	Some weeks after transaction
Store voluntarily offered for use by member	18	1100	24	100%	0	no	Trader/middlemen	Direct
Store voluntarily offered for use by member	150	1200	25	100%	0	no	Does not know	Direct
Rented store	120	1200	23	100%	0	yes	Does not know	Direct
Store of new cooperative group is member of	500	1200	3	5%	0	no	Oyam Agri Cooperative	Direct
10. Who transported the produce?								
Acwec Omio								
Trader								
Does not know								
Does not know								
Oyam Agri Cooperative								

# A9 Summary statistics of variables used in analyses

Binary variables	N	Mean	SD	Median	Min	
<i>Sold soya bean to trader</i>	102	0.83				
<i>Sold sunflower to Mukwano agent</i>	70	0.54				
<i>Bought seeds from Mukwano agent</i>	118	0.44				
<i>Respondent is trader</i>	118	0.12				
<i>Season 2014 soya bean</i>	102	0.09				
<i>Season 2014 sunflower</i>	70	0.84				
<i>Respondent is male</i>	118	0.51				
<i>Respondent is household head</i>	118	0.64				
<i>Household has other income source</i>	118	0.65				
<i>Household has at least 1 bicycle</i>	118	0.90				
<i>Household has motorcycle</i>	118	0.08				
<i>At least 1 trader in group</i>	118	0.61				
<i>At least 1 Mukwano agent in group</i>	118	0.25				
<i>Farmer group bulked soya bean in respective season</i>	118	0.34				
<i>Farmer group bulked sunflower in respective season</i>	118	0.08				
Continuous variables						
<i>Risk aversion factor</i>	118	0.00	1	0.21	-4.19	0.95
<i>Trust in trader factor</i>	118	0.00	0.83	-0.29	-1.47	2.03
<i>Discount rate</i>	118	0.59	0.46	1	0	1

<i>Age of respondent</i>	118	41.90	13.42	40	15	84
<i>Household size</i>	118	6.73	2.47	6.5	1	14
<i>Amount of children in household that go to school</i>	118	2.84	1.99	3	0	8
<i>Wealth index</i>	118	0.04	0.72	-0.05	-1.64	1.60
<i>Distance to market in minutes</i>	114	80	186.68	60	5	2000
<i>Quantity sold in transaction soya bean (in kilo)</i>	102	605.09	630.04	360	2	3300
<i>Quantity sold in transaction sunflower (in kilo)</i>	70	850.97	1388.98	490	8	10000

#### A10 Group comparisons for soya bean transactions

	Sold to trader	Sold to other buyer	Equality test <sup>13</sup>
N	85	17	
Categorical variables (%)			
<i>Time paid (1= not direct)</i>	5.88	17.65	2.713 <sup>+</sup>
<i>Location of transaction (1= farmgate)</i>	81.18	35.29	15.323 <sup>***</sup>
Continuous variable (mean)			
<i>Discount rate</i>	0.575	0.625	0.413
<i>Min</i>	0	0	
<i>Max</i>	1	1	
N	13	11	
<i>Transport costs</i>	13,846.15 ( 21,551.67)	8,136.36 ( 12,393.73)	-0.882
<i>Min</i>	0	0	
<i>Max</i>	80000	40000	

<sup>+</sup>p<0.15 <sup>\*</sup>p<0.10 <sup>\*\*</sup>p<0.05 <sup>\*\*\*</sup>p<0.01. Standard deviations in parentheses

<sup>13</sup> Wilcoxon Mann-Whitney test was performed for continuous variables with a skewed distribution and equal variance. Z values given if WMW test was performed, t values given if t test was performed. Pearson's chi-square is given for categorical variables, level of significance is based on Fischer's exact test as the sample is small.

#### A11 Group comparisons for sunflower transactions

	Mukwano agent	Other buyer	Equality test <sup>14</sup>
<b>N</b>	38	32	
<i>Time paid (1= not direct) (in %)</i>	23.68	25.00	0.016
<i>Bought seeds from Mukwano agent</i>	84.21	62.50	4.286**
<b>N</b>	37	32	
<i>Location of transaction (1= farmgate) (in %)</i>	63.16	56.25	0.345

#### A12 Comparing basic logit model and model with first controls for sunflower transactions with and without FG fixed effect

	(1)	(2)	(3)	(4)
<i>Bought seeds from Mukwano agent</i>	1.198* (-0.639)	2.383* (-1.356)	1.198+ (-0.737)	4.226* (-2.441)
<i>Risk aversion factor</i>	0.08 (-0.313)	0.114 (-0.645)	-0.116 (-0.383)	0.443 (-0.931)
<i>Trust in trader factor</i>	0.374 (-0.317)	0.081 (-0.538)	0.391 (-0.372)	-0.452 (-0.796)
<i>Discount rate</i>	1.209** (-0.601)	1.683+ (-1.060)	1.660** (-0.726)	2.462 (-1.930)
<i>Respondent is trader</i>	1.140+ (-0.764)	3.153** (-1.505)	0.776 (-0.904)	3.433+ (-2.376)
<i>Season 2014</i>			-0.186 (-0.890)	2.011 (-1.862)
<i>Respondent is male</i>			-0.349 (-0.957)	1.746 (-2.149)
<i>Respondent is household head</i>			-0.443 (-0.975)	-4.595* (-2.637)
<i>Age of respondent</i>			0.002 (-0.028)	0.11 (-0.082)
<i>Household size</i>			0.326+ (-0.214)	0.361 (-0.506)
<i>Amount of children in household that go to school</i>			-0.104 (-0.245)	-0.178 (-0.612)
<i>Wealth index</i>			-0.047 (-0.563)	0.780 (-1.013)
<i>Household has other income source</i>			1.027 (-0.742)	3.358 (-2.846)
<i>Intercept</i>	-1.479** (-0.636)	-2.797* (-1.611)	-3.594* (-1.877)	-8.515** (-4.294)

<sup>14</sup> Pearson's chi-square is given for categorical variables, level of significance is based on Fischer's exact test as the sample is small.

<i>FG fixed effect</i>	No	Yes	No	Yes
<i>N</i>	70	45	70	45
<i>LR <math>\chi^2</math></i>	11.594	16.054	19.391	26.864
<i>Prob &gt; <math>\chi^2</math></i>	0.041	0.310	0.111	0.216
<i>Pseudo <math>R^2</math></i>	0.120	0.265	0.201	0.444