Dairy service delivery by lead farms

A case study to evaluate the fit of the services offered by lead farms with the demand for services of small-scale dairy farmers around Addis Ababa, Ethiopia

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Abstract

This research examined the role of five lead farms in Ethiopia in the process of increased market orientation and commercialization of small-scale dairy farmers. A lead farm is a relatively large, high-developed farm as compared to the neighbouring small-scale farms. A lead farm tends to serve as a supportive platform to the small-scale farms by delivering services such as milk collection, feed supply, demonstrations and trainings. This research is conducted to evaluate the key mechanisms used by the lead farms in the demand/supply articulation process that may or may not lead to a match between lead farms and small-scale farmers in the Oromiya region of Ethiopia. In addition, this research determines the coordinating role of the lead farms in the dairy value chain. Literature study gave insights into the useful mechanisms (Zijlstra et al., 2015), lead farm models (Christoplos, 2010) and coordinating roles (Poulton & Lyne, 2009). A multiple case study method is used to gain access to the data needed. The data was gathered through interviewing, observations and information artefacts. Remarkable are the differences between on the one hand lead farms in rural areas and lead farms in urban areas at the other hand. The research showed that lead farmers in the rural area use an open approach with a wide range of services based on a cost covering or donor-recipient relationship. The lead farmers in the (relatively) urbanized area use a cost covering or commercial relationship, especially in areas with multiple service providers. The results show which mechanisms, models and coordinating roles a certain lead famer could use to serve small-scale farmers in Ethiopia.

Key words: Lead farming, small-scale dairy farming, value chain coordination, Ethiopia, commercialization.

Abbreviations

AC: Ada'a Dairy cooperative

AI: Artificial insemination

B2B: Business to business

CB: Crossbred

DA: Development agent

DRC: Democratic Republic Congo

FAO: Food and Agriculture Organization of the United Nations

FC: Final consumers

FFE: Farm Friends Ethiopia

FFN: Farm Friends Nederland

FSC Ambo: Farmer Service Centre Ambo

HARC: Holeta Agricultural Research Centre

HC: Home consumption

HD: Holland Dairy milk processor

Hobo: Crossbred of Holstein Friesian indigenous Borana breed

HP: Home processing

IFAD: International Fund for Agricultural Development

LSD: Lumpy skin disease

USAID: United States Agency for International Development

USDA: United States Department of Agriculture

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1. Introduction

In Ethiopia, small-scale farmers produce milk for own consumption and sell the remaining milk and hand-processed dairy products on the informal market (Jaleta et al., 2009; Yigrem et al., 2008). At the same time, in the city, milk and dairy products are expensive and scarce (e.g. due to urbanization, an inefficient value chain and malfunctioning markets). The government favours increased market orientation and commercialization of the informal dairy sector to become formal in order to prevent shortage of milk products in the city and to reduce the import of dairy products. To increase the production, small-scale farmers need for instance better infrastructure, knowledge about farming and access to new markets. An important condition for enhanced market orientation is a well-functioning value chain. The three most important processes in the value chain are (1) mobilization of resources, (2) conversion of resources into end products and (3) commercialization of these end products (Poulton, 2010). A so-called lead farm may deliver a major contribution in the link between the different actors in the dairy value chain in order to achieve intensification and commercialization of small-scale farmers (Chabata & Wolf, 2013). Lead farms are (for Ethiopian concepts) large farms and are established and managed by government agencies, Ethiopian or foreign farmers. These large farms tend to serve as a supportive platform for the neighbouring small-scale farmers. This research examines the role of lead farms in the process of increased market orientation and commercialization of small-scale dairy farmers. A lead farm may play a role in the value chain as input provider, knowledge broker, processor and/or marketer of milk products to foster the production and market orientation of small-scale farmers. (Chabata & Wolf, 2013; Kruijssen et al., 2009)

Over the past decade, a number of Dutch dairy farmers have emigrated to Ethiopia. These farmers first established their own farm at Dutch development standards to become a profitable farm. When the new established farm became profitable, the commercial farm became a lead farmer. For example, by establishing a farm shop to offer seeds and technical equipment or a training centre to the neighbouring small-scale farmers, subsidized by the Ethiopian and Dutch government. Some lead farmers collect milk from the neighbouring small-scale farmers, bring the milk to the dairy plant and sell. The lead farmers opened their gates to foster the small-scale farmers to make use of the existing infrastructure of the lead farmer. This is expected to lead to an increase in economic activity in the rural areas (Bijman, 2008; Poole et al., 2013).

Wageningen UR Livestock Research has started the DairyBISS project to support Ethiopian and international private companies in the dairy sector (van der Lee, 2015). In order to inform prospective investors about the feasibility of the lead farm approach, DairyBISS would like to evaluate the current experiences, as to create knowledge about the demand/supply articulation between these lead farms and the neighbouring small-scale farmers. This research aims to explore the mechanisms used for demand/supply articulation of five lead farms in Ethiopia, to determine their coordinating role in the value chain and to determine the lead farming models used to make a supply and demand match between the lead farmers and small-scale farmers.

2. Theoretical framework

In order to be able to conduct this research, it is important to have insights from literature on the concept 'lead farm' and on the methods used by lead farms as well. This chapter provides the theoretical foundation on which this research is build. Section 2.1 provides a broad perspective on value chain development and the role value chain developers might play in this process. Section 2.2 defines the characteristics of a lead farm as value chain developer. Section 2.3 presents several methods used in lead farms to match the supply of their services with the demand for services by small-scale farmers. Section 2.4 presents farm models used by lead farms to foster small-scale farmer commercialization. This chapter ends with a section about former experiences with the lead farmer approach in other African countries.

2.1 Commercialization, market orientation and value chain development

2.1.1 Commercialization and market orientation

While Ethiopia has a good climate and acreage to produce enough milk for the entire country, dairy products need to be imported to cover the demand, mainly in the cities (worth $38 million in 2015 (FAO, 2015)). This offers an opportunity for small-scale farmers to sell their milk in the cities to satisfy the demand. Roughly 80% of the dairy production in Ethiopia takes place in rural areas (IFAD, 2012). To sell their products, small-scale farmers should focus their production towards the demand in the city. This focus requires adjustment of the practices of the small-scale farmers in terms of commercialization and market orientation.

Expanding markets are the driving force for development and commercialization of the dairy sector (Christoplos, 2010). Commercial farmers are farmers who see their milk production as a business rather than a side activity, sell a substantial part of the milk or milk products to the formal or informal market and base their decisions on market signals. Commercial farmers are market oriented and raise cows primarily for milk production to generate their income from the milk (USAID, 2013). Commercializing small-scale farmers should focus on the demand for dairy products in the market in the sense of the variety of products and have to abide to high standards in quality and quantity to get access to and stay in the market (Christoplos, 2010). Marketing outlets show to be crucial as a key initiator of milk production enhancement of small-scale farmers in India, Uganda and Kenya (Yigrem et al, 2008). Moreover, it is important to stay close to the market to respond to changing demand in the market. Ethiopian small-scale farmers have four markets to sell their milk surplus: (1) sell it informally on the local market (as raw milk or home-processed product); (2) sell it to a producer group or cooperative; (3) sell it directly to a processor or (4) sell it to traders (USAID, 2013).

Moreover, commercialization promotes the demand for modern technologies that result in higher production such as high quality feed and equipment to decrease work load. This demand may have a positive effect on the development of a dairy support sector providing inputs and production increasing services (Jaleta et al., 2009). The aim of the DairyBISS project is to set up a network for this support sector that depends on market orientation and commercialization of small-scale farmers (van der Lee, 2015).

The process of commercialization has to deal with many constraints. Poor access to finance, technical equipment and farmer inputs, less skilled labour practices, poor functioning output markets and high

transaction costs are some of the bottlenecks for commercialization (Poulton et al., 2010; Makoni et al., 2014, pg. 53). Market orientation and increased commercialization need development of the entire value chain in order to prevent these bottlenecks in the reachability of the market (Jaleta et al., 2009).

2.1.2 Value chain development for the commercialization process

The dairy value chain is defined by the International Fund for Agricultural Development (IFAD) as the full range of activities required to bring milk and milk products to final consumers passing through the successive segments of production, processing and delivery. It can also be defined as a market-focused collaboration among different stakeholders or actors who produce or add value to dairy products (Rota & Sperandini, 2010). Development of the value chain may lead to an increase in quality and quantity of the production by making the chain more efficient (Jaleta et al., 2009; FAO, 2013). Value chain development may help to overcome the challenges in market orientation and commercialization (USAID, 2013). Value chain developers may coordinate the value chain development at three crucial segments in the value chain: (1) mobilization of production resources (input), (2) conversion of resources into end products (production) and (3) commercialization of these end products (processing and marketing) (Poulton, 2010). According to (Christoplos, 2010), value chain developers can be defined as the actors in the value chain building multi-actor networks. The process of commercialization needs these networks between the value chain actors. The realisation of these multi-actor networks requires effective communication, collaboration and coordination between the actors. The collaboration between actors may be increased by building trust and by creating an equal partnership between actors in the value chain. As (Christoplos, 2010) states: “Social capital is often the most important factor in value chain development”. Lead farmers may have a facilitating role in these multi-actor networks in the value chain.

2.1.3 Modes of value chain coordination

According to (Poulton et al., 2010), value chain developers can coordinate value chain development through four coordinating roles. Coordination between actors in the value chain has a positive impact on the value chain development and fosters the commercialization process. Value chain coordination can take place in one or more segments by actors in- or outside the value chain, by government agencies or private actors.

Vertical coordination: Vertical coordination (or relational contracting) refers to coordination of the interaction between two actors in the value chain. The coordinator could take part of the relation or could be a third party facilitating collaboration between other actors. A contract between a product buyer and a producer is an example of vertical coordination. Also the provision of market information to other actors within the value chain is an important part of vertical coordination (FAO, 2013). Vertical coordination may affect all the segments of the value chain and may lead to a decrease of the transaction costs (the costs of running an economic system such as a value chain) of small-scale farmers (Poulton & Lyne, 2009). This form of coordination requires repeated interactions between the actors. An important disadvantage of vertical coordination is the issue of power. An actor in the value chain may press other actors to deliver a service to them at low cost, especially if there is only one supplier of that particular service in the area. (Poulton & Lyne, 2009) Vertical coordination makes the relationship between different actors in the value chain more secure for example by the use of contracts. But vertical coordination might be costly and inefficient without horizontal coordination

between the small-scale farmers because of the many interactions of one small-scale farmer with a lead farmer.

Horizontal coordination: Horizontal coordination (cooperation or central collaboration) refers to coordination between the same type of actors in the value chain. Horizontal coordination can be defined as "the coordination of integration, collaboration or centralization of corresponding actors at a certain stage in the value chain" (Poulton & Lyne, 2009). Improved horizontal coordination of small-scale farmers gives them for example the opportunity to become more powerful in their relationship with other actors in the value chain. Horizontal coordination may replace the imperfectly coordinated actions of independent actors by a more centralized decision making process in a single company, cooperative or enterprise. A clear example is the coordinating role of dairy cooperatives in Ethiopia. Cooperatives may coordinate the collection of milk, processing, input provision as seeds and financial services. Single farmers may not be able to process the milk up to the high quality standards of the formal market, but as a horizontally coordinated collective they might be able to buy high quality processing equipment. A group of farmers can share the risks of an investment with all members and thus lower the transaction costs. Other examples are capacity building and training of small-scale farmers (FAO, 2013; Poulton & Lyne, 2009). Horizontal coordination is therefore an important tool for NGOs, government agencies and cooperatives. This role of value chain coordination takes by definition place in one segment of the value chain. An important disadvantage of horizontal coordination is monopolism. Price fixing of horizontal coordinated actors in a segment of the value chain excludes competition between value chain actors and has a negative effect on the income of other actors in the chain. (Poulton & Lyne, 2009) propose an intervention by the government to prevent this negative side of horizontal coordination.

Complementary coordination: Complementary coordination refers to coordination between actors who provide complementary services in the value chain. From a horizontal coordination point of view, complementary coordination refers to coordination among service providers who offer complementary services rather than competitive providers of the same service. An example of complementary coordination is collaboration by input suppliers resulting in a complete range of inputs for the small-scale farmers instead of offering every part of the inputs separately (for example feed ingredients). At the same time, complementary coordination refers to linking different actors throughout the value chain (vertical coordination). Complementary coordination (as a hybrid form of horizontal and vertical coordination) is for example very important in regions with limited service providers. In that case, the development of the value chain needs a mix of services throughout the whole value chain. Complementary coordination combines the strengths and mute the weaknesses of horizontal and vertical coordination. Complementary coordination may be provided by private companies or the government. Competition between actors subsequent in the value chain (especially the final markets), may lead to a focus on efficiency and low-cost product sourcing. These actors are able to set the price and may profit from the improved vertical coordination, but it is quite possible that the profits will not be distributed equally among the other actors in the chain, especially in tiny markets. (Poulton & Lyne, 2009)

Focal coordination: Focal coordination refers to a specific combination of complementary and vertical coordination. Focal coordination takes place by a single service provider who supplies a full package or set of services to small-scale farmers as discussed before (Poulton & Lyne, 2009). Coordination is focal when the services are offered as a package and established by an (in) formal agreement. Focal

coordination can be defined as a focal coordinating role when a service provider offers services in all the three segments of the value chain. (Poulton & Lyne, 2009)

In a coordinating situation between a lead farm and small-scale farmers, it is important to come to a match between the offered services and the demand for those services. The need for this match has implications for both vertical and horizontal coordinators of the value chain. Small-scale farmers' willingness to purchase e.g. expensive high quality feed or improved technical equipment depends on the expected market access and stability of the market in terms of quantity and price. On the other hand, service providers' returns on their investments (especially credit) depend in that way also on the market access of the small-scale farmer. This contradiction might be countered by complementary coordination as a mixed form of horizontal and vertical coordination (Poulton & Lyne, 2009).

2.1.4 Realization of service supply/demand match

Research conducted on innovation support services describes the mechanisms of the interplay between demand and supply of coordinating services (Kilelu et al., 2014). The interplay between demand and supply will always start at the demand side. If there is no willingness or ability to pay for an offered service, there is no supply needed. This means that the demand-side in this process must have the opportunity to articulate its needs. According to (Kilelu et al. 2014,), the concept of a dynamic learning agenda could be used to describe the process of demand articulation, which leads to supply of services. The service delivery is more than only matching demand and supply but it "leaves space for co-creation. Matching demand and supply (…) is part of a continuous learning and negotiation process". This learning process is triggered when the service provider offers "a menu of options" (Kilelu et al., 2014). Since the demand for services continually emerge (triggered by challenges, problems and new opportunities (Christoplos, 2010)), the supplier of services preferably has the opportunity to react as soon as possible to optimize a demand/supply match. This continuously changing demand needs an adequate articulation system to monitor these changes of demand and a continuous adaptation to the new situation (Kilelu et al., 2014).

According to (Kilelu et al., 2014), matching demand and supply sometimes is a complex process because of power and interest issues. Value chain coordinators may play an advisory role for the farmer, but their goal might also be to sell their services and products. Lack of knowledge or a lack of competing service providers may lead to undesirable power issues and may have a negative effect on the value chain development and commercialization of small-scale farmers (Poulton et al., 2010). Value chain developers might have a blind spot for the negative effects of their activities, for example on the environment or social structures in the community. This requires careful balancing by the value chain developer. In order to have a balanced matching process, the relationship evaluation should focus on optimal interactions between the demand and supply sides rather than on monitoring predefined outcomes (Kilelu et al., 2014).

2.2 Lead farming

In this section, the concept of lead farming will be discussed. A lead farm is a relatively large, high-developed farm as compared to the neighbouring small-scale farms. These (for the Ethiopian context) large farms are established and managed by government agencies, Ethiopian entrepreneurs or foreign entrepreneurs. One of the aims of a lead farm is to support small-scale farmers for example through offering them access to farmer input, technology, technical assistance and market access (da Silva et

al., 2008). Depending on the context and aims of the lead farm, offering these services might be used to coordinate value chain development. Lead farms are financially independent from small-scale farmers and have access to resources, knowledge and markets not reachable for small-scale farmers. Offering small-scale farmers access to these markets for small-scale farmers is a promising model for commercialization, market orientation and production enhancement (table 2) (da Silva et al., 2008). A lead farm is a promising model for increasing food safety, consistent quality, year-round supply of food products, and to foster innovation of the dairy production practices of small-scale farmers (Vorley et al., 2009).

A satisfying demand and supply match is a crucial condition for the success of the lead farm approach (da Silva et al., 2008). There are many mechanisms that can be used to achieve a demand and supply match between the services offered by lead farms to transfer goods and knowledge and demand from small-scale farmers. These are further described in the next paragraph. Every lead farm may use different mechanisms to match its service delivery with the service demand of small-scale farmers. On a more abstract level, the lead farms use a (combination of) lead farm model(s) leading to a fit of demand and supply. By offering these services, lead farms play a certain coordinating role in the support of the value chain for small-scale farmers. This connects to the aim of this research, to discover these mechanisms, models and coordinating roles at several lead farms in Ethiopia.

2.3 Mechanisms used and services provided through lead farms

Literature describes various mechanisms used and services offered by lead farmers to interact with small-scale farmers and other actors in the value chain to reach a supply/demand match. This section will explicate some of these mechanisms and services.

Contract farming

The US Department of Agriculture (USDA) defines contract farming (CF) as “the growing and marketing of farm products under such circumstances that selective terms of the market-quantity, grade, size, inspection, timing, or pricing are specified to both the grower and the processor or shipper before production is undertaken” (Bijman, 2008). An example in the lead farming context is a contract between a small-scale farmer and a lead farmer for the supply of milk by the small-scale farmer. Lead farmers who use CF in their lead farm strategy are vertical, complementary or focal coordinators in the value chain, because it strengthens relationships between successive actors in the value chain. CF may lead to a win-win situation when used in a lead farmer – small-scale farmer relationship (Bijman, 2008). CF ensures the relation between actors in the value chain in a formal contract.

CF has some important advantages for small-scale farmers: (1) market stability: a stable income; (2) access to marketing information and technology (advisory services); (3) transfer of technology to improve farming practices; (4) access to farming inputs; (5) new markets and (6) protection of small-scale farmers from incurring losses (Arumugam, 2010). These advantages are the result of increased vertical coordination of the value chain.

Milk collection grid

As indicated in figure 1), a milk collection grid is a network of milk collection points that is used to collect milk from various producers (p). A milk collection grid is an example of horizontal coordination since it coordinates the milk sale of a group of small-scale farmers. Milk collection is linked to CF when all the producers in the scheme are contracted by a formal agreement. The processing plant is the next stage in the value chain, which indicates that a milk collection grid might also be part of a complementary or focal role of coordination in lead farming if the milk collection grid is facilitated by a lead farm.

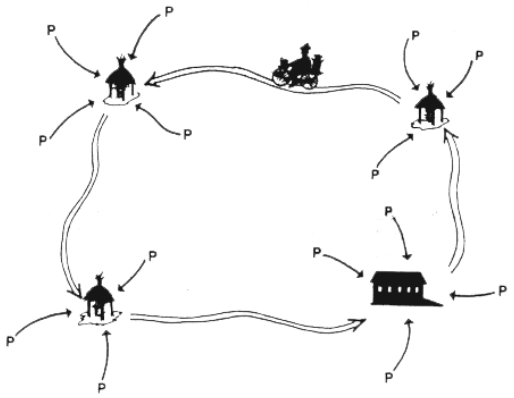

Figure 1): Milk collection along a milk route. (FAO, 2016).

Advisory services

Advisory services are an important and essential contribution to value chain development. Services are not useful for small-scale farmers if there is no one who tells them how to use, why to use and when to use them. Lead farmers need to provide advisory services when services are delivered. (Makoni et al., 2014) propose a public-private partnership approach to strengthen advisory service providers. Public funded universities or institutes may educate dairy advisors who work in the field.

Lead farmers offering advisory services may use a group extension approach. It is a form of adult education where field workers train small-scale farmers in groups. Neighbouring farmers discuss and observe the practices at the host farm. The goal of this approach is to educate small-scale farmers to enhance their capacity to make their own decisions in response to what is demonstrated at the lead farm (Berg, 2004). By seeing these practices on the lead farm and discussing their own experiences with other small-scale farmers, the small-scale farmers learn from each other on the practical level. Regular meetings at the lead farm may lead to a satisfying demand-supply match of services between lead farms and small-scale farmers.

Advisory services can be divided in two parts: training and demonstration. Training is a school like form of education and demonstrations are given in practice. Training could be given on for example husbandry system, milk handling, feed preparation and farm management. A demonstration shows for example the advantages of a new technology or improved husbandry system. Demonstrations in practice are very important in areas with less educated farmers. Demonstration of new practices in groups enhances also the transfer of knowledge between small-scale farmers. This mechanism gives the lead farmer a horizontal coordinating role within the value chain.

Farmer shops

Farmer shops are important at the input side of the value chain. A farmer shop provides different kinds of inputs like seeds, drugs and equipment. A farmer shop supplies the input at one place, which makes it an ideal place for direct interaction between the lead farmer and the small-scale farmer. This is important for a good demand/supply match (Berg, 2004). A farm shop fits into a vertical coordinating

role, because the lead farmer coordinate linkages between different actors (input providers with small-scale farmers).

Breeding and AI services

The local dairy cattle in Ethiopia produce 1.5 litres per day on average. Universities and research centres improved this production to 12 litres per day by crossbreeding the local cattle with highly productive cows (for example the Holeta Agriculture Research Centre (HARC), one of the examined lead farms). Crossbred cows are very important for the enhancement of the dairy production. Crossbred cows have the potential to combine the best of two worlds. The local breeds in Ethiopia (e.g. Borana and Brahman) are strong due to selection on the use for draught power in crop farming (e.g. ploughing). Moreover, the local cows are adapted to the climate and to the most common diseases in Ethiopia, whereas exotic cows (e.g. Friesian Holstein and Jersey) are selected on respectively milk and meat production. Because of the selection of Boranas for the use of crop farming, the milk production is very low. A crossbred cow combines the adaptation to Ethiopian circumstances with a high milk yield potential and contributes in that way to an increase of the milk production and income for small-scale farmers. (Interview HARC)

Lead farms may play an important role in the improvement of the cattle of small-scale farmers by offering these genetically improved breeds. Introduction of highly productive crossbred cattle needs to be combined with knowledge about animal nutrition and housing, because the cattle needs more fodder and drinking facilities (Makoni et al., 2014). Lead farmers who offer crossbred cows and AI services to small-scale farmers are vertical coordinators by linking two actors in the value chain to each other.

Financial services

Financial services for small-scale farmers are currently not sufficient available in Ethiopia to contribute to the value chain development. The cause of this issue stems from both the financial sector and the dairy sector. The financial service sector does not understand the business of the dairy sector at this moment and the dairy sector does not demonstrate a commercial orientation, which is essential for the sustainability of value chain development. Public financial service providers or foreign funders (for example through microcredits) could solve some of these problems. Lead farmers who offer financial services are vertical coordinators of the value chain. (Makoni et al., 2014)

Feed supply

A major problem in Ethiopia is the supply of good quality and sufficient amount of feed for cows. Crossbred cows need a more balanced diet to produce their maximum capacity of milk. The lack of land (due to competition with land for crop production) and good quality seeds are the main causes of this problem. While the government has plans to stimulate the production of high quality feed (e.g. by providing seeds and improved policies for land ownership), feed production is still an important issue for small-scale farmer development. Higher-producing cows need more feed and water, but with the same amount of feed, the milk production does not increase. Development of dairy production by introducing higher-producing cows should therefore include feed and water supply increase. (Zijlstra et al., 2015)

Veterinary services

Veterinary services in Ethiopia are offered by the government. In Ethiopia, almost 10.000 veterinary professionals are active. But the quality of the veterinary service is very low (Zijlstra et al., 2015). Many farmers do not trust the vaccinations by the government, apparently with good reason. Last year, the vaccine for lumpy skin disease (LSD) was too strong. The cows where not strong enough to deal with the too little attenuated vaccine. Many vaccinated cattle died due to the LSD vaccine. This causes distrust in the veterinary services. Therefore, there is a need for high quality private veterinary services in Ethiopia.

Milk marketing

Milk processing is a very useful mechanism in lead farming to close the value chain. The milk processing in combination with milk marketing might be a sustainable way for both small-scale farmer and lead farmer, because it leads to a win-win situation. Milk processing (in combination with milk collection) give small-scale farmers access to markets not reachable for the individual farmer and is therefore a complementary coordinator.

2.4 Lead farm models

Literature mentions different models used by lead farmers in their relationship with small-scale farmers. Lead farmers may combine some of these models to reach a better match of services with the small-scale farmers:

- Master farmer-model: Lead farmers may use this model to reach small-scale farmers in their surroundings. A master farmer is a small-scale farmer with a leadership role for small-scale farmers. A master farmer is trained by the lead farmer to perform this leadership role. Other small-scale farmers visit his farm to learn from his practices, to ask questions and to discuss problems. Master farmers do not offer other small-scale farmers dairy inputs from outside, they are only trained to be a leader in dairy practices and knowledge (table 1). These farmers know the context very well. This provides a higher success rate of the lead farmer project. The model is a clear example of a production driven model. It focusses mainly on enforcing the production of small-scale farmers. The use of this model results in a horizontal coordinating role, because it organizes small-scale farmers to work together and to learn from each other (table 2). (Christoplos, 2010)

- Demonstration model: The small-scale farmers come to the lead farm and learn how to use new equipment and practices. This can be in groups (horizontally coordinated, table 2) or individually. An advantage of the demonstration model is that the farmers meet each other at regular times. Learning in groups is another advantage since it fosters the learning process. This model is a production driven model since it enhances the production of small-scale farms by providing knowledge on farming. Another important part is that the small-scale farmers see in practice what happens. This is particularly important in rural areas without sufficient education. (Vágány et al., 2003)

- Training model: An advisory oriented model. Small-scale farmers get advice about e.g. milk yield improvement, how to reach the market, husbandry, cleaning, hygiene, disease recognition, feeding systems etc. Its manner of working is more school-like compared to the demonstration farmer-model. Usually trainings are provided in groups, resulting in horizontal coordination (table 2). (Alemayehu, 2003)

• Retailing farm-model: This model is used as an advisory service to make farmers more marketing oriented (support to markets) rather than a market oriented farming model (development of the value chain to reach markets). The sustainability of a lead farm using only this model is low since it needs continuous external investments (learned from previous projects). This model is an output driven model. (Christoplos, 2010)

• Business hub model: A business hub could be defined as "a single business entity supplying inputs and providing services in a specific geographic area serving small-scale farmers' needs. The service provider could be private, cooperative, or public owned" (Jaleta et al., 2013). The model is based on a business to business relationship. Lead farmers who use this model are rather a business partner of small-scale farmer than serving small-scale farmers with services focused on enhancing market orientation and commercialization. The sustainability of this model is high, because the business to business relation makes sure that there is no need for external money (subsidy by government or NGO). The coordinating role of a lead farm using this model depends on the context, e.g. the number of offered services. (Jaleta et al., 2013)

Lead farms may use a combination of models in order to reach their goal – enhancement of the value chain for small-scale farmers by offering services. For example, trained small-scale farmers (master farm model) may get their knowledge via demonstrations on the lead farmers' farm (demonstration farm model).

The following tables provide an overview of the lead farm models compared to the mechanisms and the approaches used by the lead farm. These tables show that a lead farmer using the training farmer model and the master farmer model might have a coordinating role throughout the entire value chain, whereas the retailing farmer only plays a role in the end of the value chain. The coordinating roles depends on the services offered.

Table 1: Characteristics of lead farm models

	Master farmer	Demonstration farmer	Training farmer	Retailing farmer	Business hub
Community based	+	--	--	--	--
Sustainability level	+	+	+	--	+
Dairy input provider	+/--	+/--	--	--	+
Practice oriented	+	+	+	--	+
Value chain developer	--	+	+	--	--
Training	+	--	+	--	--
Advisory	+	+	+	--	--
Marketing	--	--	+	+	+/--
Processing	+/--	--	+/--	+/--	+/--

Sources: (Alemayehu, 2003; Christoplos, 2010; Jaleta et al., 2013; Technoserve, 2014; Vágány et al., 2003)

Table 2: Coordinating role in the value chain

	Master farmer	Demonstration farmer	Training farmer	Retailing farmer	Business hub
Vertical	--	--	--	+	+/--
Horizontal	+	+	+	--	--
Complementary	--	--	+/--	+/--	+/--
Focal	--	+/--	+/--	+/--	+/--
Input supply	+/--	+/--	+/--	--	+
Production enhancement	+	+	+	--	+
Output marketing	--	--	+/--	+	+/--

Sources: (Alemayehu, 2003; Christoplos, 2010; Jaleta et al., 2013; Poulton & Lyne, 2009; Technoserve, 2014; Vágány et al., 2003)

2.5 Former experiences with the lead farm approach

Several projects with lead farms were implemented in the past. The Food and Agriculture Organization of the United Nations (FAO) started a lead farm project in Burundi, the Democratic Republic of Congo (DRC), Uganda and Rwanda (FAO, 2013). The experiences gained in this project could be useful to understand and evaluate the practices, mechanisms and models of lead farms in Ethiopia.

1. At the initiation of the project, the lead farmers chose to work with local service providers. They first focused on the enhancement of the capacity of the local service providers. They are adapted to the local manner of production and distribution of inputs and equipment. As a result, the production increased, but the market prices decreased due to poor market access. Producers became discouraged to continue the high production. (FAO, 2013)

Conclusion: Market access should be one of the main conditions ensured by a lead farm to make the relationship between small-scale farmers and the lead farmer sustainable.

2. The lead farmers provided training on hygiene and milk handling to ensure lower spoilage of milk and the lead farmer initiated a cost-shared investment for a milk cooler. The supervision and monitoring of the hygiene and milk handling took place every week and ensured the involvement of the farmers. The lead farmers organized regional trainings to share best practices and challenges. The local service providers were trained with tools for value chain development and a market-oriented production. (FAO, 2013)

Conclusion: Cooperation and cost sharing of investments by the lead farm and the small-scale farmers in combination with regular meetings appeared to be a good approach to reach a successful relationship between small-scale farmers and the lead farmer.

3. Lead farmers in the DRC opened small input shops at farms of selected members of cooperatives where the members of the cooperatives could purchase products at 50 percent of their original price, sold on credit to be recovered at harvest time. Training was carried out to demonstrate how to use improved inputs such as seeds, fertilizers and pesticides that were introduced and provided by research centres and international companies. Lately, farmers have been willing to pay for these inputs because they have seen evidence of their investment by increased yields. This approach created a new demand for input supply and good conditions for private actors in the value chain to meet this demand. (FAO, 2013)

Conclusion: Seeing improved practices themselves activates the demand for services by small-scale farmers. Lead farmers can use this information by 'opening their gates' for small-scale farmers to activate the demand of small-scale farmers and to find a mechanism to satisfy this demand.

4. The lead farmers introduced Memoranda of Understanding (MoU) to strengthen relations between producers, processors and traders. Informal contracts were formalized and both producers and traders have benefited from the arrangements. The process of formalization needs communication and coordination, which was ensured through weekly meetings and various modes of communication. Building trust between the producers and traders is critical to lessen the risks of side-selling. (FAO, 2013) (For the mechanism of contract farming, see 2.3)

Conclusion: Vertical coordination (relational contracting) within the entire value chain is an important aspect of the success of a lead farmer project leading to a win-win situation between actors in the value chain.

The project used different practical mechanisms to reach its goal. These mechanisms might be useful for lead farmers in the Ethiopian situation:

To make the lead farm approach successful, the FAO facilitated regular meetings to conduct a value chain analysis in order to map the challenges, constraints and market opportunities for the different actors. The FAO coordinated collaboration between the value chain actors to create win-win situations for farmers, buyers and service providers.

The FAO supported the local service providers by enhancing their marketing skills. The FAO facilitated access to new input products and equipment to the local service providers. The FAO also coordinated (as a vertical coordinator) the establishment of formal agreements between value chain actors resulting in reduced market risks and the exchange of market information and market opportunities. Furthermore, the private sector became involved in the value chain coordination to increase transaction efficiencies.

The FAO discovered some innovative elements and critical success factors that made the project successful (the project reached 50.000 people in more than 350 cooperatives in four countries):

- Building on existing and potential social capital through transforming existing farmer groups and farmer associations into legally recognized business entities;

- Providing technical capacity and knowledge to cooperatives to improve the productivity and profitability of member farmers;
- Supporting the emergence of private sector service providers;
- Supporting effective product commercialization through innovative marketing systems such as the establishment of commercialization units composed of selected members of the cooperatives (small commercial farmers);
- Training and coaching in preparation of business plans;
- Developing stronger links with buyers and supporting public-private partnerships to promote value chain financing by local authorities.

3 Objective and research question

Wageningen UR Livestock Research has started the DairyBISS project to support Ethiopian and international private companies in the dairy sector (v.d. Lee, 2015). The aim of the DairyBISS project is to set up a dairy business platform and a network of dairy sector service providers. In order to inform prospective investors about the feasibility of the lead farm approach, DairyBISS would like to evaluate the current experiences, as to create knowledge about the key mechanisms of these lead farms to create a demand/supply match. According to (Kilelu et al., 2014), "best fits (between supply and demand of services, G.) should emerge through a continuous process of articulating demands that are then linked to an adequate network of service providers with attention to the appropriateness of service modalities". This research aims to evaluate the key mechanisms used by five lead farms in this articulation process leading to a demand/supply match in the Oromiya region of Ethiopia.

Research question

The research question of this research follows smoothly from the research objective: "What are the key mechanisms leading to a satisfying fit of demand/supply for services between lead farmers and small-scale farmers?"

Sub-research questions

The sub-research questions (to be answered per lead farm) are:

- Which services are offered by the lead farm?
    - How are the services offered by the lead farm?
    - Which mechanisms does the lead farm use to reach a supply/demand match?
    - How are these mechanisms evaluated by the small-scale farmers?
- Which coordinating roles has the lead farm in the value chain?
- Which (combination of) farming models are used to interact with small-scale farmers?
- What is the demand articulation for services by small-scale farmers?

4 Methodology

This chapter aims to explain the research design and the way the data was collected and processed.

4.1 Research design/Research strategy

4.1.1 Repeated case study

To answer the research question, a repeated case study was conducted. As this master thesis deals with the analysis of the demand/supply match between lead farms and small-scale farmers in the Ethiopian value chain, a multiple case study was employed using data from Oromia, central Ethiopia. A multiple case study approach enables to explore differences between and within cases (Yin, 1994). Five lead farms were visited for data collection of this research. The lead farms were chosen after arrival in Ethiopia. At every lead farm, an in-depth semi-structured interview was conducted with the lead farmer and at least one other employee/key informant on the farm. The combination of the information gives the opportunity to check the answers of the lead farmer, to examine different perspectives on the lead farm and to respond to changing conditions while talking about the topics of the questionnaire without predefined answers. Depending on the lead farm, the 'places of interaction' with the small-scale farmers were visited and described by taking pictures and doing direct observations.

4.2 Data collection methods

4.2.1 Site visit and observations

An important part of this research was conducted during the visitation on the lead farms and the small-scale farms in order to conduct the interviews. The observations were captured by camera. Observations were helpful to check the answers of the interviews of farmers (by estimating the amount of milk for example).

4.2.2 In-depth interviews with lead farmers, key informants and small-scale farmers

In-depth interviews were conducted with the lead farmers and small-scale farmers to examine the topics of this research. While conducting the interviews, several key informants were determined and they were also interviewed using the semi-structured questionnaire. The used interview guides can be found in the annexes. The semi-structured set-up of the questionnaire gave the opportunity to respond to changing topics, follow-up questions and farm specific questions.

4.2.4 Artefacts

The lead farmers offered several brochures and documents which are used to check the data gathered during the interviews and to collect facts about the farms. The Holeta Agriculture Research centre provided a PowerPoint presentation about the training for small-scale farmers (unfortunately in Amharic). The artefacts were used to support and check the results of the interviews.

4.2.5 Small survey

A small survey in the manner of a structured questionnaire was conducted to examine the coordinating role of Genesis farms in the value chain. It was used to check whether the farmers use all the offered services (i.e. as a package) to examine the focal or complementary coordinating role.

4.2.6 Case selection method

The cases in the research were selected in different ways. All the cases were selected after a first visitation:

FSC Ambo was selected because my nephew has contact with Gadissa Gobena before. He knew that Gadissa was involved in a project that fits in my definition of a lead farm. We visited Gadissas farm and we decided to include him into our research.

Holeta agriculture research centre (HARC) was selected because Holeta is the main place in Ethiopia when it comes to agricultural research, like Wageningen in the Netherlands. The HARC provides crossbred heifers to small-scale farmers around the research centre (found in the Ethiopian Herald), so we decided to include the centre into our research after visitation.

Genesis farms, Cowgrow and Alfa farms were selected because of their connections with the Dutch community. The decision of selecting the farms was based on examination of their websites and visitation.

4.2.7 Sampling methods of small-scale farmers

To find the small-scale farmers at the cases, different sampling methods were used:

Alfa farms: A truck from Alfa farms brings the feed for the cows to the customers in and around Debre Zeit daily. One time we went with the truck to visit the customers, wrote down their name and took their phone numbers. After that we visited them to perform our research. We also visited a former customer of Alfa farms. We used snowball sampling (Noy, 2008) to get his address from a current customer of Alfa farms.

Cowgrow: At Cowgrow some employees work for the FFE cooperative-program. They know where the farmers live who are involved in the FFE program. One of them went with us to show us the place of the farmers. Farmers at different distances of Cowgrow were interviewed in order to get a representative interview sample.

FSC Ambo: The farmers of the FSC in Ambo were selected via the local agricultural development agency. This agency provided us information about the farmers who visit the FSC and where they live. In that way we were able to conduct the research.

Genesis farms: Every day, the farmers from Genesis come to the farm to bring their milk, around 20 people in total. They were asked for their name, phone number and description of their livelihood to find their place. The interviewees were randomly selected from the 20 visitors of the collection point. All of them filled in the structured questionnaire. One of my translators (Sammy) knew some former customers of Genesis farms. Some of the interviewees were selected after we visited a collection point outside the Genesis farm. One time we went with a truck from Genesis farms around in Debre Zeit to

pick up the milk from small-scale farmers. After that we conducted a semi-structured interview at their farm.

Holeta research centre: The farmers of the HARC were selected by the research centre. Since their working field was very big (13 woredas, furthest 200 km from Holeta) it is too big to visit them all. The research centre gave us the addresses of the farmers in 2 woredas. A woreda is the third-level administrative division of regions in Ethiopia (Wikipedia). The first was Holeta woreda, the other was Adda Berga woreda, adjacent to the northern border of Holeta woreda. To examine the presence of model farming, we asked some neighboring farmers (using snowball sampling, (Noy, 2008)) about the role of the farmer as developer of other farmers.

4.3 Data analysis

The interviews of the small-scale farmers were conducted on the farm. The interviews were transcribed at least in the same week; the observations were described at the end of the day. The data of the interviews was analysed by coding the written transcripts of the interviews. This technique made the data of the interviews accessible for data analysis. In this study the interview transcripts are analysed through pattern-finding, between the interviews of small-scale farmers in and across the cases. The observations were done subsequently. The observations came from real life observations and pictures.

4.4 Limitations

This section aims to access the limitations of this research. The limitations of the used methods and the limitations of the research cases are examined:

The role of the researcher as a participant observer is an important limitation of a case study in general. In Ethiopia, being a foreigner from Holland influences the answers of the small-scale farmers, especially in the case of Alfa farms and Cowgrow, because they are managed by Dutch lead farmers. This is prevented by showing them the letter from Wageningen University which states that the research is conducted independent from the lead farm.

This research was partly conducted together with Degu Tolera, an Ethiopian student who also did his master thesis research. He translated lots of Amharic information from the small-scale farmers for me. The use of an external translator always influences the research because the data is second hand. Some of his questions were the same as mine which made the research less reliable. Sometimes Degu even did not ask my question to the farmer because he knew the answers already. Because of this, the interpretation of the data became harder. The information was already interpreted by Degu before I could start my interpretation.

One interview fragment of an interview conducted with Degu was also translated by Sammy (another translator). He told me that Degu did not translate every word. Degu gave only a summary of the information given by the small-scale farmer. Since I knew this, I asked Degu to translate literally the words of the small-scale farmer.

The cases of this master thesis research face several case-specific limitations:

Alfa farms: Only a few of the customers were visited due to the low amount of customers. The low amount of customers is a limitation for the generalisability of the research. Due to this low amount (400 farmers used the services of Alfa farms before) there is a population bias in the results. Only more commercialized small-scale farmers made use of the feed supply (5 of the 6 farmers indicated milk production as their main income).

Cowgrow: One limitation is the fact that all the farmers in and nearby Hidi are linked to Cowgrow. There was no alternative available for the small-scale farmers, so I could not find someone to tell me the negative sides of Cowgrow which resulted the relation with Cowgrow to stop. Another limitation of the research data is the interviews with the lead farmers. Both interviews were conducted in Dutch, which makes it less reliable when translated to English.

FSC Ambo: A limitation is the amount of interviews. Due to political instability it was not possible to go for a longer time to Ambo. The FSC was also not able/willing to share the addresses of the small-scale farmers who were involved in the training program.

Genesis farms: A lot of the interviewees were customers from the direct surroundings of Genesis farms. Customers from Genesis who live further away from the farm could evaluate the service provision in a different way. Genesis farm has an amount of 200 small-scale customers, only 20 farmers bring their milk directly to Genesis farms.

HARC: Because the research centre works in 13 woredas, this lead farm could be a research case for one master thesis research. Because of the time schedule we were only able to visit one woreda, the woreda around the HARC. Even in this woreda there were differences in service delivery due to accessibility, which might also be the case in other woredas. Another limitation was the selection of small-scale farmers. Since we did not know the places of the small-scale farmers, we were not able to select them ourselves. The HARC offered us a list of addresses from small-scale farmers, but they were not randomly selected, because the small-scale farmers in Holeta woreda were visited only in 2 small places around Holeta. If the small-scale farmers were randomly selected throughout the whole woreda, the results would be more valid.

4.5 Triangulation

This section aims to elaborate on the used triangulations in the research as a whole and the triangulation methods used to determine the limitations mentioned before.

This research was conducted using multiple research methods. The use of multiple methods strengthens the viability of findings of this research. The results of different types of information from different sources validates the gathered data. (Yeasmin & Khan, 2012)

A method used to triangulate the research at the lead was asking the same questions at different persons. Sometimes the lead farmer and an employee gave different answers. These results were leaved out from the research. This ‘double interviewing’ was conducted at Cowgrow, the FSC Ambo, Genesis Farms and HARC. Also during the small-scale farmer interviews it was important to ask questions again. Asking broad questions like: ‘Do you need more services?’ where answered negatively contrary to the question: ‘Do you need more training in farming?’ was answered positively.

To overcome language barriers Degu Tolera, a student of Ambo University conducted a research together with this master thesis research. We travelled together and he translated the local language into English. Our research objectives were different, to make a clear distinguish between the two researches. Some interviews of small-scale farmers from Genesis farms and Cowgrow were translated by another translator, Sammy. He lived in the neighbourhood and was available for translation. One farmer of Genesis farms was visited once with Degu and once with Sammy. Asking the same questions with different translators made it possible to triangulate the interview. Also the translation of an interview fragment of another translator showed small differences. The biggest difference was the amount of words translated.

To validate important information on the small-scale farms, it was important to observe the practices on the farm. Also talking with my translator about the behaviour of the interviewees gave me more information about the quality of the research. During the interviews, some questions were asked twice in one interview to find out if the given answers were still the same. In the case of the Farm Service Centre in Ambo, much information of the interviews did not correspond with each other. This makes the information about the lead farm activities very unreliable.

Table 4) This table aims to show the used methods divided per lead farm:

	Alfa farms	Cowgrow	Genesis farms	HARC	FSC Ambo
Site visit and observations	++	++	++	++	++
In-depth interviews	+	++	++	++	+
Artefacts	++	--	++	--	+
Survey	--	--	++	--	--
Case selection	Found via Dutch relation	Found via Dutch relation	Found via Dutch relation	Newspaper	Found via Dutch relation
Sampling small-scale	Lead farm record	Employee	Milk collection grid	Lead farm record	Agricultural agency
Limitations	Small research population	No other service provider	Only interviewees from nearby	Selected by the research centre	Political instability
Triangulation	Asking questions several times	Asking same questions to several people	Multiple research methods	Asking same question to several people	Asking questions several times
Multiple translators	--	++	++	--	--

5. Results

This chapter aims to describe the results of the case study conducted in Ethiopia. The first section will provide an introduction to the daily practices of the dairy sector in Ethiopia and an introduction in the research area. The subsequent chapters will describe the results of the individual cases.

5.1 Introduction

This section aims to give an overview of the results of the research. The first three sections of the introduction provide insights in the dairy sector in Ethiopia in general. The fourth section is an introduction specific on context of the cases of the research.

5.1.1 The value chain in Ethiopia

The value chain in Ethiopia is very complex, with both formal and informal channels and a variety of value chain actors. 95% of the milk production in Ethiopia is sold on the informal market (USAID, 2013). The term 'informal' is used to describe the marketing system of dairy products without intervention of the government in marketing (Yigrem et al., 2008). The formal marketsystem ('official market system') and commercial dairy production face severe constraints. Low average milk production per cow, limited access to markets, low and unstable pricing and poor logistics between actors in the value chain makes the value chain inefficient and unable to cover the demand of milk and milk products in Ethiopia. Increasing urbanization, higher income per capita and a continue population growth foster a higher demand for dairy products. However, the demand for raw milk fluctuates during the year due to fasting periods. All the milk in those periods needs to be processed into perishable products. The previous mentioned problems are the reasons of the import of milk products from international markets, while large parts of Ethiopia are prolific enough to produce enough milk to satisfy the internal market. 2.86% of worlds' livestock population lives in Ethiopia, ranked at the 8th place, more than the 2.83% of USA's livestock population. However, Ethiopia is still a country that imports dairy products due to a very low production and productivity of the livestock population. (USAID, 2013)

Small-scale and commercial dairy farmers, dairy service providers, input suppliers, cooperatives, transporters, traders, supermarkets, small retail shops and processors are all involved in the dairy value chain from cow to human. (USAID, 2013)

The raw milk is mainly consumed and processed at home. More than three-fourth of the milk produced by rural households is consumed at home (Staal et al., 2008). The major milk products are raw milk, sour milk, curd (defatted sour milk), ghee (heated butter) and various kinds of butter, cheese and yogurts. Most of the raw milk is rapidly processed in milk products as a result of rapid spoil of raw milk. (USAID, 2013)

Market oriented milk production is centred in the highlands where temperature and rainfall are suitable for fodder production (65-75% of total livestock). Commercial farmers are situated around the cities. Consumers and retailers buy their milk directly from the dairy farmers. Besides milk production, cows are used in agriculture and serve as insurance for food during drought periods. (USAID, 2013)

5.1.2 The role of cooperatives in the Ethiopian dairy sector

A few decades ago, the Ethiopian government initiated the establishment of farmer cooperatives (Bernard, Gabre-Madhin, & Taffesse, 2007). The Ethiopian law defines cooperatives as: 'associations established by individuals on a voluntary basis, to collectively solve economic and social problems and to democratically manage them' (Francesconi & Heerink, 2011). Dairy cooperatives play an important role in the Ethiopian dairy sector by buying milk from their members, process it and sell the dairy products on the distinctive markets in the city (SNV & Consult, 2008). They are established to improve the economic power of small-scale farmers reduce market risks (by creating a stable market) and production costs. They may also facilitate access to inputs, knowledge and credit (Abebaw & Haile, 2013). Research shows divers success of farmer cooperatives. Research of (Tegegne et al., 2006) shows the positive practices of the Ada'a Dairy cooperative, while (Francesconi et al., 2011) and (Bernard et al., 2007) found no significant improvement of commercialization. The results show that cooperatives in Ethiopia has mainly a positive effect on middle class farmers. This selective membership neglects poor small-scale farmers. Good working cooperatives have a more supportive rather than a commercial approach (Bernard et al., 2007).

5.1.3 Gender and the Ethiopian dairy sector

According to the literature, women dominate the production process of milk in the dairy sector in Ethiopia (SNV & Consult, 2008) (Makoni et al., 2014). Most of the milk produced by small-scale farmers is processed on-farm into butter and cheese, generally done by woman. (SNV & Consult, 2008). However, research shows that women in Ethiopia do not own the cattle. Generally women only participate in the dairy production process (Abebaw et al., 2013). When it comes to business operations, men are the ones who make the decisions. Getting access to market information, veterinary services and AI/bull service are the task of the men in the production process as well as heavy manual activities (Aregu et al., 2010). This pattern slightly differs per region, but the above mentioned task division is most common in Ethiopia (more details: (Aregu et al., 2010) (Abebaw et al., 2013). Also within farmer cooperatives the gender composition is male-dominated (Abebaw et al., 2013).

5.1.4 Introduction to the research area

This research is conducted in the so called milk shed of Addis Ababa, Ethiopia. There are several milk sheds around Addis Ababa that are the main sources of milk for this city with millions of people. The major milk sheds around Addis Ababa are: Adama-Asella, Ambo Woliso and the Great Addis milk shed. The cases examined in this research are situated in these milk sheds. (Zijlstra et al., 2015)

The Adama-Asella milk shed is the largest in the country in terms of the potential volume of raw milk production as well as the number of milking cows. This milk shed is 200 km long and is located east of Addis Ababa, connecting Dukem -- Debre Zeit – Adama -- Assela. It has well-developed infrastructure to access the large Addis Ababa market and other small towns using new highways. The area also has high potential for roughage production, access to feed from nearby feed factories (Alema Koudijs Feeds, Ethio Feed and others). Factory by-products such as brewers' grains are also widely available. The number of crossbreds and exotic cows are relatively high and artificial insemination (AI) services are functioning well. Alfa farms, Genesis farms and Cowgrow are part of this milk shed. (Zijlstra et al., 2015)

The Ambo-Woliso milk shed consists of West and South-West Shoa in the Oromia region. Market potential is high because of access to the big milk market Addis Ababa. Feed production conditions are good, by-products are available and AI and veterinary services are of moderate quality compared to Great Addis and Adama-Asella milk sheds. Milk production is low compared to the number of milking cows, since most of them are local breeds with low average daily production (Zijlstra et al., 2015). The Farm Service Centre in Ambo (FSC Ambo) and Holeta Agricultural Research centre (HARC) are situated in this milk shed, while they both are not acting as a milk supplier to Addis Ababa.

5.2 Alfa fodder and dairy farm Plc.

Location:	Oromia region, West Shoa zone, Ada'a district, kebele 05
Coordinates:	8° 48,647' N, 39° 3.981' E
Rainfall (annually):	500-1000 mm
Meters above sea level:	1900 meter
Number of small-scale farmers served:	10 at this moment, 400 served over the last years
Distance to small-scale farmers:	300 m – 5 km
Lead farmer	Peter Stam

Source: http://www.gpscoordinaten.nl/bepaal-gps-coordinaten.php

Introduction

Alfa fodder and dairy farm (Alfa farms) is established in 2008 by a Dutch entrepreneur (Bert Flier). Alfa farms is established in Debre Zeit, 45 km south east of Addis Ababa (map can be found in annexes). In 2009 the construction of the cow barn and the house for Peter Stam and his family started, the manager/lead farmer at this moment. The herd of Alfa farms consist of 130 lactating, 20 dry cows, 120 heifers and 80 bulls. All cows are pure Holstein, imported from Holland.

Alfa farms has different objectives. The first and most important objective of Alfa farms is to produce high quality milk in Ethiopia with Dutch expertise on dairy farming. Other activities of the farm are bull fattening, production of pigs and the sale of high quality cow feed to small-scale farmers in the surroundings.

Services offered and mechanisms used

The offered service by Alfa farms is the distribution of high quality feed to small-scale farmers. Alfa farms produces a balanced dry feed diet in bags of 25 kg. Alfa farms mixes ingredients from several feed suppliers to create a balanced diet for its own cows based on Dutch knowledge about feed production. One cow needs 25 kg of feed per day, so feeding a cow becomes very easy for a small-scale farmer. The small-scale farmers have only a business relationship with Alfa farms. There is less exchange of knowledge between small-scale farmers. At the beginning of the feed delivery service, the small-scale farmer receives a leaflet with information about additional ingredients during the different development phases of calves/cows (can be found in the annexes in hard copy version).

Coordinating role

According to (Poulton & Lyne, 2009), vertical coordination in an agricultural setting may prevent and overcome problems such as the lack of land (and therefore the availability of feed) and the quality and a year round availability of inputs. The coordinating role of Alfa farms in the value chain is at the first segment of the value chain (inputs). Alfa farms delivers an input that the small-scale farmer uses for the production of milk (the second segment of the value chain). Alfa farms' coordinating role is therefore at one hand vertical. Vertical coordination often needs many repeated interactions, in this case every day delivery of feed.

Alfa farms is a horizontal coordinator as well, since in brings together feed ingredients from different feed suppliers (feed from Alema Koudijs, maize from the agriculture institute Debre Zeit, by products of beer production from Heineken (Peter Stam: personal communication, observations)). Alfa farms' coordination adds not just quality to the feed, Alfa farms also coordinates the quantity of the feed and the timing of the delivery which shows that horizontal coordination may lead to horizontal integration of services offered by independent suppliers. The combination of vertical and horizontal coordination shows that Alfa farms is a complementary coordinator of a part of the value chain. The complementary services delivered are delivered via an informal agreement with the customers (observations). Alfa farms is not a focal coordinator, since it does not deliver services throughout the whole value chain (Poulton et al, 2010; Poulton & Lyne, 2009)

Alfa farms anticipated more coordination with other actors in the value chain. Peter: "I expected more cooperation with other actors in the value chain for example the processing industry in paying the milk based on quality. Everyone is focusing on his own profession and does not work together to increase the quality." Since market orientation and commercialization needs development of the entire value chain, Alfa farm need to cooperate with other service providers to become a value chain developer (Jaleta et al., 2009). The dairy value chain in Debre Zeit needs a complementary coordinator who coordinates interdependent actors in the value chain in order to develop the value chain (Poulton & Lyne, 2009).

Lead farmer models

Alfa farms uses an indirect master farmer model. All the interviewed small-scale farmers became customer of Alfa farms via information of their neighbours. The (former) customers of Alfa farms told them about the feed supply service of Alfa farms. These farmers were passive master farmers. Based on the interviews, Alfa farms did not ask and train them to do so. The small-scale farmers also do not offer the feed to their neighbours (table 1 and 2).

Alfa farms uses the business hub model for its lead farming role in the value chain. Alfa farms' service delivery is based on a business to business relationship. The main focus of Alfa farms is not to commercialize small-scale farmers in the first place, but to produce high quality milk and feed. Alfa farms anticipated more coordination between other actors in the value chain as mentioned before.

Combining the information of the interviews of the small-scale farmers and the lead farmers opens up the contours of a new lead farmer model. In short: the model of infrastructural inclusion. The main goal of Alfa farms is to produce milk and producing high quality feed is one of the ways to reach that goal. Alfa farms give small-scale farmers the opportunity to buy the balanced diet feed from them and

includes the farmers in their infrastructure of feed preparation. This model of lead farming is less labour intensive: buying more resources on the existing markets and providing the feed to small-scale farmers.

Lead farmer perspective on small-scale farmer development

Lead farmer Peter Stam faced problems in getting long-term customers and to get sustained trust from the small-scale farms. Because of the high price, 390 of the 400 farmers served in the past stopped after a while. Mainly because they did not see fast results on the relatively high investments in feed. As lead farmer Peter Stam stated: “It is hard to convince small-scale farmers to buy the balanced diet feed. The small-scale farmers expect improvements of the milk production and animal health in a short period of time. But the concept of long term investment is not developed. Changes in the milk yield are best visible at the start of a new lactation. Ethiopian farmers need practical examples of 'good experiences' before they will use the feed for the long run. A high success rate of innovation introduction in Ethiopia needs a small group of innovative small-scale farmers who experience improvements with the innovation. They can spread the good experiences to their neighbors.”

Characteristics of the interviewed small-scale farmers of Alfa Farms

Number of small-scale farmers interviewed: 6

	Average	St. dev.
Farmers’ age (year)	43,6	3,9
Education (grade)	8,6	4,7
Household members	6,4	3,4
Total number of cows (all crossbred)	7,6	2,2
Number of lactating cows (crossbred)	3,4	1,2
Total amount of milk per day (L)	41,2	17
Average per crossbred cow (L)	11,7	2,4

Milk buyer (besides home consumption):	Holland Dairy, final consumer, home processing, cooperative.
Dairy as only income:	Yes for five farmers, one for side-side business.
Gender of the farmers:	All male.

Notes:

All the cows of the small-scale farmers were Borana x Frisian Holstein breeds. The number of lactating cows is high compared to the small-scale farmers of the other investigated cases. The total amount of milk per day is also high. The reason for this could be that the income of the dairy is the only income of most of the farmers. The average milk production per cow per day is slightly higher than the small-scale farmers of other cases, and corresponding with the daily amount of Genesis farms.

Evaluation of the services by small-scale farmers

All the interviewed farmers agreed on the high quality of the feed offered by Alfa farms. The farmers reported increased milk yield and improved health of the cows as an effect of the use of the feed of Alfa farms. But at the same time they all agreed independently from each other that the quality of the

feed was decreasing. One of the farmers mentioned a lower milk production, another mentioned a higher amount of straw (low quality feed and cheap) in the feed. Peter Stam suggested the length of the straw as a possible reason for this perception. That could make the feed visually of a lower quality.

Half of the interviewed small-scale farmers mentioned the price of the feed as being too high. The price of feed increased over time (two times a year). The other half of the small-scale farmers mentioned the price as high, but worthy because of the high quality. Two of the six famers went to Alfa farms to ask for a lower price, but the lead farmer did not lower the price.

Another important point of the feed delivery is the decrease in labor. The ready-to-use bag of 25 kg per cow decreases the labor of buying and mixing the right amount of ingredients in the feed.

Expectations from the lead farmer

All the small-scale farmers evaluated the offered services positively and no one expected more services from Alfa farms. Because of the business to business relationship and the availability of other service providers, there is no need for more services. The farmers know that Alfa farms only delivers the feed and no other services.
The small-scale farmers faced several problems. Lack of land, low price of milk and high price of feed were the problems mentioned by two-third of the farmers, but they did not see a role for Alfa farms to overcome these problems.

Demand articulation

The small-scale farmers asked for a lower price of the feed, but Alfa farms did not lower the price. The lead farmer replied: “The price of the ingredients of the feed is fluctuating throughout the year, but the price of the feed only changes twice a year. The price of the feed is the same when the price of the ingredients used is low, but also when it is high.”

Based on the interviews farmers indicate that there is no need for other services from Alfa farms. To the question how they would ask for another service at Alfa farms, the small-scale farmers replied that Alfa farms need to inform them about the introduction of new services. They will not ask for services themselves. All the interviewed farmers started doing business with Alfa farms because they heard about the feed supply service of Alfa farms from other small-scale farmers.

Observations

Compared to small-scale farmers connected to other lead farms, the cowsheds and practices of the small-scale farmers look more advanced: more light, better access to water, clean floors and clean cows. Most of the small-scale farmers fed their cows also with feed from other feed suppliers. Two of the small-scale farmers only fed the lactating cows with the feed from Alfa farms. Farmers used teff straw, hay and brewers waste as alternative feeds. One farmer even made a covered area of 50 square meters for his cows to walk around freely in and outside the barn.

Generalizability

The case of Alfa farms is very context specific, namely the context of Debre Zeit. The availability of multiple other service providers and (most important) a competitive formal milk market makes it able for Alfa farms to offer feed supply only. Being a service provider like Alfa farms in the rural areas (with less other service providers available) would not be feasible. The dairy milk shed of Debre Zeit is in a higher developmental stage than most other milk sheds of Ethiopia (Makoni et al., 2014). Further research could be done on the demand/supply articulation of a comparable lead farm, since there is no supply articulation by Alfa farms.

5.3 Cowgrow Plc.

Location:	Oromia region, East Shoa zone, Ada'a district, Egdu woreda, Hidi kebele, rural area
Coordinates:	8° 48.647' N, 39° 3.981' E
Rainfall (annually):	500-1000 mm
Meters above sea level:	1920
Number of served small-scale farmers:	53
Distance to small-scale farmers:	200 m – 4 km
Lead farmer:	Ruben van Kooten
General manager:	Jan van de Haar Sr.
Secretary of FFE program	Afework, employee of Cowgrow

Source: http://www.gpscoordinaten.nl/bepaal-gps-coordinaten.php

Introduction

Cowgrow is located in the rural area, 10 km eastwards of Debre Zeit. The compound is located on a hill half an hour walking from the centre of Hidi, a small village where all the small-scale farmers connected to Cowgrow live. Compared to the small-scale farms in Debre Zeit, the space per cow is bigger and the cows live in wooden houses covered with cow manure, instead of concrete barns. All the farmers in and around Hidi with cows for dairy production use the services delivered by Cowgrow. The rural area in Hidi is all used for crop production, mostly teff (the predominant cereal produced in Ethiopia).

Cowgrow is part of the Solagrow group. Solagrow was established in 2008 by Jan van de Haar sr., and in 2009 Cowgrow was established by his son Jan van de Haar jr. and Ruben van Kooten, the current managers of the lead farm. The cows of Cowgrow are crossbreds of Holstein bred and the local Borana bred.

Services offered and mechanisms used

Solagrow together with Farm Friends Nederland (FFN) established the 'Farm Friends Ethiopia' program (FFE). FFN is a Dutch NGO that provides credit to buy pregnant heifers for small-scale farmers in Ethiopia and Tanzania via a lease system. FFN covers only the financial part of the FFE program, the

FFE cooperative handles the operational activities. All the services of Cowgrow are offered as part of the FFE program. FFE is an Ethiopian cooperative of small-scale farmers established by Cowgrow. The cooperative has a board, consisting of a chairman, a financial officer, a secretary and four small-scale members. The secretary (Afework, employee of Cowgrow) is involved in the FFE cooperative as a technical assistant, the other board members are all small-scale farmers from Hidi. The cooperative operates almost independent from Cowgrow. Cowgrow only plays a role as a bridge between FFN and FFE. A small-scale farmer can lease a cow from FFE on credit. The farmer has to show his bank account to show that he has enough money to feed the cows for the first months. The other part of the price of the cows is provided on credit to the farmer. The first time 40 pregnant cows were supplied to selected small-scale farmers in Hidi by chance, due to the high demand. The credit is paid back to FFE via the milk collection grid (checkoff from milk money) at Cowgrow in three years. When the loan has been repaid, another cow can be leased by the farmer himself or by another farmer to continue the program. The return of the invested money in the FFE program makes the program sustainable.

The FFE board members meet twice a month to discuss the management and current problems in the FFE cooperative. Once a month the FFE board members and the small-scale farmers of the cooperative meet each other at a central place in Hidi to discuss the complains, future plans and experiences of the cooperative and farm activities in general. The secretary gives only technical advice and he discusses the problems faced by the small-scale farmers with Cowgrow to find a possible solution. “We as Cowgrow at this moment have a back-up function. FFE is taking over more and more responsibility. This was already the goal since we started the FFE program” (Afework, personal communication).

The mechanism of regular meetings is used to come to a supply and demand match of the FFE cooperative and Cowgrow. This structure of communication evolved over time. “Regular meetings lead to an organic collaboration with changes at both sides. The provision of a service starts in a certain manner and we change that overtime, daily if needed, it a continuously changing process” (Jan van de Haar Sr.). This approach fits with what (Kilelu et al., 2014) describes as “the matching process of demand and supply that focus on optimal interactions rather than on monitoring predefined outcomes”.

As part of the FFE program, Cowgrow has a milk collection grid for small-scale farmers. Farmers of Hidi bring their milk to the compound of Cowgrow twice a day, in the early morning and in the afternoon between 3 pm and 5 pm. The farmers bring the milk in small cans and flacons. At the compound, the milk is checked with an alcohol test and the amount of milk is recorded. The milk is brought to Holland Dairy together with the milk of Cowgrow. The amount of milk is recorded and the farmer is paid monthly.

Cowgrow offers also a bull service to the small-scale farmers. The FFE cooperative bought a bull from Cowgrow, the bull (named ‘Hans de Stier’) remains in the barn of Cowgrow. A small-scale farmer can come to the Cowgrow barn with the in-heat cow to impregnate it. The costs for the service are only 30 birr, a low price compared to the 50 birr of other insemination providers.

In the near future, FFE (together with Cowgrow) will start with feed supply and milk collection at a central point in Hidi. The feed will be brought to Hidi together with the feed needed by Cowgrow. The milk will be cooled, which is better for quality of the milk.

Other important services from Solagrow are the water supply and the clinic. The water supply is used for the farmers' domestic us as well as for watering the cows.

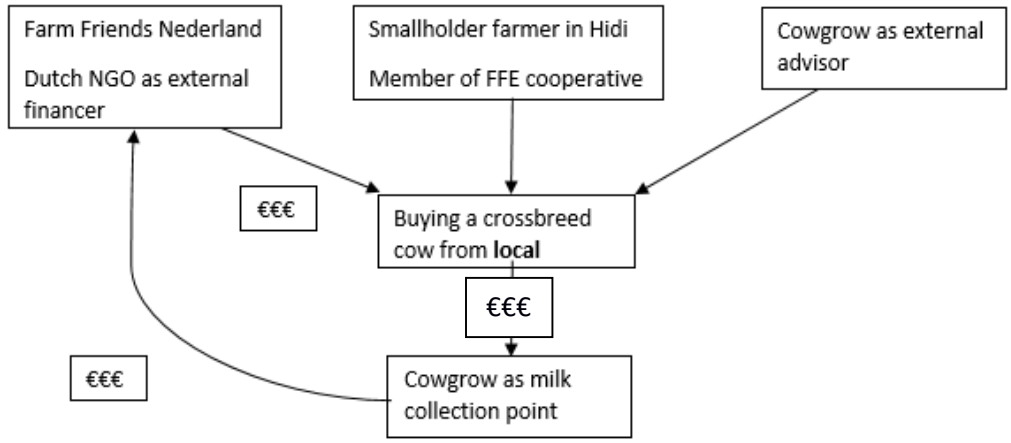

Figure 1) Structure of the FFE program (source: interviews with lead farmers and key-informants)

Coordinating role

The coordinating role of Cowgrow is a combination of focal and horizontal. Cowgrow offers pregnant cows, a milk collection grid, a bull service, and advice for small-scale farmers of Hidi in one program, the FFE program. Cowgrow only provides a pregnant cow to a farmer if the money from the milk (sold via the milk collection grid) goes partly to FFN. The milk collection grid is part of the agreement. Since Cowgrow is almost the only provider of dairy farm services in the area, this focal coordinating role is crucial for the small-scale farmers in Hidi. Most of the farmers in Hidi even did not have dairy cows before Cowgrow came to Hidi. By doing this, Cowgrow covers the input, production and output segments of the value chain. Focussing on the development of the whole community instead of only the cows is very important to build trust, an important part of lead farming. "The water supply (for free) and the clinic are very important for me. That is useful for the whole community." The establishment of FFE as a cooperative by Cowgrow makes it a horizontal coordinator. The role of Cowgrow in FFE is decreasing, so the horizontal coordinating role of Cowgrow decreases. When a small-scale farmer is offered with a credit to buy a cow, an employee of Cowgrow goes together with the small-scale farmer to the local market to buy a cow.

Lead farm models

One of the lead farm models of Cowgrow is a specific form of the demonstration model. Some of the small-scale farmers in Hidi are also employees of Cowgrow and have crossbred cows themselves at home. As they are working together as employees and with Ruben as operational manager, they can directly ask questions about the practices on the farm. "Some of the employees work now already for three years at Cowgrow and have their own cows at home. One former employee of Cowgrow already has six milking cows and earns enough money for his family only from the dairy. They see how important it is to feed cows the right feed, to give them a sufficient amount of water, they see with their own eye's how to handle the cows." (Ruben, personal communication) A small-scale farmer agreed: "Cowgrow works for me as a demonstration place: I am looking on how cows grow, for anything how they work with the cows. I use the experience now on my farm" These findings support

the theory summarized in table two. Cowgrow as a demonstration farm shows the enhancement of productivity and the practice oriented approach of this model.

Many of the small-scale farmers asked Cowgrow to help them with the provision of feed for their cows. This is an example of the before mentioned infrastructural inclusion model. Small-scale farmers profit of the existing infrastructure of the lead farm as feed supply and milk marketing.

Lead farmer perspective on small-scale farmer commercialization

According to Jan van de Haar sr. and Ruben, the key to small-scale farmer commercialization as a lead farmer is the involvement of small-scale farmers in the daily work on the farm. “Tell the farmer what to do: he will forget, train the farmer what to do: he will understand, involve the farmer in what you do: he will do it. Open the gates of your farm. Be there and stay there is the best way for development” (Jan van de Haar sr.). “The employees of Cowgrow see that structural investments are profitable. They cannot learn that in a training for one or two days. They see what happens with a cow when it receives good hygiene, feed and water. Being an example farmer is the best method to show the small-scale farmers the practices he could implement on his own farm” (Ruben).

According to Ruben, being a lead farmer with a coordinating role like Cowgrow, cannot implement this approach when it is only commercial driven. “I have an employee who works most of the time on the FFE project. I have to pay him, but the program itself is not profitable. Starting lead farm activities besides your own business needs also a social motivation”.

Problems faced as lead farmer

Cowgrow faced some problems which are important to know for prospective lead farmers in Ethiopia. The main issue is the quality of the milk. Small-scale farmers’ milk is of low quality due to low hygiene and addition of water and other fluids to the milk. The processor (Holland Dairy) sometimes rejects the milk because of the low quality, which is of course a problem for small-scale farmers, because they do not get the money for their milk. When this happens too many times, the farmers will not be able to buy feed for their cows. This problem can be solved by using more advanced quality check methods. The milk collection grid in the centre and the milk cooler may help to increase the quality of the milk.

Characteristics of the interviewed small-scale farmers of Cowgrow
Number of small-scale farmers interviewed: 13

	Average	St. dev.
Farmers’ age (year)	25,3	7,4
Education (grade)	6,2	4,3
Household members	4,4	1,6
Total number of cows	7,6	5,1
Number of crossbred cows	2,7	1,9
Number of lactating cows (crossbred)	1,8	1
Total amount of milk per day (L)	17,4	10
Average per crossbred cow (L)	9,7	2,5

Gender of the interviewees:	6 Male / 7 Female
Milk buyer (besides home consumption):	Holland Dairy via Cowgrow (all)
Dairy as only income:	No, 12 out of 13 farmers
Other incomes:	Crop production
Employees of Cowgrow:	5 farmers

Notes:
The milk production is a side-income of the small-scale farmers. The main income comes from crop production, but the milk production is still important. All the crop producing farmers produce teff, some produce vegetables. The milk production is a year round source of income.
The education, amount of crossbred cows and total amount of milk per day is limited, like the small-scale farmers in Holeta. The farmers of Cowgrow and Holeta live both in the rural area.

Evaluation of the offered services

All the small-scale farmers were satisfied about the quality of the FFE program. The farmers encounter the FFE program as a big opportunity to buy a cow, whereas they could not buy it if the program (together with the collection and transportation of the milk) was not available. Some small-scale farmers stated: “Why should I buy a cow if there is no market? This is a very good opportunity for me” and “The government is not active in this region to provide services, so we are happy with Cowgrow”. Most of the farmers in Hidi did not have crossbred dairy cows (cows for milking only) before. One negative point of the milk collection grid was the delay of payment. According to the agreement, Cowgrow should pay once a month, but almost all the farmers mentioned a delay of at least ten days.

The milk collection grid at the Cowgrow farm is also a strategic point for small-scale farmer – lead farmer contact. “The place of the milk collection grid gives me the opportunity to look around there and to ask questions. I bring the milk and take the water at the same time” (small-scale farmer).

The small-scale farmers report the bull service as low cost and of good quality. Two farmers changed from the bull service to AI service from Debre Zeit, because “at birth time, there were male cows. With AI insemination I got female cows.” Another farmer was afraid of the bull at Cowgrow “because it damages the cow. The bull is too big.”

Before the FFE provides the pregnant cow to a small-scale farmer, the board members visit the farm of the small-scale to examine if the small-scale farmer is able to keep the cow. “When the members of FFE visited my farm, they told me what to change. That helped me to improve my farm practices.”

Expectations and demand articulation

Based on the interviews with lead farmers, key informants and small-scale farmers the provision of high quality feed is in high demand by the small-scale farmers. The small-scale farmers buy their feed in Debre Zeit (10 km distance).

Another issue all the farmers mentioned was the communication about the payment. The farmers answered that Jan told to help them, but still he does not:

Small-scale farmer: “I asked Solagrow, but still they did not give the money. Sometimes Jan is there, and I ask him many questions, but he does not answer anything. I think because it does not

matter. Solagrow is so big, Jan is always busy." "We need to talk to Jan, because he is the boss. But Jan is always busy".

Interviewer: "Why do you not talk to Ruben? He has also the knowledge about the farming?"

Small-scale farmer: "Yes, but Jan is the boss, so we need to talk to him"

This small dialogue is in contrast with the words of Jan van de Haar about the communication between the small-scale farmers and him:

"The farmers like to talk together in Oromo. And the secretary tells me about the biggest problems and complains of the farmers in Hidi. At that moment I can involve to find a solution.

The small-scale farmers in Hidi need more services from Cowgrow, but do not ask Cowgrow to offer more services. The farmers mentioned several reasons:

"I need services, but I do not ask, because they do not offer. I did not ask them to offer the service. We discuss all things with the cooperative that is enough to help me to overcome my problems."

"I am complaining in asking questions. I will buy the feed when they sell it for customers."

"I did not ask Cowgrow for AI service, because they do not offer"

All the questions for Cowgrow are first discussed with other small-scale farmers in the FFE meetings. Therefore, there is no reason for direct contact with Cowgrow. The services needed can be discussed with other farmers to share experiences.

Observations

The cow barns of the small-scale farmers in Hidi are open and the cows get extra light inside as compared to those of other small-scale farmers visited during data collection. The barns are made of eucalyptus poles. Three quarters of the wall are covered with cow manure and the upper quarter is open. The roof sticks out for preventing rain coming in. The opening between the walls and the roof brings in light and fresh air. The floor of the barns are relatively clean as compared to those of other small-scale farmer barns of other lead farms. There is also less water available and the feed is mainly teff straw in the barns. The cows of the farmers who work at Cowgrow have more access to water (for example Terrafa, our guide in Hidi).

At the milk collection grid, the small-scale farmers bring the milk in yellow cans (5 liters) or blue can (25 liters). The milk collector measures the amount of milk, examines the milk with an alcohol test (to examine the freshness of the milk). The milk is put in the milk tank (picture on front page) and brought to Holland Dairy in Debre Zeit. The records show that the amount of milk brought to the milk collection grid is stable per farmer.

Generalizability

The case of Cowgrow is the most generalizable case of this research, because their approach reaches the small-scale farmers in the rural areas with less other service providers. Most of the small-scale farmers in Ethiopia live in the rural area (Makoni et al., 2014) and has therefore potential for many

other areas in Ethiopia. Lead farmers in the rural areas need to be as independent as possible from other service providers, which means that they have to serve the small-scale farmers with services among the complete value chain, i.e. a complementary or focal coordinating role. Cowgrow has already the intention to establish cooperatives like the FFE in other places as well.

5.4 Farm Service Centre Ambo

Location:	Oromia region, West Shoa zone, Ambo district, Ambo kebele.
Coordinates:	8° 59.033' N, 37° 51.886' E
Rainfall (annually):	1000-1500 mm
Meters above sea level:	2133 m
Number of small-scale farmers served:	Unknown
Distance to small-scale farmers:	1 km – 6 km
Lead farmer:	Gadissa Gobena

Source: http://www.gpscoordinaten.nl/bepaal-gps-coordinaten.php

Introduction

In 2013, USAID initiated the Commercial Farm Service Program (CFSP) (figure 2). With this program, USAID "wants to address small-scale farmers' needs for improved seeds, fertilizers and plant protection products through its farm-service-centre model to improve commercialization of farmers and to strengthen commercial linkages between dairy service providers, producers, processors, wholesalers/distributors and markets" (USAID, 2013). USAID established six Farm Service Centres in Ethiopia. The owner of the FSC in Ambo is Gadissa Gobena. Gadissa has his own farm besides the FSC. His farm (G.G. Commercial Farm Products Plc.) is founded in 1990 and started with dairy and agriculture. In 2004 the production and multiplication of improved seeds started. The farm envisions a food secure society through the use of modern system cattle rearing and the use of improved cattle breeds. The mission of the farm is to provide selected cattle breeds to the community, preparation and provision of animal feed to the small-scale farmers and designing different mechanisms of improving cattle breeds.

Services offered and mechanisms used

Together with USAID, Gadissa Gobena farms established the farm service centre with a training room where farmers are trained in milk handling, forage growth, cow vaccinations and the health aspects of cows such as condition and birth. USAID is not actively involved in the contact with small-scale farmers, but only facilitated the establishment of the farm service centre. USAID trained the staff, funded the office and training room, facilitated the training materials and organized the trainings for small-scale farmers. Besides training, the FSC offers forage seeds, animal health service, AI service and a drug store. There is also a two-hectare demonstration field on the area of the FSC.

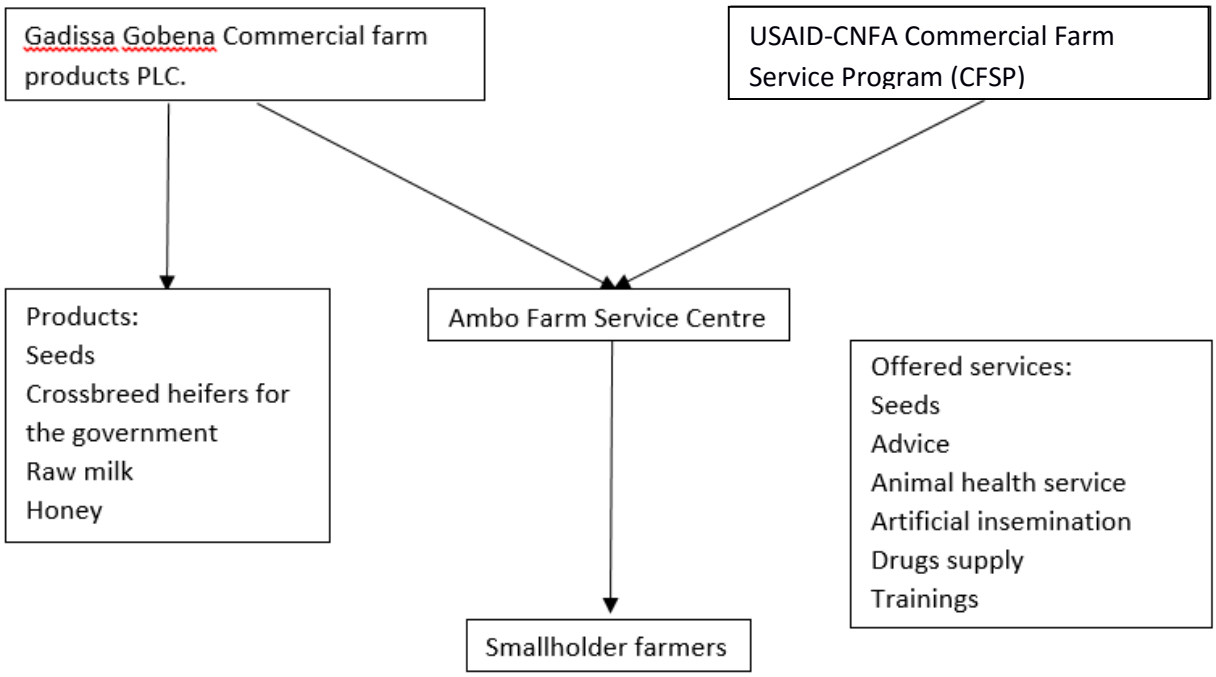

Figure 2): Structure of the FSC project (source: brochures FSC).

Coordinating role

The coordinating role of the FSC is in the first place vertical. FSC Ambo offers inputs to small-scale farmers. FSC Ambo does not coordinate actions of other service providers, which makes FSC a direct input supplier. There is no active coordination between other actors in the value chain supported by FSC. The FSC is also a horizontal coordinator by bringing small-scale farmers together for trainings and by giving demonstrations on improved farming. These trainings are an opportunity to share experiences, which strengthen the horizontal coordination between small-scale farmers. The combination of these services shows that the FSC has a complementary coordinating role. The training on health aspects and vaccinations and the offering of veterinary services, medicines and vaccinations are an example of the complementary role of the FSC. PS: The results of the interviews with the small-scale farmers showed other coordinating roles. This is based on the website and the interview with the lead farmer.

Lead farmer models

FSC Ambo uses a training and demonstration model. Together with USAID a training room and demonstration plot for improved forage seeds was established to give the training. An AI technician, a veterinarian and an agronomist were trained by USAID at the start of the project.

Another model used by FSC Ambo is the business hub model. The trainings centre and the shop are used as a place to sell medicines and vaccinations. All the services delivered to small-scale farmers are delivered at one place on a commercial basis. This selling point is an opportunity for the lead farmer to stay in contact with the small-scale farmer and is a good place for demand articulation.

Lead farmer perspective on small-scale farmer development

The owner of FSC Ambo expected the government as the most important driving force of small-scale farmer development. Gadissa has close contacts with the government. He sells crossbred heifers to the government. The government distributes the heifers to small-scale farmers elsewhere in the country. At the training centre, development agents are trained to improve their skills and knowledge. These development agents are paid by the government for small-scale farmer development. Development agents are mainly advisory service providers. For small-scale farmer development, the lead farmer refers consequently to institutions (government or NGO) or small-scale farmers themselves.

Characteristics of the interviewed small-scale farmers of the Farm Service Centre in Ambo
Number of small-scale farmers interviewed: 7

	Average	St. dev.
Farmers' age (year)	61,6	14,2
Education (grade)	9,8	2,1
Household members	7,9	2,2
Total number of crossbred cows	6,3	3,1
Number of lactating cows (crossbred)	2,1	1,7
Total amount of milk per day (L)	25,6	23,4
Average per crossbred cow (L)	10,5	5,3

Gender of the interviewees: 6 male / 1 female
Milk buyer (besides home consumption): Own shop, other shops and restaurants, neighbours
Dairy as only income: Yes for 2 farmers No for 5 farmers
Other incomes: Government, house rent, crop farming

Notes:
The average education of the small-scale farmers is high, compared to small-scale farmers of the other cases. It is even higher than indicated, because three of the seven small-scale farmers where graduated. Two of them in social sciences, one in agriculture.
The age and education of the small-scale farmers in Ambo are high compared to the small-scale farmers of the other cases.

Evaluation of the offered services

The interviews of the small-scale farmers give a contrasting image of the FSC. All the small-scale farmers use the FSC only as a drug store, while the employees at the FSC indicate that they offer a wide range of services. The truth is that the FSC offered all those services in the past, but two years after the establishment of the FSC (when USAID leaved) the trainings, demonstrations and other services stopped. At this moment only the drug store is open as service for small-scale farmers.

Half of the interviewed small-scale farmers did not know about the trainings of the FSC in the past. Some farmers got the trainings from the FSC, all two years ago.

"I was trained on how to give injections and medicines. It is useful because I use it now at home. They do not give more training because they got their annual amount of training. Now I organize meetings with other farmers to share experiences."

The trainings were evaluated as useful for daily practices. The trainings and demonstration of practices were given on farm management, health aspects and feed preparation.

All the interviewed farmers indicated that the FSC promised to offer more services, but they did not offer till now.

"They told me that they will offer heifers and feed in the future for a low price, but they did not till now. He answers properly to our questions, but not practically. Practically he is doing nothing except the drug store. With the drug store he can make money without making his milk market worse."

The small-scale farmers and the FSC also think differently about the quality and price of the drugs supplied in the shop. The agronomist at the FSC stated that the price is very low and the quality of the drugs very high, "because it is not from China but from Holland, USA and France". The small-scale farmers replied in the interviews that the drugs come from China, and that he needs to buy more doses of drugs because of the low quality.

Expectations of small-scale farmers from the lead farm

Many farmers asked the FSC for additional services, for example bull service. But the FSC respond that they do not offer bull service because of the possibility to spread sexual transmitted diseases. But none of the small-scale farmers believed that this is the real cause. All the farmers replied that the FSC does not provide bull service because Gadissa Gobena will lose his milk market in Ambo if he supports small-scale farmers:

"He fears to improve other farmers because we serve the same market. He has a monopoly position now, and he is not willing to lose that position."

"FSC is not supporting me to become market oriented, he is not willing to help me grow because he sells his own milk at the same market. He is not willing to commercialize other farmers because of that."

The small-scale farmers gave this also as a reason why the FSC does not offer all the promised services. The FSC promised e.g. feed supply and crossbred heifers:

"They are not really willing to help us. He sells crossbred heifers to farmers, but not in this city. The milk price goes down if the other farmers also sells their milk on the market. That is not what he wants. He is not willing to commercialize the farmers of Ambo."

"They told me that they will offer trainings on processing in the future, but still they do not. This is very important because the milk products are highly perishable and the market here is not big enough for all of us. If we can process the milk, we are able to bring it to Addis, the big milk market."

In the past, the veterinary service was offered, but only at the service centre. The farmers who used it indicated that they need veterinary services at home, because they are not able to come with the cow to the service centre. For lead farmers, this is a negative side of offering all the services at one place (business hub model).

Demand articulation of small-scale farmers

Based on the interviews, the small-scale farmers of the FSC in Ambo indicate that the demand for more services from the service centre is low:

"I do not ask for other services; they need to tell me about that. I need information from them if they offer new services."

"If I should ask for new services, I will ask Gadissa, not the people from the FSC."

"They can call me if they offer new trainings for farmers. They are selecting farmers for training, so I wait for them."

The small-scale farmers are biding to get more services, and the reasons for that come both from the small-scale farmers' view on the FSC and the selection procedure of the FSC. In the past, the lead farmer selected the small-scale farmers to call them for trainings, but at this moment there is only the drug store. The small scale-farmers do not ask the FSC to offer the trainings to them.

Observations

When I visited the farm of Gadissa together with my nephew, he offered crossbred cows to him. There are crossbred cows available, but he does not offer them to small-scale farmers in Ambo.

Generalizability

The case of the FSC in Ambo is less generalizable to other areas because of the very context specific characteristics of the FSC in Ambo. The FSC is established by the lead farmer together with a donor who leaved two years ago. Also complicating the generalizability is the fact that the lead farm and the small-scale farmers have the same (informal) market. Research on a lead farm with a current external donor could provide information about the feasibility of private lead farmers with an external donor. The results of this case could be used to help lead farmers preventing situations like the current situation on the FSC in Ambo.

5.5 Genesis farms

Location:	Oromia region, East Shoa zone, Ada'a district, kebele 01
Coordinates:	8° 45.716' N, 38° 57.535' E
Rainfall (annually):	500-1000 mm
Meters above sea level:	1920 m
Number of served small-scale farmers:	200
Distance to small-scale farmers:	100 m – 10 km
Lead farmer:	Ato Behailu Wolde, Tacher Haile

Source: http://www.gpscoordinaten.nl/bepaal-gps-coordinaten.php

Introduction

Genesis Farms Ethiopia PLC. was established in 2003 by two investors, Gert van Putten from the Netherlands and Genesis Farms Ethiopia Plc. from the USA. Currently it is managed by an Ethiopian entrepreneur (Ato Behailu Wolde) who became shareholder and recently owner of the farm. Genesis farm has four hectares own property. Most of the land used by Genesis farms is rented from local farmers. They also lease land from the government. The amount of land fluctuates according to different contracts. Most of the land is irrigated land used for crops. The dairy herd of Genesis farms consists of five local cows, two crossbred cows and around 100 exotic Holstein cows. Next to the dairy, Genesis farms is also involved in the production of vegetables, flowers, poultry (eggs and pullets) and construction of farm equipment. (After this section: by Genesis Farms is meant: the dairy part of Genesis Farms).

Services offered and mechanisms used

Genesis Farms offers several services to small-scale farmers and uses several mechanisms to offer these services to small-scale farmers.

The milk processing plant of Genesis farms can process 10,000 liters per day. At the moment only 6000 liters are processed every day and 25% of the production is collected from 200 small-scale farmers in and around Debre Zeit. Genesis farms processes the milk of its own cows and has 15 milk collection grids in and around Debre Zeit to collect the milk of small-scale farmers. Uncooled trucks collect the fresh milk from the collection points every morning between 6:30 and 8:30 and at the end of the afternoon between 16:00 and 18:00. The milk processing plant produces: fresh milk and pasteurized milk; 3 types of butter: cosmetic butter, butter oil and table butter; natural and fruit yoghurt; local type cheese and Gouda cheese. The dairy products are sold to wholesalers, supermarkets and hotels in Mojo, Adama and Addis Ababa (all within 50 km from DZ). There is also a shop in DZ at the main road through DZ. The dairy products are brought to the customers with trucks.

Genesis farms has a school-like training room where trainings are offered to small-scale farmers. There are courses available about cattle breeding, animal husbandry, and farm management (website Genesis farms). Every new small-scale farmer who would like to deliver his milk to Genesis farms also gets training on how to bring the milk to the collection point. Training and advice is also given by personal visitation on request.

Another service offered by Genesis farms is feed provision. Three times a year, chicken drops are offered to the small-scale farmers as feed inputs. The poultry part of Genesis farms has a lot of chickens three times a year, around Easter, Christmas and New Year. The chicken drops are transported to some small-scale farmers with the truck that also collects the milk.

At Genesis farms full AI equipment is available. At request of a small-scale farmer an AI technician visit the farmer for insemination. Also bull service is available, but no one of the small-scale farmers uses it, because all the cows are kept inside continuously, so the farmers will not bring their cow to Genesis farms.

Genesis farms offers also veterinary service for the small-scale farmers. The small-scale farmers can ask the veterinarian of Genesis to come to the farm when a cow is sick.

Coordinating roles

Genesis' role in the value chain is complementary. Genesis farms coordinates the collection of milk from small-scale farmers both at home for farmers close to Genesis and at a collection point far from Genesis farms (horizontal) and processes and sells it subsequently (vertical).

To examine the possibility of focal coordination by Genesis farms, a short quantitative study with a structured questionnaire was conducted. The small-scale farmers were asked which services they used from Genesis farms. The results showed that 13 out of 19 farmers used all the services Genesis farms offers. But during the interviews the small-scale farmers replied that they did not use any other service from Genesis farms than the milk collection grid. This implies that Genesis farms does not offer their services as a focal coordinator.

Lead farm models

One of the lead farm models used by Genesis farms is the retailing farm model. Genesis farms is the link in the value chain between the small-scale farmer and the end market. The milk collection grid has all the characteristics of a retailing farm. This lead farm model can be implied in a vertical, complementary or focal coordinating role (table 2) and it only supports marketing and value chain development (table 1).

Based on information on the website of Genesis farms, another lead farm model of Genesis farms is the training farm model. Genesis farms has a training room (mentioned before) which makes the model school-like. But the lead farmer and the small-scale farmers did not mention the trainings as offered service. The lead farmer only mentioned: “The training room is not in use this moment” and no small-scale farmers received a training from Genesis farms.

Genesis farms also uses the infrastructural inclusion model (as described before). The milk of the small-scale farmers is collected, processed and sold using the equipment and marketing channels of Genesis farms.

Lead farmer perspective on small-scale farmer development

Genesis farms does not have (or no longer has) the direct intention of small-scale farmer development. “We are the milk market for small-scale farmers and the farmers know what they can get from us. The farmers can change to any other service providers in the town and they do. Mainly based on costs or milk price.” (Tacher Haile, (manager and veterinarian of the dairy part of Genesis farms) personal communication).

Characteristics of the interviewed small-scale farmers of Genesis farms

Number of small-scale farmers interviewed: 10

	Average	St. dev.
Farmers’ age (year)	48,2	15,5*
Education (grade)	8,3	4,6
Household members	5,6	1,4
Total number of cows	8,1	4,7
Number of lactating cows (crossbred)	3,8	2,4

Total amount of milk per day (L)	34,6	19,5
Average per crossbred cow (L)	11,6	3,4

* Outlier of 86

Gender of interviewees:	3 male / 7 female
Milk buyer (besides home consumption):	Genesis only: 4 Genesis + informal market (neighbours, shops, restaurants): 5, Holland Dairy: 1
Dairy as only income:	Yes for 6 farmers No for 4 farmers
Other incomes:	4 farmers: income from business/employment

Notes:
Because of the delay in payment of Genesis farms, many of the small-scale farmers changed their milk market partly to the informal market. Genesis farms did not pay the money of the milk for some months. To get enough money to buy feed, farmers started selling to neighbours and other final consumers. The characteristics closely match with the characteristics of the small-scale farmers of Alfa farms. Three of the interviewees had a 10+ amount of crossbreed cows.

Evaluation of the offered services

All the small-scale farmers agreed on the good quality of the milk collection service. The milk collection with the truck was clear and punctual. The problem of delayed payment was faced by all the small-scale farmers. Due to financial problems, Genesis farms has no money to pay the milk. Some farmers already did not receive money for over three or four months. One farmer had a credit open of 100.000 birr. This leads to very bad situations with poor small-scale farmers who have one cow, no money and no feed for the cows. The milk production is decreasing and there is no income. Four of the ten small-scale farmers were still delivering all the milk to Genesis farms while they did not get paid on time.

The feed supply (chicken drops) was evaluated by small-scale farmers as low quality. As a small-scale farmer stated: “I got four bags of chicken drops from Genesis farms, but after cleaning only two bags were useful for feed. The calves get respiratory diseases caused by the chicken drops.”

The veterinary service of Genesis farms was evaluated as slow and bureaucratic. Small-scale farmers get their veterinary service from the government because they are faster for the same price.

The AI service of Genesis farms is evaluated as low quality, because the service provision is too slow. The small-scale farmers use the public veterinary service for their insemination because they come to the farm quickly.

Demand articulation and expectations from the lead farm by small-scale farmers.

Because of the availability of many service providers, there were no big expectations from Genesis farms. If Genesis did not offer a service, the small-scale farmers themselves will find another service provider. For example, over half of the farmers over time changed to other milk collectors.

The small-scale farmers react differently to the delay of payment:

"Genesis does not pay, but Behailu is a good communicator. He openly discusses, good communication."

"He is a good man, like family for me. If there are like 10 men like Behailu in Ethiopia, Ethiopia will change immediately. He is open to speak with me."

"Behailu is a good man. I do not force him to pay. He will pay me once."

"I went to Holland Dairy now, because Genesis farms does not pay on time. They do not pay as they told us."

"Now I sell half of the milk production to neighbours and restaurants, because I need to buy feed. I need good feed for my cows, and I cannot buy it without money. I asked him to pay, but till now he did not pay"

Most of the small-scale farmers still bring their milk to Genesis farms, because they trust Behailu. They ask him to pay, but most of the time he does not give the money. Two small-scale farmers get the money of 15 days when they went to Genesis farms and asked for money.

Observations

The cows of the small-scale farmers of Genesis farms were held in closed barns with poor hygiene (standing in their own manure, no clean floor and cows). The farms were all inside the city of Debre Zeit. All the barns are closed, with little or no sunlight.

Genesis farms itself was more advantaged. The cows were cleaned every day, the floor was covered with rubber and every cow has its own water supply (Netherlands' system). But the water supply did not all work properly. The employees of Genesis farms supplied water to the cows one by one. The cows were fed with crop residues, teff straw, maize and minerals.

Genesis farm has its own AI equipment, but according to observations during visitation, Genesis farms uses its own bull for insemination of in-heat cows. An evasive answer was given on the question why the insemination service is not used.

Generalizability

The case of Genesis farms is more generalizable compared to Alfa farms. While Genesis farms also operates in the context of Debre Zeit, it offers a wider range of services (throughout the entire value chain) including a milk collection service and a processing plant. Establishing a lead farm who offers the same range of services in other places has potential for commercialization and market orientation of small-scale farmers. The most important addition to the services could be year round feed supply.

5.6 Holeta Agricultural Research Centre

Location:	Oromia region, West Shoa zone, Holeta district, Welmera woreda, Goro Kerensa kebele, Holeta town
Coordinates:	9° 3.863' N, 38° 29.982' E

Rainfall (annually):	1000-1500
Meters above sea level:	2400 m
Number of small-scale farmers served:	400
Distance to small-scale farmers:	2 – 120 km
Lead farmer:	Government agency

Source: http://www.gpscoordinaten.nl/bepaal-gps-coordinaten.php

Introduction

The Holeta Agricultural Research Centre (HARC) is established in 1965 by the government and is still a governmental funded research centre. The main objectives of the farm are to conduct agricultural research, to produce improved crossbred heifers and to provide trainings to small-scale farmers in production practices. The crossbred heifers are sold to small-scale farmers in the surroundings of Holeta for a discounted price. The total number of cows on the research centre is 280. 55 of them are local cows (Borana) used for research, e.g. on digestion and optimal nutrition. The other 225 cows are crossbred cows (50 up to 75 percent Friesian Holstein and 25-50 percent Borana). 130 of the crossbred cows are lactating. They produce 1061 litres of milk per day, which means 8.2 litres per cow per day on average. The milk of the 15 lactating Borana cows is fed to the calves.

Services offered and mechanisms used

The mechanisms used to realize a match between demand and supply are crossbred delivery, advisory service by training, demonstration and visitation, and seed supply. The supply of these services are offered together in an agreement to prevent side selling.

The heifers who are delivered to the small-scale farmers are grown up at the research centre. The price of the crossbred heifers is very low as compared to the market price. The average price for a crossbred heifer of the research centre is 600 birr, depending on the blood level and the age of the heifer. The price of a crossbred cow on the local market is between 30.000 and 45.000 birr, depending on the blood level and the age of the cow/heifer. The crossbred heifers are distributed to selected farmers in 13 woredas in the West Shoa zone of Oromia region: Holeta, Ada'a Berga, Addis Alem, Dendi, Geldu, Ambo, Imchimi, Woliso, Karsa, Kebena, Emdhir, Abechege and (recently) Chelia. A total amount of 79 crossbred heifers are distributed to small-scale farmers in 2015.

The small-scale farmers are selected by the development agent (DA) of their woreda (figure 3). The DA is a government-funded advisor of small-scale farmers. The HARC asks the DA to select 20-25 small-scale farmers in his/her woreda, based on farm management, availability of land to produce forage and market orientation. These farmers are asked to involve in the development program of the HARC. The selected farmers get a heifer by chance via a lottery system because of the high demand for crossbred cows by small-scale farmers in the region. The development agent is an important link between the small-scale farmer and the HARC. The advantage of using the DA is that they know the context and social structures of the farmer community (interview researcher of HARC). The DA is therefore a good counsellor to prevent negative effects in the social context of lead farming (section 2.1.4, (Kilelu et al., 2014)).

Together with the distribution of crossbred heifers, the HARC also offers trainings and demonstrations on husbandry, feed preparation, production, milk handling and milk hygiene. The trainings are for two or three days. The farmers are asked to come to the training location. The HARC rents a classroom in the woredas far from the research centre for trainings, or the HARC will rent a bus to bring the farmers to the HARC to give a demonstration. All the expenses of the farmers, like lunch and transport costs, are covered by the research centre. After the training the farmers get their crossbred heifer. The employees of the research centre try to visit the farmers twice a month to give additional advice on the above mentioned subjects. The repeated interactions of the HARC are important to reach a good demand and supply (Kilelu et al., 2014).

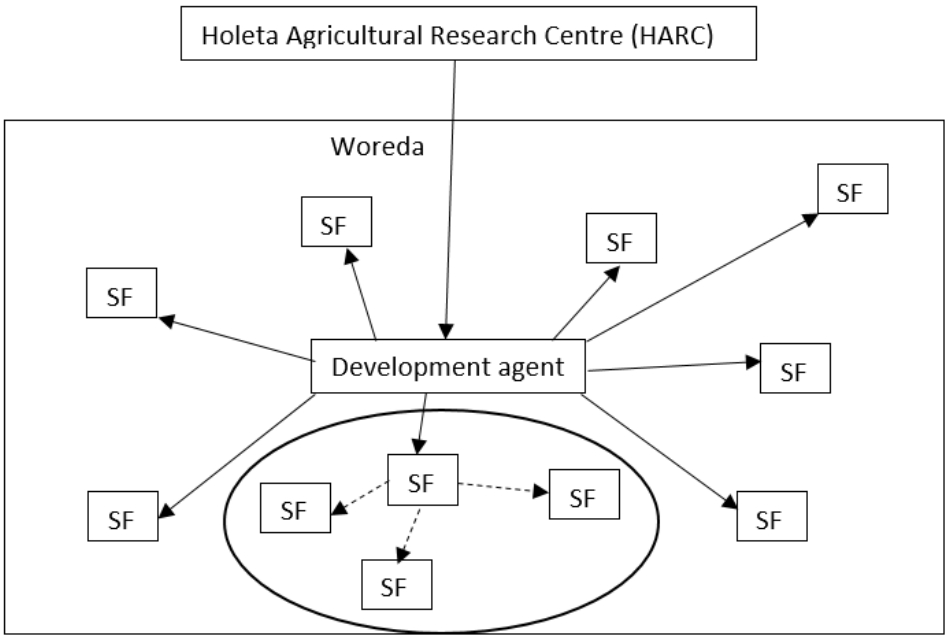

Figure 3): Small-scale farmer selection method and lead farm model of HARC.

Coordinating role

The coordinating role of the HARC is focal. All the services are delivered in the context of the delivery of the heifers to small-scale farmers. The delivery of the heifer is set in an agreement, a prerequisite for focal coordination (table 1 and 2) (Bijman, 2008). Because of the great difference in price between a crossbred cow of the research institute and the local market, the agreement aims to prevent side selling. The research centre brings together the same actors in the value chain (small-scale farmers) and fosters the exchange of experiences between small-scale farmers and let them discuss about the provided information. This horizontal coordinating role turned out to be very important for small-scale farmers to get hands on information at farmer level. The HARC therefore has a focal and a horizontal coordinating role

Lead farmer model

The small-scale farmers who are involved in the program of the HARC serve as a master farmer in their community. A selected small-scale farmer with a crossbred cow serves as an example farmer for the

community (figure 3). Other farmers in the community asked the HARC for a crossbred heifer, because they saw that crossbred cows give more milk and provide additional income to the small-scale farmer involved in the heifer supply program of the HARC. Other farmers bought a crossbred heifer themselves, because they saw in practice that the crossbred cow of their neighbour from the HARC gives more milk than their own cattle.

Characteristics of the interviewed small-scale farmers of Holeta Agriculture Research Centre
Number of small-scale farmers interviewed: 9

	Average	St. dev.
Farmers' age (year)	45,4	7,9
Education (grade)*	4,3	2,2
Household members	7,2	2
Total number of cows	10,4	3
Number of lactating cows (crossbred)	1,3	0,5
Total amount of milk per day (L)	12,4	4,7
Average per crossbred cow (L)	9,4	1,9

Gender of the interviewees:	7 male / 2 female
Milk buyer (besides home consumption):	Traders, cooperative, final consumer
Dairy as only income:	No
Other incomes:	All crop production besides milk production

Notes:
The characteristics of HARC are comparable with the small-scale farmers of Cowgrow. They both have a high number of cows, most of them are local cows. The income of both groups of farmers consists of a dairy and a crop production part.

Evaluation of the services offered

The small-scale farmers evaluate the service as high quality. All the farmers agreed on a low price for the heifer. The price varies between 400 up to 1350 birr per crossbred cow, depending on the blood level and age. The price of a crossbred cow on the local market varies between 15.000 and 20.000 birr, depending on blood level and availability of genetic records. The farmers also liked the combination of the crossbred delivery and the trainings together with the free supply of seeds.

"I need the other services together with the heifer, because the crossbred heifer is more complicated than my other cows."

These results indicate that a focal service delivery has the favour of the small-scale farmers around Holeta. The small-scale farmers live all in the very rural area so there is a reason, since other service providers are not widely available.

Two of the small-scale farmers got a heifer from the research centre, but the heifer was infertile. But the research centre did not give the farmers another crossbred cow, although the HARC promised to help.

All the small-scale farmers agreed on the high quality of communication of the HARC. They were easy accessible if they have questions and the different research departments (nutrition, housing, hygiene) visit the small-scale farms regularly. The number of visitations differs per season and appeared to be dependent of the distance from the main road.

Expectations of small-scale farmers from the lead farm

The small-scale farmers have high expectations of the services of the HARC. Because of the high quality of the services and service delivery the farmers expect more services from the research centre:

"The quality of the services is high, so I hope that the research centre will provide also the other services I need for my cow (AI service, feed supply, G.). I hope they will deliver a full package of services to help me."

"I need a full package of services because they are almost the only supplier of services."

These comments fits exactly in the definition of the focal coordinating role of lead farms. An extended focal coordinated package could be a chance for the research centre to improve the service delivery.

Demand articulation of small-scale farmers

The demand articulation of the small-scale farmers of the HARC is not high developed. All the interviewed small-scale farmers did not ask for more trainings, while they indicate that they need more trainings. The farmers are all happy with the current situation because they realize that they are lucky that they could get a crossbred heifer. The demand articulation of the veterinary service is present.

"When my cow is sick, I call the research centre and they come immediately."

To enhance the impact of the trainings, the research centre could consider to change to the woman as group. One farmer indicated:

"I got the training, but my wife is handling the cows. She need to have the trainings I got at the research centre. I told the research centre to give the training to my wife. They told to do, but they did not offer the training for women till now."

Observations

Compared to other small-scale farmer in this research, the cow barns of the farmers around Holeta are of average quality. The farms are most comparable with the small-scale farmers of Cowgrow. Both cases are in the very rural area. The cows live in a closed barn and the feed they get is mostly hay and teff straw. The water supply is very low. This is surprising, because it is to be expected that e.g. the housing system and feed quality would be increased compared to other small-scale farmers because of the trainings and demonstrations at the research centre. A PowerPoint presentation used for a training provided insights in the information showed in a training session. The information was on birth, but the showed handlings were not useful for small-scale farmers but for veterinarians only. The PowerPoint also shows a table with a balanced diet mix for cows, heifers and cows including minerals. But most of the small-scale farmers even did not use minerals in their feed now. The housing system as shown in the PowerPoint are not representative for the situation at the small-scale farmers' farm.

Generalizability

The case of HARC is an example lead farm for government agencies or lead farms who collaborate with an NGO. The HARC offers a wide range of services to small-scale farmers in the rural areas, comparable to Cowgrow. The lead farm approach of HARC (offering crossbred cows together with a range of services throughout the value chain) has a disadvantage for private service providers. Because of the low-cost services, private companies may struggle with market entrance. Study of a lead farm like HARC in a context like Debre Zeit would give more insights in this lead farm approach in the non-rural areas and on the effect of the government funded service delivery on the private sector. To study the demand articulation in the woredas served by the HARC, the recently entered woreda (Chelia, West Shoa zone) could be used to get insights of this lead farm approach at the beginning of service delivery. This research examined only the role of the government in the rural area around Holeta.

6. Discussion

6.1 Comparison of the cases

This section aims to discuss the results of this research by comparing the cases of this study with the theory in order to come to a final answer on the research questions of this research. The sub-research questions will be answered throughout this chapter to come to a final answer of the main research question. The structure of this chapter is different from the results chapter, as the research questions are not answered per farm, but per type of economic relationship between lead farms and small-scale farmers. This section aims to discuss the differences between the lead farms in order to come to an overview of the cases. This section makes it able to draw non-case specific conclusions in chapter seven.

6.1.1 Coordinating roles

This section aims to discuss the coordinating roles of the examined lead farms. The coordinating roles of the lead farms are briefly described and summarized in table 5.

- The coordinating role of Alfa farms in the value chain is complementary. Alfa farms is a horizontal (feed) input coordinator of various feed ingredients and sells it subsequently to the small-scale farmers. Alfa farms takes over the coordination of the feed preparation from the small-scale farmer and links two actors in the value chain (input suppliers and producers) to each other. The coordinating role is not focal, since Alfa farms only delivers at one side of the value chain.

- The coordinating role of Cowgrow is focal. Cowgrow offers pregnant cows in the FFE program as part of a package of services in a formal agreement. The horizontal coordinating role of Cowgrow in the FFE program was high, but is decreasing and will be reduced to none in the future. The vertical role of Cowgrow is part of the FFE program. This program goes through almost the whole value chain. Cowgrow supports the small-scale farmer with buying a crossbred cow at the local market till the end market of the milk in Debre Zeit.

- The coordinating role of FSC Ambo is low. In the past, their role was focal. The selected farmers got training, demonstrations, AI service and veterinary services as part of a development project. Now their coordinating role is changed to a vertical coordinating input supplier based on a business to business relationship.

- The coordinating role of Genesis farms is complementary. Genesis farms coordinates the milk collection at the farm of the small-scale farmer, at Genesis farms and via milk collection grids. Genesis farms processes and sells the milk subsequently. Farmers are free to get services elsewhere, they are not bounded to Genesis farms by a contract. Genesis farm therefore has no focal coordinating role.

- The coordinating role of the HARC is focal. The services of the research centre are delivered to selected farmers in a contractual agreement. Agreements are used to prevent resale of the delivered heifer on the local market. The trainings and demonstrations given by the HARC are part of the contract gives the focal coordinating role a horizontal character. This shows that focal coordinating also could be a mix of vertical, horizontal and complementary coordination.

Table 5) Coordinating roles of the lead farms

	Alfa Farms	Cowgrow	FSC Ambo	Genesis farms	HARC
Vertical	++	++	++	+	++
Horizontal	++	+	-- --	+	++
Complementary	++	++	-- --	++	++
Focal	-- --	++	-- --	-- --	++

The results show that a lead farm with only an input supplying role, might have a vertical role only, but also that it might have a complete range of coordinating roles (FSC Ambo vs. Alfa Farms). The examined Lead farmers in the rural areas (HARC and Cowgrow) have multiple and preferably a complementary or focal coordinating role.

6.1.2 Mechanisms and services offered through the lead farms

Table six provides an overview of the offered services and the used mechanisms of the lead farms.

Table 6) Mechanisms and services offered:

	Alfa Farms	Cowgrow	FSC Ambo	Genesis farms	HARC
Feed supply	++	(+)*	--	+	+
Bull service/AI	--	++	(++)**	(++)**	--
Milk collection	--	++	--	++	--
Milk marketing	--	++	--	++	--
Vet. service	--	--	++	+	++
Heifer supply	--	++	--	--	++
Training	--	--	(++)**	(+)**	++
Demonstration	--	++	(++)**	--	++
Other:	--	--	Drug store	--	Seed supply

*: In the near future; **: Offered service but not supplied

The results show that farmers in the rural area provides services throughout the entire value chain (HARC and Cowgrow), where the lead farms in the more urbanized areas (Alfa Farms, FSC Ambo) offer services in parts of the value chain. This is possible since there are multiple service providers available. (This correspond with the coordinating roles of the lead farm).

6.1.3 The model of infrastructural inclusion

During this research the contours of a new lead farm model appeared, the model of infrastructural inclusion. The definition of this model is: opening the existing infrastructure of a lead farm for small-scale farmers to provide access to improved inputs or new output markets. This model is very useful for the lead farmer approach, because the model is relatively low-cost and low-labour intensive for lead farmers. At the other hand, the model is very important for small-scale farmers. The low-cost characteristic of this model makes it attractive for lead farmers who are business oriented in the first place. The model could be used as part of vertical coordination and the vertical aspects of the focal and complementary coordinating role. The lead farmer acts as a coordinator between existing input and/or output markets, and small-scale farmers which leads to stronger linkages between actors in the dairy value chain (Christoplos, 2010).

6.1.4 Lead farm models used by the lead farms

Table seven provides an overview of the lead farm models used by the lead farms. This shows that all the lead farms use a combination of lead farm models. Farmers who start lead farming should take this into account when starting their lead farm practices.

Table 7) Lead farm models used:

	Alfa farms	Cowgrow	FSC Ambo	Genesis farms	HARC
Master farmer model	(+)*	--	--	--	++
Infrastructural inclusion model	++	++	--	++	--
Business hub model	++	+	++	+	+
Demonstration model	--	++	--	--	++
Training model	--	--	(++)**	(++)**	++
Retailing model	--	+/--	--	++	--

*: Indirect; **: Offered service but not supplied

The results show that:

- Focussing on one model or mechanism may not work. Every new lead farmer has to take into account the different lead farm models and mechanisms in order to make a choice for the combination useful in his situation.

- Lead farmers serving a large area may use the master farmer model to reach as much as possible small-scale farmers. The combination with the training model makes the trainings more effective when they are performed to all the farmers in the community and showed in practice by one master farmer. (HARC)

- The infrastructural inclusion model is used by the lead farmers with a commercial focus on own production (in contrast to HARC) and the intention to support and develop small-scale farmers (in contrast to FSC Ambo)

- The business hub model is used by every lead farmer. The service delivery at one point (at the lead farm) supports the interaction between lead farmer and small-scale farmers (and therefore the demand and supply articulation) and supports best practices articulation between small-scale farmers. (Jaleta et al., 2013)

- The training and demonstration model is only used by a lead farmer with an (almost) unlimited amount of money to invest (HARC). The high costs of these models might be a threshold for performing them. The passive demonstration model variation of Cowgrow might be a good substitution for the high costs models. The small-scale farmers learn by themselves via working on the lead farm or by asking questions when passing by. This continuous demonstration relationship is a low-cost possibility for starting farmers.

- The retailing model is needed in areas where there are no other milk collection providers (Cowgrow). The lack of milk collection by a lead farm mutes the lead farm practices (FSC Ambo). A lead farmer offering services in an area without a well-functioning formal market has a limited potential for small-scale farmer commercialization (Christoplos, 2010). Using a milk collection service or a processing unit at the lead farm is important for the success of all the other services delivered by the lead farm (FAO, 2016). The lack of a missing formal market undermines the effect of increased production by other services. The mechanism of contract farming is useful in every lead farm-small-scale relationship to make the relationship formal, to improve and insure the relationship and to prevent side selling (Bijman, 2008)

The results also show that there is not a clear distinguish between the characteristics of the lead farm models and coordinating roles (table 1 and 2). Lead farmers may make use of the concepts of a lead farm model, but not in practice as assumed based on the literature. For example, the business hub model, shown as not community based, was used by Cowgrow. But Cowgrow established its cooperative together with the community. And also the combination of the business hub model and the community based master farmer model (at HARC) showed to be an effective combination for small-scale farmer development.

6.1.5 Demand articulation

A good match between demand and supply starts with intensive and continuing supply articulation (Alfa farms). There is ‘no culture’ of asking for services, as the small-scale farmers replied. Service suppliers need to offer the services (Genesis farms, FSC Ambo). Organizing regular meetings between small-scale farmers is a good opportunity for sharing experiences on farmer level and is important for the inclusion of new small-scale farmers. Sharing experiences activates available demand for services. The differences in demand articulation between the lead farms became visible in this research. Where HARC and Alfa farms use a top down approach (no/less influence on the services delivered) (Alfa farms) (HARC)

6.2 Economic relationships between lead farms and small-scale farms

The lead farm approaches of the five lead farms examined in this research can be differentiated in three economic relationships. The economic relationship of a lead farmer with its small-scale farmers has implications for the use of the (combination of) models and mechanisms used by the lead farm. The first type of relationship can mainly be found in the rural areas with a low commercialization and market orientation level (such as around Cowgrow and HARC). The second and third type of relationship can be found in the more urbanized areas, such as Debre Zeit (Alfa farms and Genesis farms) and Ambo (FSC Ambo). The choice for a certain type of relationship depends therefore at least a bit on the geographical location (rural or non-rural area) and the level of development of the dairy sector in that area (availability of other service providers and formal market). Examining the intended economic relationship before starting a new lead farm in combination with the results of this study may help to establish a successful lead farm for both the lead farm and the small-scale farmer by using the most suitable mechanisms, lead farm models and coordinating roles.

6.2.1 Donor-recipient relationship

Lead farmers can build their lead farm activities on a donor-recipient relationship. A clear example is the government, but it could also be a lead farm program funded by an NGO. The government is not a profit making organization and can offer the services at less than production costs. This has implications for the population composition of the small-scale farmers. The very poor small-scale farmers (even without starting money) are able to become part of the service delivery of this type of lead farm.

A lead farm with a donor-recipient relationship may use the (potentially) high-cost lead farm models and mechanisms such as the demonstration and training model (CropLife, 2013). These models do not have direct return-on-investments (in terms of money). The advisory services should be used in combination with other paid services (such as inputs) to be cost-effective. To reach as much small-scale farmers as possible, the lead farmer might use the master farm model. In advance selected small-scale farmers serve as an example for their neighbours in their improved practices or returns on high quality inputs and spread knowledge about the services to other small-scale farmers (Christoplos, 2010). The mechanism of contract farming is useful for both small-scale farmers and lead farmers to make their relationship formal to improve and insure the relationship (Bijman, 2008). Contract farming is useful for lead farms who use this type of relationship to prevent side selling of goods offered at (less than) production costs.

A lead farm with a donor-recipient relationship reaches the largest number of farmers when it has a horizontal or focal coordinating role. The horizontal coordination organizes and supports groups of farmers or cooperatives (Poulton & Lyne, 2009). The typical mechanisms and models for this relationship (training and demonstration) are more effective when they are given to groups of farmers (CropLife, 2013; Alemayehu, 2003). Especially the rural areas where the entire value chain is underdeveloped, there is a need for a range of trainings and demonstrations in combination with other services in the three segments of the value chain (mobilization of resources, production and commercialization) (Poulton et al., 2010); (Vágány et al., 2003). Since most of the dairy cows in Ethiopia are available in the rural areas, this type of relationship has potential for the commercialization of many small-scale farmers in the rural areas (Makoni et al., 2014).

The donor-recipient relationship also has a negative side. If small-scale farmers get their services 'for free', the development of commercialization will not evolve. In combination with the establishment of dairy cooperation's, the government may also be involved in the milk sale of the small-scale farmer. Training focused on commercialization and market orientation could overcome this problem. This research shows that small-scale farmers hesitate to ask for more services, because they like to have a good relationship with the donor. This results in a (small or big) mismatch of supply and demand for services.

These lead farmers may initiate the first step in the commercialization and market orientation process of small-scale farmers. According to (Poulton et al., 2010), the government has to invest in the basic infrastructure of the dairy value chain for increased dairy production. This infrastructure is also needed for the promotion of service demand development and commercialization. The coordination of the government may have a positive effect on the establishment of a private sector that take over the coordination and services of the government (Jaleta et al., 2009). The private actors can compete with each other to come to higher production volume and higher quality of both services and service delivery based on market rules. The government is in that sense the initiator of the value chain development.

6.2.2 Cost covering relationship

Lead farmers may also strive for a 'cost covering' relationship with the small-scale farmers. This means that small-scale farmers have to pay the costs of a certain service (e.g. production or transportation costs). A lead farm with this type of relationship might have a horizontal coordinating role for the small-scale farmers. The horizontal coordination may lead to an effective use of services (instead of serving individual farmers) and is therefore affordable for small-scale farmers. The costs per farmer for the service goes down when it is shared with many farmers. An advantage of this 'cost covering' relationship is that it does not require continuous investments over a long period of time because (for example) after the repayment of a credit, the money can be offered as a new credit to small-scale farmers. This relationship is more sustainable in the private sector compared to private lead farmers with a donor-recipient relationship, because the invested money or costs will be paid back. Another advantage is the development of commercialization. Small-scale farmers are supported to think about their investments and may look for other service providers for a better price. Farmers are not 'waiting for help' as in a donor-recipient relationship, but are actively involved in the economic decision making process of farming.

The infrastructural inclusion model and the retailing farm model can be associated with the cost covering relationship. The infrastructural inclusion model is a low-cost investment for a lead farmer (and therefore less costly for small-scale farmers), but might be a big opportunity for the small-scale farmers. The lead farm might be involved in gaining access to input or output markets. The lead farm itself has the complete infrastructure for dairy production at its own farm and is therefore able to support the small-scale farmers around with the inputs and output markets he uses himself. The small-scale farmers have only to pay the transport costs.

Examples of services offered by these lead farmers are credits, milk collection, milk processing and feed supply. This type of lead farmer may use the retailing farm model, the lead farm model focused on marketing of dairy and dairy products (Christoplos, 2010). By paying the market price for milk, the lead farmer gives the small-scale farmers the opportunity to get a fair price for their milk.

This relationship is useful in areas where none or less other service providers are available and/or in combination with the supply of crossbred heifers. Because of the higher needs for inputs by improved crossbred cows, a complete range of services is needed throughout the value chain (Zijlstra et al., 2015). The coordinating role of lead farms supplying crossbred heifers is therefore preferably complementary or focal.

6.2.3 Business to business relationship

A lead farmer may build its relationship with small-scale farmers on a business to business relationship. A clear example is an input supplying lead farmer. The lead farmer offers the input for a profitable price to small-scale farmers. Small-scale farmers who use these services are capable to determine in advance whether a certain service is an advantage or not in terms of profitability. This means that these small-scale farmers are already commercialized significantly. This approach has the disadvantage that not commercialized small-scale farmers could be ignored. To reach this group of farmers, the lead farmer need to show that higher investments pre-harvest is profitable post-harvest. This could be done by the use of the demonstration model or the master farmer model. This type of farmers may also use the business hub model to offer their services and/or the demonstration plot to show that their services are worth to buy for small-scale farmers. The biggest difference between the second and third type of farmers is the profits made by the sale of the services.

The coordinating role of these lead farmers is mainly vertical. This type of lead farmers might have a role in the increase of the dairy production in terms of quality and quantity, but in an existing independent functioning value chain. The services offered by these lead farmers might be at one point in the value chain, because of the existence of other service providers who cover the other parts of the value chain (Poulton et al., 2010). This group of lead farmers are mainly located in the peri-urban and urban areas in places with multiple service providers and small-scale farmers who have already a developed market orientation.

Examples of mechanisms used by this type of lead farms are contract farming, farmer shops and milk collection in favour of their own milk processing plant. This business to business relationship need mainly repeated interactions between supplier and buyer, and a formal contract makes this relationship secure for both parties (Bijman, 2008). The farmer shop is a place where small-scale farmers can buy inputs, equipment, and/or veterinary services.

7. Conclusions

This research is conducted to explore the mechanisms and lead farm models for a demand and supply match used by five lead farms in Ethiopia and to determine their coordinating role in value chain development. The theoretical literature on these mechanisms, models and coordinating roles of lead farms are used to answer these questions. This chapter aims to describe the key findings of this research thematically in order to come to a final answer of the research question.

Lead farm models

The lead farmer model of infrastructural inclusion is an important tool for lead farmers to foster commercialization of small-scale farmers. Lead farmers are relatively big farm with already an existing infrastructure in the value chain. The combination of the need for services small-scale farmers and the access of lead farmers to input and output markets to fulfil these needs, makes it a promising model for starting lead farmers.

The variation of Cowgrow on the demonstration model (opening the gates for small-scale farmers) and involving small-scale farmers in daily practices on the lead farm is very important for the development of small-scale farmers. The knowledge about dairy farming increases and the open approach give the small scale-farmers the opportunity to ask the questions they have.

Service delivery of lead farms at one point (the business hub model) supports the demand articulation and exchange of knowledge, especially when there is a daily contact between the lead farmer and the small-scale farmer.

Demand and supply articulation

According to (Kilelu et al., 2014), the match between demand and supply of services start at the demand side. If there is no demand for a certain service, there will be no supply. The results of this research shows the importance of 'supply articulation' by lead farmers as the first step to make the small-scale farmers aware of the services offered. This section aims to discuss the demand articulation on the lead farms.

The demand articulation of small-scale farmers in Ethiopia, especially in the rural areas is limited (Christoplos, 2010). To activate the demand for services by small-scale farmers, intensive and ongoing supply articulation is needed. In the rural areas, organizing meetings with small-scale farmers may help to foster demand articulation and service awareness. According to (Kilelu et al., 2014), sharing experiences activates covert needs into clear demands. Lead farmers can play an important role in organizing experience-sharing events such as training or practical demonstrations. Sharing experiences between small-scale farmer may lead to a demand for services by other small-scale farmers (Berg, 2004). The latent demand for services might be activated by learning new practices and supply of improved equipment. The growth of the income of the small-scale farmer gives him/her the opportunity to invest and to become commercialized. The horizontal coordinating role of these events are facilitating linkages between small-scale farmers and services provided by the lead farm.

Coordination

In areas with multiple service providers on different services, horizontal coordination by lead farms might be low because small-scale farmers find their own supplier of service and service suppliers focus on their own business/profession. This may lead to an ignorance of small-scale farmers who are not commercialized now, because they have to find their own way to the various service providers.

Farmers in the rural areas need a complementary or focal coordinating approach compared to farmers in the city, due to the lack of multiple service providers. There is therefore a complementary coordinating role needed to prevent a 'hold up' in the value chain. Complementary coordination prevents that delivering one service (for example providing a cow) is not offset by the lack of other services (for example high quality feed). The results of Cowgrow and HARC show that the farmers in the rural areas lack most of the services needed for increased commercialization and market orientation. A horizontal approach of lead farmers ensures that as much as possible small-scale farmers are reached.

Role of the government

In Ethiopia, the government supports small-scale farm development through development agents (DA). These development agents are trained to give advice to small-scale farmers on a wide range of issues regarding to dairy farming. The development agents visit the small-scale farmers regularly and know therefore the development level of the small-scale farmers in their district. A lead farm may use the knowledge of the development agent for the selection of small-scale farmers. This is especially useful when the lead farmer makes use of the master farmer model.

8. Recommendations

This section aims to provide recommendations for the farmers in Ethiopia who will become lead farmer in the future, the role of the government in the lead farm approach and the role of NGO's in the lead farm approach.

Future lead farmers

This research showed that lead farmers in Ethiopia do not have strict models, mechanisms or coordinating roles in their approach as lead farm. A new lead farmer first needs to decide the kind of relationship he wants with the small-scale farmers. What is the priority of the farm? Is it to produce dairy products and to provide services as a side-business? Or is it an important aim? Other relevant questions need to be answered before the start of service delivery. Questions like: are there other service providers serving the same services? Will there be a market for the increased milk production reachable for the small-scale farmers? The answers of these questions are needed in order to choose the right models and coordinating roles.

A starting lead farmer should first explore the possibility of using the infrastructural inclusion model. This model is easy to perform, has low costs and is highly beneficial for small-scale farmers. The inclusion of the small-scale farmers in the lead farm is a good first step towards a profitable relationship between small-scale farmers and lead farmers. During supply of the services, the lead farmer has to discover the needs of the small-scale farmers and extend its range of services. A continuous process of demand and supply articulation possibilities (facilitated by the lead farmer) is needed for this continuous learning process (Kilelu, 2013). Lead farmers use a combination of and variations on models and coordinating roles as described in literature. This process should be facilitated by the lead farmer since the demand articulation for dairy services in Ethiopia is limited (Christoplos, 2010). The learning process of the small-scale farmers' profits from a combination of training, demonstrating and involving the small-scale farmers in the lead farm.

Next steps in the lead farm approach could be the supply of cross-bred cows to the small-scale farmers. A possible way to do this is by offering the cow with a credit system. The supply of cross-bred cows need a more advanced value chain, because of the specific needs by the cross-bred cows.

Government

The government may play a role in supporting the lead farmers by subsidies or by involving existing private service providers into the 'service menu' of the governmental lead farm. The role of the government in a certain area needs to be clear. Private lead farms in an area of a governmental lead farm may suffer of undesirable competition. The governmental lead farm may serve the small-scale farmers with free services of low quality, where the private lead farmer may offer higher quality for a higher price. It might be hard for the private lead farmer to convince the small-scale farmer, which results in a stagnating development of commercialization.

There is more research needed on governmental lead farms to examine their role in (peri) urban areas. The research institute started serving small-scale farmers in a new area (Chelia), where it serves small-scale farmers with the same services as the other districts. Research in this area has the advantage that the demand articulation just started. The working methods of the government could be examined

here to learn more about the influence of governmental lead farms on the market orientation and commercialization, which was not possible in other areas.

Future research

This research contributed to the knowledge about coordinating role, models and mechanisms of lead farmers in Ethiopia. But still there is a need for more research in order to come to a complete set of information about the lead farm approach in Ethiopia. This section aims to discuss some possible ways for further research.

This case study examined the coordinating role of the lead farms at one point of time, but a study over a longer period of time will provide useful information about the evolvement of the coordinating roles over time.

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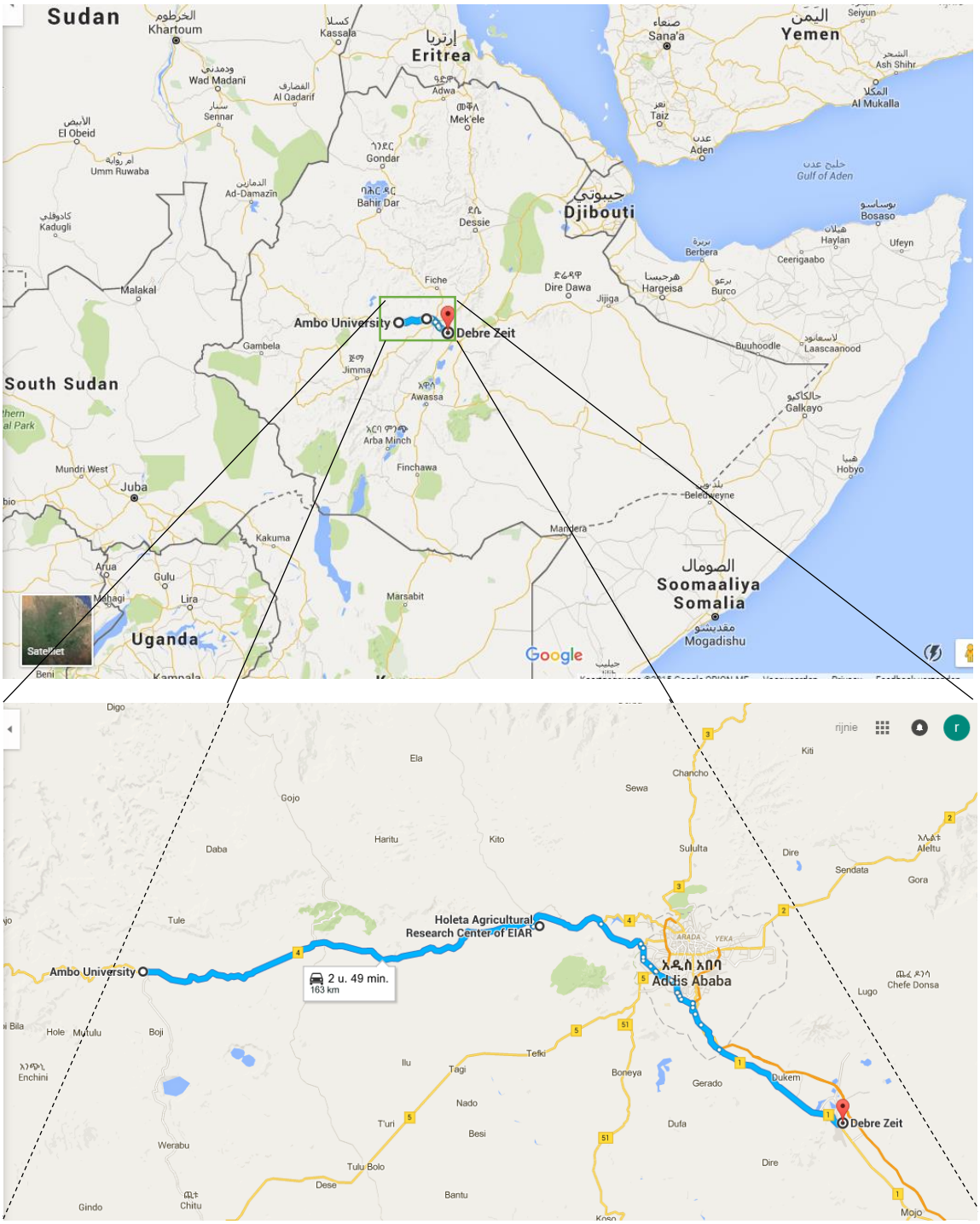
Annexes

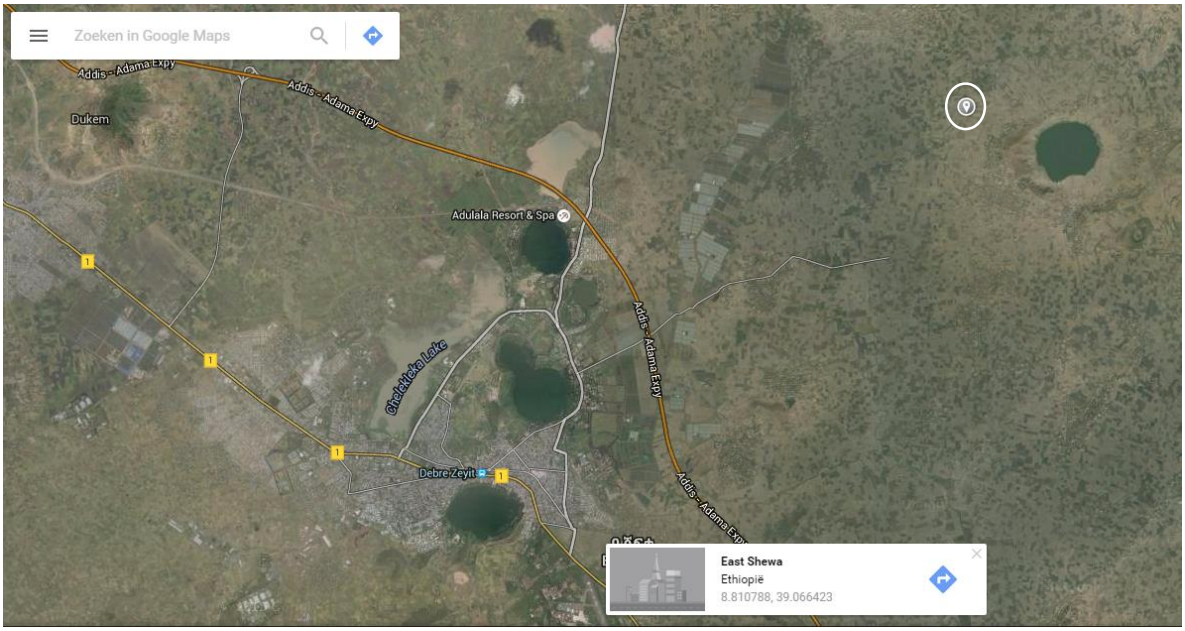
Annex 1: Geographical locations of the cases

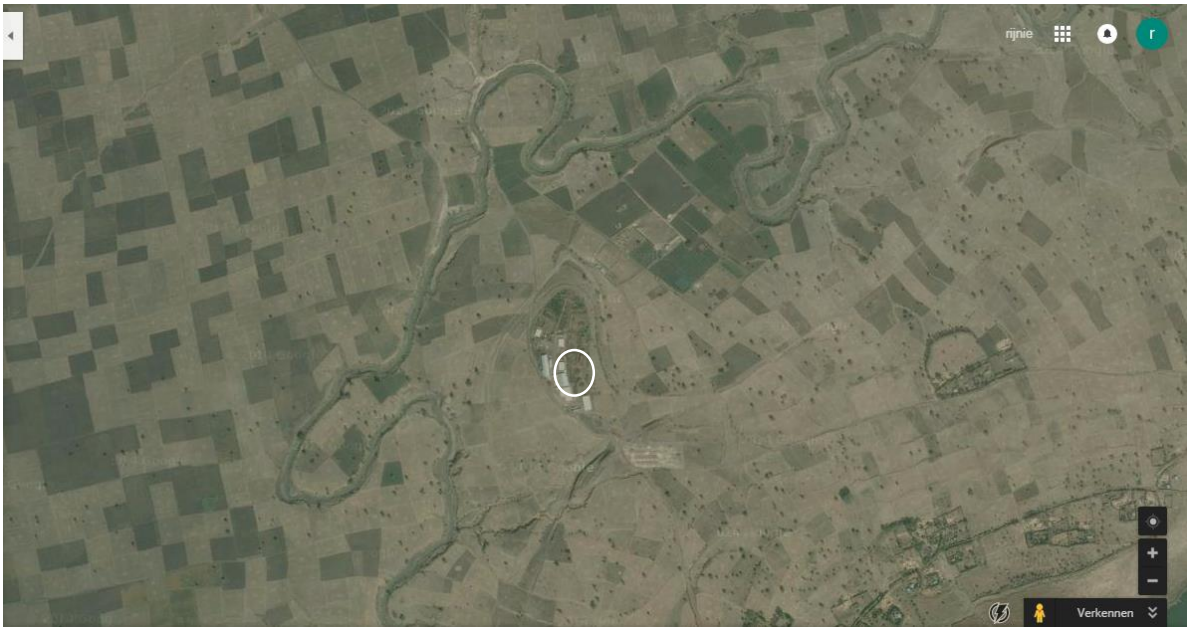
Geographical location of the cases in Ethiopia:



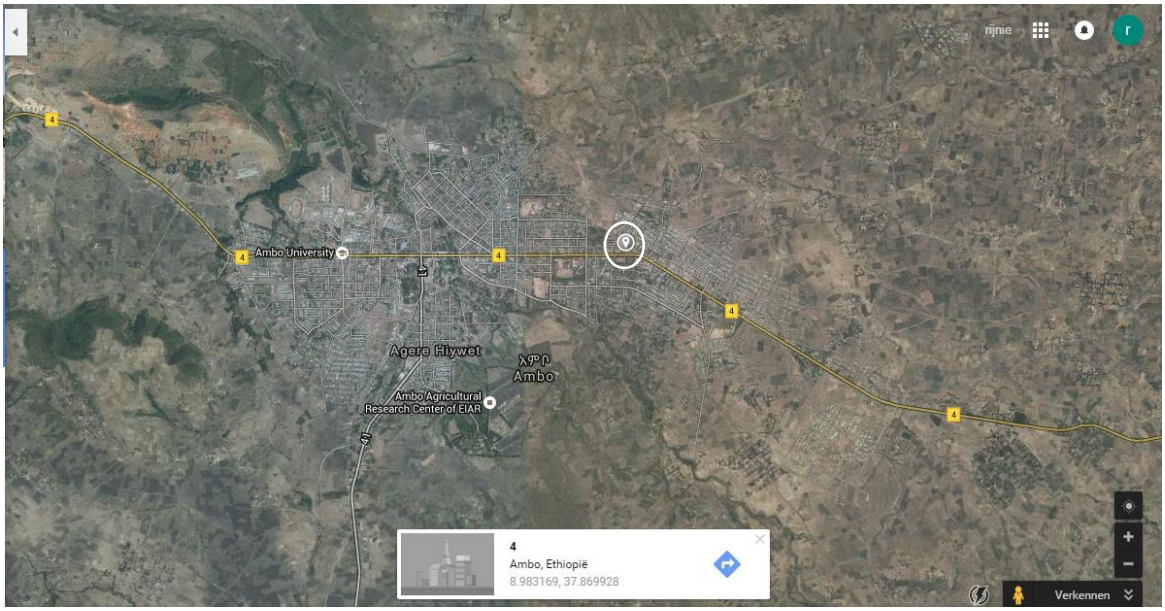
Geographical location of Alfa farms

Geographical location of Cowgrow:



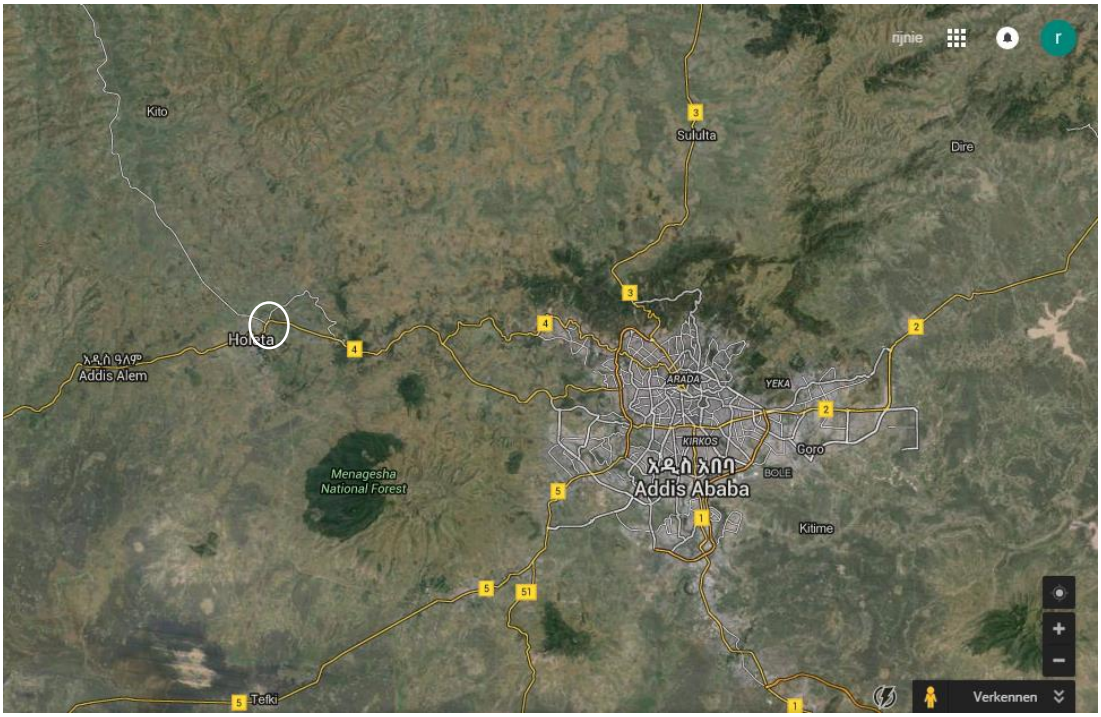


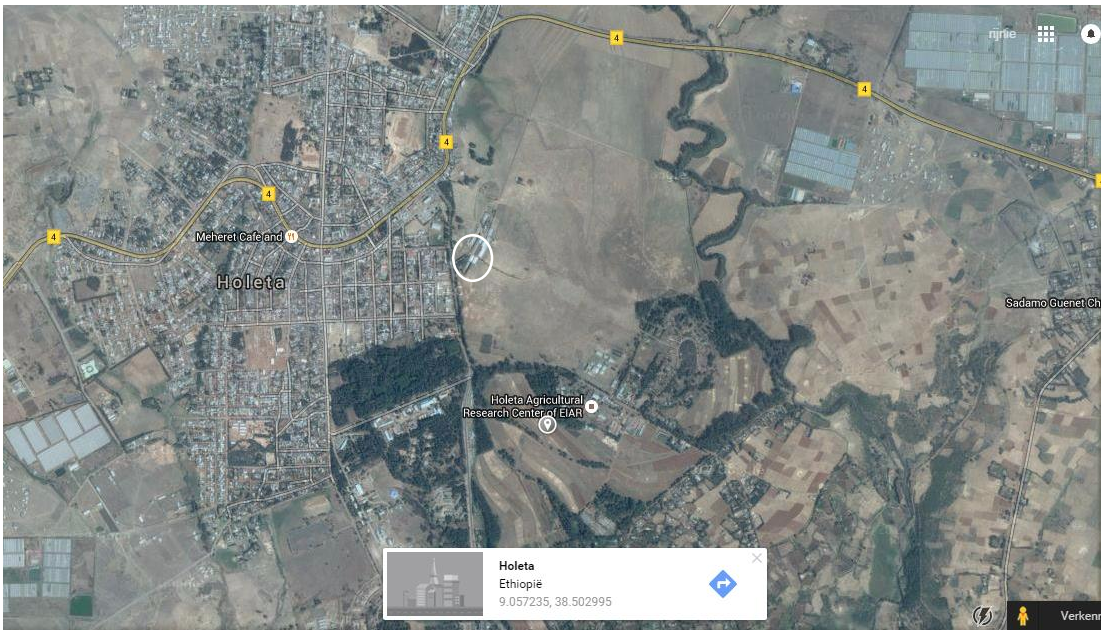
Geographical location of FSC Ambo



Geographical location of Genesis farms:

Geographical location of HARC



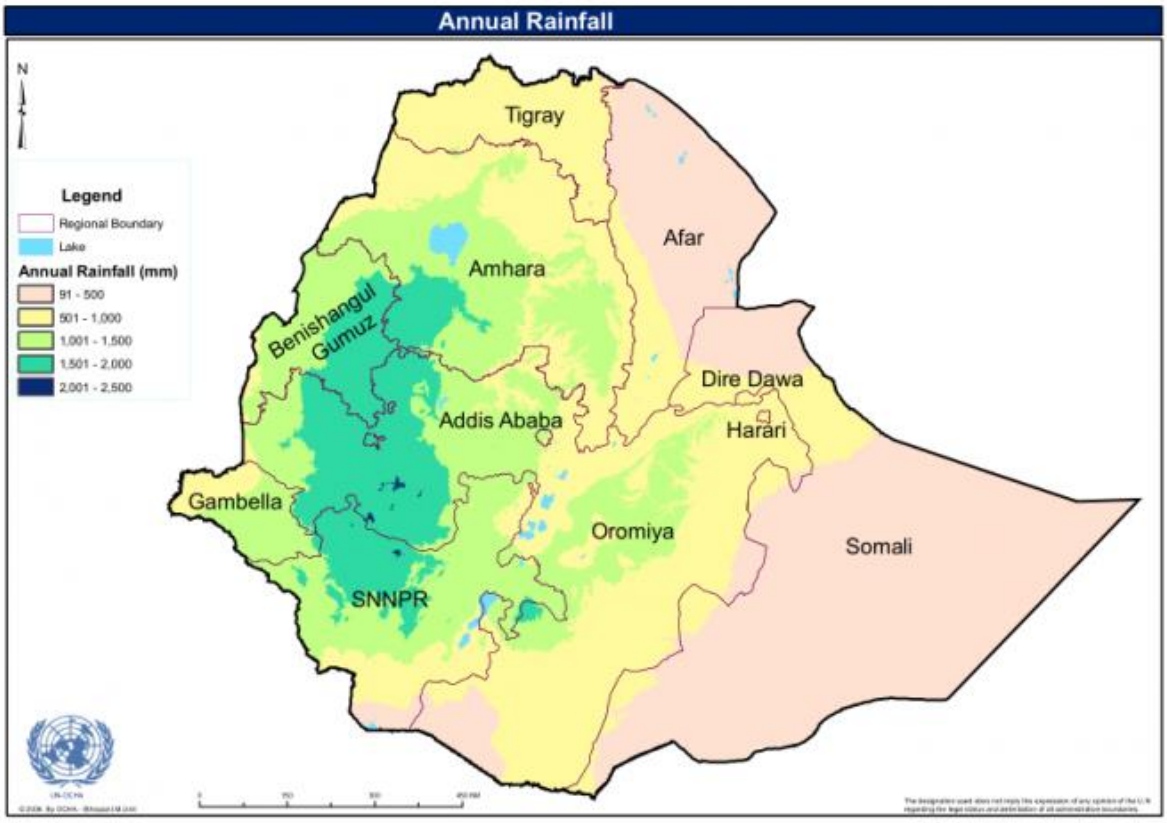


Annex 2

Districts of West Shewa zone, area of served small-scale farmers by HARC. All in West Shewa zone:

http://www.ethiodemographyandhealth.org/Oromia.html

Annex 3: Annual rainfall



http://reliefweb.int/map/ethiopia/ethiopia-annual-rainfall

Annex 4: Interview guides

Interview schedule small-scale farmers Date__-__-____

Place_____

Short explanation of my definition of a lead farmer as described in the theory.

My relation to the lead farmer (WUR student, so not connected to the lead farmer)

Short explanation about the aim of this research and the potential outcomes.

Name of the farmer: _____

Age: _____. M / F.

Relation to household head: Y/N Number of household members: _____

Kebele, district, zone, region, federal state: _____

Highest education: _____

1. Number of cows: _____ How many are lactating at the moment? _____
2. Crossbreed or local cows? _____
3. How much milk are the cows producing? _____ litres
4. What is the usual way of milk marketing? (How much is consumed/sold/processed?)

Possible options:

a.	Own consumption	0	+	++	+++
b.	Neighbours	0	+	++	+++
c.	Middle man	0	+	++	+++
d.	Shops	0	+	++	+++
e.	Restaurants	0	+	++	+++
f.	Cooperative	0	+	++	+++
g.	Processing industry	0	+	++	+++
h.	Lead farmer	0	+	++	+++

5. How important is the milk sale for your family income? Other sources of income =>
6. In what ways do you communicate with the buyer?

The next questions are built on answers from the lead farmer interview, so the questions vary between the lead farms.

7. Do you get any service from an external service provider?

   If No: What is the reason?

   If Yes: Which services do you get?

Service:	How satisfied are you with the service/the relationship with the service provider?

(Satisfied in terms of quality, costs, delivery of the service, compliance with agreements)

8. Is the input always delivered by the same supplier? => important for focal coordination
9. Can you give some advantages of receiving services from the lead farm?
10. Do you receive any training/workshop from the lead farmer?

If yes: can you indicate what the training has been on?

For example: farm management, diseases identification and treatment, post-harvest handling and storage, marketing, processing, nutrition, fodder and water management, breeding etc.

Questions focused on demand articulation

11. What would the farmer consider as his/her biggest challenge to improve/commercialize their farm?
    ⇨ What actions do you take to overcome these challenges?
12. Who is the initiator of a new service? => does the introduction of new service start at the demand or supply side? => tells something about expectations of small-scale farmers and their willingness to innovate their farm.
13. What investments in order to develop your farm are you planning to do? / Is there already a plan?

Remarks:

Interview guide lead farmers. Date:

Place:

Name of the lead farmer:

Age: _____ Male: / Female

Kebele, district, zone, region: _____

Established by: (Ethiopian/Foreign farmer) (Government) (NGO) (Other_____)

Established in (year): _____

Managed by: (Ethiopian/Foreign farmer) (Government) (NGO) (Other_____)

Hectares of used land for own purpose (dairy): _____

- ⇨ Leased, rented, owned

Number of cows: _____

- ⇨ Local: Y/N
- ⇨ Crossbreed: Y/N
- ⇨ Exotic: Y/N

Lead farmer since: _____

Number of farmers/households served with dairy services (if known): _____

Questions to cover all research questions:

1. What does it entail to be a lead farmer and how do you see the role of your farm in this community? => starter to let the lead farmer talk about his business.
2. What is the purpose and objective of being a lead farm?
3. How are small-scale farmers incorporated in the lead farm project?

=> Provides information to be used examine the lead farmer model

4. Which parts of the value chain do you support/cover with your service(s)?
   - ⇨ Farming input, production and processing, marketing
   - ⇨ Provides information about the coordinating role of the lead farmer and answer is used as starting point in the next question.
5. Which services are offered to support these processes?
   - ⇨ Farming inputs, animal health services, AI, processing, marketing
   - ⇨ Do you make use of financial products for smallholder farmers?
6. Do you give any training/advice/demonstration to the served small-scale farmer? How do you determine which services you need to offer? Follow up questions: did you change your 'menu of services' and on who's initiative?
7. Where are the services delivered?
   - ⇨ Provides information about the meeting/interaction places of lead farmer – small-scale farmer
   - ⇨ At the farmers' place, at the training center, at the demonstration field?
8. How and where do you get in contact with small-scale farmers?

- ⇨ Classroom-setting (group), demonstration plot, informal meetings, individual visitation of small-scale farmers by lead farmer/, farmers visiting the lead farm etc.
- ⇨ Provides information about the manner of demand/supply articulation.

9. To what extend are the small-scale farmers involved in the decision process of the provided services?
10. Are there any challenges you currently face? (input, production or marketing related?)

Other topics:

11. Used lead farm model(s): examined not only by interviewing, but also analysis during the visitation.
    - ⇨ Ask for correction
12. Why do the used approach and (combination of) models work in this situation?
    - ⇨ What are the conditions to make it successful at this place and which are generalizable?
13. Working together with a farmer cooperative?
    - ⇨ (former) experiences, competition, strengthening each other?

Remarks: