FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

Feed the Future Innovation Lab for Livestock Systems

Rapid Assessment of the Gaps in Dairy Cattle Feeding and Management That Constrain Milk Quality and Quantity in Rwanda

Conducted December 5-9, 2016 by

The Management Entity at the University of Florida

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Acknowledgement

Dr. Geoff Dahl, Professor, Department of Animal Sciences, University of Florida, and Leader of the Animal-Source Foods Production and Marketing Area of Inquiry and Saskia Hendrickx, Project Coordinator, prepared this report.

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Sustainably intensifying smallholder livestock systems to improve human nutrition, health, and incomes

Disclaimer

Acronyms

AI	Artificial Insemination
ASF	Animal-Source Food
BDF	Business Development Foundation
BF	Butterfat
CAHW	Community Animal Health Workers
ECF	East Coast Fever
GDP	Gross Domestic Product
IFAD	International Fund for Agricultural Development
IFAS	Institute of Food and Agricultural Sciences
ILRI	International Livestock Research Institute
LoL	Land o' Lakes
MINAGRI	Ministry of Agriculture and Animal Resources
NDS	National Dairy Strategy
NGO	Non-governmental Organization
OIE	World Organization for Animal Health
RAB	Rwanda Agricultural Board
RALIS	Rwanda Agriculture Livestock Inspection and Certification Services
RBS	Rwanda Bureau of Standards
RCA	Rwanda Cooperative Agency
RDCP II	Rwanda Dairy Competitiveness Project II
RNDP	Rwanda National Dairy Platform
RCVD	Rwandan Council of Veterinary Doctors
SNF	Solids Not Fat
ToT	Training of Trainers
UF	University of Florida
US	United States
USAID	United States Agency for International Development
UR	University of Rwanda

Contents

1. Introduction

The U.S. Agency for International Development (USAID) awarded the University of Florida (UF) Institute of Food and Agricultural Sciences (IFAS) funds to establish the Feed the Future Innovation Lab for Livestock Systems. This five-year initiative (October 2015 to September 2020) supports USAID's agricultural research and capacity building work under Feed the Future, the U.S. Government's global hunger and food security initiative. The International Livestock Research Institute (ILRI) is the UF/IFAS partner in implementation of the Livestock Systems Innovation Lab. The six target countries for this project are: Burkina Faso and Niger in West Africa; Ethiopia and Rwanda in East Africa and Nepal and Cambodia in Asia.

The Livestock Systems Innovation Lab aims to improve the nutrition, health and incomes of the poor by sustainably increasing livestock production and marketing, and consumption of animal-source foods (ASF). This aim will be achieved by introducing new location-appropriate technologies, by improving management practices, skills, knowledge, capacity and access to and quality of inputs across livestock value chains, and by supporting the development of a policy environment that fosters sustainable intensification and increased profitability of smallholder livestock systems.

The research topic for this study is a result of the various interactions with stakeholders in February 2016 that included one-on-one meetings as well as a multi-stakeholder Innovation Platform meeting during which research priorities for the Livestock Systems Innovation Lab project were identified.

2. Background on the dairy sector in Rwanda

Although the government and its partners have successfully reduced chronic child undernutrition and stunting in Rwanda from 43% in 2012 to 36.7% in 2015, according to the 2015 Comprehensive Food Security and Vulnerability Analysis report (WFP 2015), the high current stunting rate emphasizes the need to incorporate ASF in the diet of the children as well as adults. Such interventions need to be cognizant of environmental concerns and the fact that Rwanda has the largest human population density, at 460 people per square kilometer (World Bank 2016), in Sub-Saharan Africa. Most farmer plots are 0.5 ha in size and there is limited land to expand conventional food production systems. In 2014, there were 1.1 million cattle, 2.5 million goats, 0.6 million sheep, 1.0 million pigs, 1.2 million rabbits, and 4.9 million poultry in Rwanda (SYB, 2015). Livestock contributes to 8.8% of the national gross domestic product (GDP) (Karenzi et al., 2013). Dairy production has been prioritized by the government, and the 2013 National Dairy Strategy describes strategies needed for growth of the dairy sector, including improved milk production and marketing systems, policy environments and institutional frameworks (MINAGRI, 2013).

The USAID mission in Kigali has supported the Rwandan dairy sector since October 2007 with the Rwanda Dairy Competitiveness Program I (RDCP I) and more recently through the RDCP II (2012-2017), which was a $15 million project aiming to improve dairy products' competitiveness in local markets. The latter project was implemented by Land O'Lakes. Multiple strategies were used and included an overall increase in production by improving efficiency, improving access to market, improving local demand and consumption of dairy products, and improving the quality of dairy and milk products. Another program in Rwanda that aims to increase dairy production and consumption at the household level is the Girinka program (One cow per poor family) initiated by the Government of Rwanda in 2006, and it provides cows to the most vulnerable households who then give an offspring to

another community member. In collaboration with Heifer International, an international non-governmental organization (NGO), the program's aim is to reduce childhood stunting rates and increase household income by improving access to milk by providing poor households with a pregnant heifer.

In Rwanda, the typical livestock production system is the smallholder crop-livestock mixed farming, with the average smallholder farmer having one to three cows (Bishop and Pfeiffer, 2008; Kamanzi and Mapiye, 2012). Improved breeds account for 28% of the total cow population in the country and contribute 82% of the total milk produced (MINAGRI, 2013). The local breed has low milk production with an average mean daily milk yield of 1.33-4.58 liters/day (Klapwijk et al., 2014).

3. Purpose of the project

Improved competitiveness of the Rwandan dairy sector will greatly depend on the productivity of its dairy cows and the quality of the milk produced, aggregated and marketed from those cows. The RDCP II has supported efforts on animal services and trained leaders and other farmers in improved management. The current initiative of UF aims to build on previous efforts through Training of Trainers (ToT) targeting personnel at milk collection centers, extension agents, milk processors and community animal health workers (CAHW). Most of these groups have access to the farmers but are not necessarily aware of the role that feeding and management play in animal performance and production of a healthy dairy product, nor do they have the curriculum to train farmers. Some also have responsibilities and access upstream to influence milk handling at cooling centers and processing for retail distribution, but they may not have complete understanding of the influence of farm level management on milk quality at the consumer level. A similar approach was used for smallholder dairy systems in Malawi with great success: production of human–consumable milk delivered to cooling centers increased by more than 25%. This increase was due to training alone and had no linkage to improved access to feed supplements, which would be expected to enhance this response (Kazanga, 2012).

The purpose of the assessment trip was to: 1) obtain a clear understanding of the gaps in feeding and management of cows that constrain milk quality and quantity and 2) identify areas of engagement for the Livestock Systems Innovation Lab to develop a training in addition to extension education.

4. Methodology

This rapid assessment consisted of various visits to farms, feed mills, milk collection centers (MCC), processing centers, and discussions with various dairy sector stakeholders to get a holistic view of the Rwandan dairy sector.

The team was composed of Dr. Geoffrey Dahl, Professor and Chair, Department of Animal Sciences at the University of Florida and Dr. Robert Roberts, Professor and Head of Food Science, College of Agricultural Sciences at Penn State University. They worked together with a local dairy expert who accompanied the team throughout the entire period (December 5-9, 2016). For the agenda of the assignment, please see Annex 1. The list of persons met is given in Annex 2.

5. Results

5.1. Dairy farms

- **Mr. J.P.** is a medium size farmer with 15 to 20 cows and supplies milk to the Bugesera milk collection center (BMCC). His feeds include Napier grass with supplemental grain year round. The quality and availability of forage as well as the occurrence of nematodes are a problem during dry season. Housing is non-existent and there is limited shade for the cows. Water is provided by hand only and being brought from a steam about 500 m away using bicycles. The cows are hand milked in the field where they stand with warm water wash and with no teat dip used. Mr. J.P. expects each cow to produce 17 liters of milk per day or the cow is culled. He expressed concern about the introduction of animals on neighboring farms (as part of the Girinka program) as they may increase the risk of introduction of diseases to his herd.

- **SOCOBA Ltd.,** one of the largest dairy farms in Rwanda, is in the Rwamagana district with a total of around 140 dairy cows and young stock as well as 2 bulls. One Holstein cow produces 24kg on average per day and all milk is supplied directly to a university college in Kigali. On average, they supply 600kg/day to the University restaurant that is open to students and staff from this private University. The animals are kept on a large pasture with what appears to be St. Augustine type grass, but the primary feed for the cows is freshly chopped Napier grass forage with concentrate. The cows are fed and milked in a barn with individual stalls, while the bulls are kept separately for breeding. In terms of animal health, tickborne diseases were considered the main problem and therefore regular treatment and spraying against external parasites is done.

- **Communal kraal of Girinka program** is in Kayonza District. A number of issues were identified here, including the lack of water along with the limited space allowed for each cow, because each cow had a stall of approximately 3 x 6 meters and they were confined to their specific stall with limited bedding and feed, which are both individually collected and apportioned to the animals by their owners. In general, there is limited knowledge concerning artificial insemination as this is done by a sector veterinarian who is called when the cows come into heat. It was also noted that the cows had poor body condition.

5.2. Feed mills

- **Bugesera Animal Nutritrion (BAN) Ltd.** in Bugesera district is a small feed company with production capacity of three tons per day that supports smallholder farmers in the area. BAN received a grant from Land O'Lakes through the RDCP II project to purchase equipment for mixing and grinding ingredients. Their mill is located in an industrial area, and they have a retail shop close to the Bugesera MCC.

- The **Premier Animal Feed Industries (PAFI) Ltd.** is located in Rwamagana district approximately 40 km from Kigali. It is among the 3 largest animal feed factories in Rwanda with installed capacity of 40 tons production per 8 hour day. About 85% is poultry feed and 15% is for cattle, fish and pigs. PAFI faces a big challenge getting feed ingredients of which most are

imported. PAFI decided to produce soybean-cooking oil in order to have soybean cake that can be used in animal feeds.

- **Gorilla Feed** is in Kigali. The mill has a 40 ton capacity per 8 hour day. They produce poultry and dairy rations. Some of the challenges the company faces were outlined: Rwanda is a difficult market for feed, as feed ingredients are expensive, low quality and often unavailable, and they need low prices for outputs to be attractive to the local producers. In addition, there is often poor response to feed by native animals, which is further aggravated by the lack of a recording system with regard to cattle production or breeding/mating. Poultry include about 90% of feed fed. The company used to have a demonstration herd to stimulate the sales of dairy concentrates. The 17 cows bought locally were producing 10 liters/day at the start without any supplementation and only went up to 16 liters/day with supplementation. The animals were sold as the upkeep was not financially viable. It was estimated that the production must be at least 20 liters/day for supplementation with concentrate to be viable. The main buyers are the medium size farms (10-20 cows). Poultry producers are currently the only ones making a profit because egg and broiler prices are high, hence most of the company's production is geared towards poultry feeds.

5.3. Milk Collection Centers (MCC)

- **I.A.KI.B. Cooperative** has a large network in Gicumbi district in the northern part of the country, which is the highest milk producing district in the country thanks (among others) to its favorable climatic conditions. Even in the dry season when milk production drops significantly in other regions of Rwanda, this district continues to produce, making it a preferred district of retailers and processors to source their milk outside of the more formal collection system set up by the cooperative. This increased demand by other processors hurts Blessed Dairies, which is the only recipient of the I.A.KI.B. cooperative milk.

  I.A.KI.B. cooperative has 6 MCC that were established through initiative of its members. This is considered the strongest dairy farmer co-op in Rwanda and also offers other services to its members such as animal feeds and veterinary supplies.

  Five employees collect 5,750 liters of milk every morning and another 1,600 liters in the evening from Ngondore MCC, an I.A.KI.B affiliated MCC. Farmers meet the transporter at a centralized location where milk is tested, then transported to the MCC where the tests are repeated. The tests include alcohol, organoleptic (taste, smell), visual check for floaters, lactometer, and temperature. A sample of collected milk is used to perform a Delvotest on the whole tank as a bulk indicator for antibiotic residue testing, which is being performed at Blessed Dairies. This particular MCC serves 900 farmers through 33 transporters and 100 farmers directly. Currently, only 200 liters a month are rejected, compared to pre-testing when a much higher volume were rejected. The greatest distance milk travels is 10 km, taking 60 to 90 minutes transport time to MCC; therefore, temperature management during transport is an obvious area of concern.

There are cold chain issues related to the MCC, specifically after they supply the wholesalers/retailers. Overall, the feeding of cows is suboptimal, which reduces milk production and hurts processing. For example, typical solids not fat (SNF) is 8.5%, and the standard for fat in milk is 3.3%, while here it is around 2.8 to 3.0. If there is overproduction of skim milk, instead of wasting the milk there is a need to produce yogurt. Although this has improved, mastitis is still a problem at almost 75% occurrence! They have used the California Mastitis Test (CMT) to test for mastitis but need a new source of reagents. Hygiene training has improved with Land O'Lakes being a leader in this area.

- **Bugesera MCC** is a retail shop that receives local milk, which is then chilled and sold directly to consumers, schools and a military base. Although there is no further processing, they do some testing, including assessment of container hygiene, organoleptic quality check, alcohol test, loctometer, and check of specific gravity on all incoming milk. They sell all they take in; however, they will visit a farm to do CMT if a specific producer has a large number of rejections.

5.4. Milk processing plants

- **Blessed Dairies** is the second largest dairy processor in Rwanda after Inyange Dairy. Blessed Dairies began in 2012 in response to the Girinka program and Kigali buyers who would come to the area but not always pay for milk. It started as a one-man business collecting milk from local producers and grew steadily as he is honest and people supported him. The I.A.KI.B Cooperative has taken over the milk collection in the district and supplies milk to Blessed Dairies. In 2012, about 10,000 liters/day was bought by Blessed compared with the current 35,000 liters/day. In addition, Blessed Dairies buys milk from three other co-ops, adding another 3,000 to 5,000 liters/day. They are currently processing 5,500 liters per day, producing pasteurized milk (bulk), yogurt (3,000 liters/day), butter, fresh cream, low fat milk, and mozzarella cheese.

  Currently, the company has 60 employees in areas such as processing and marketing, among others. The company had early challenges with regard to milk quality. To address this problem, they are now investing in cooling tanks and they have changed their transportation methods. Before, they used aluminum cans for transport and they now have both stainless and aluminum cans in addition to insulated tankers to transport the milk to the Dairy from the MCC to Kigali. By working with the Rwandan Bureau of Standards (RBS), Blessed Dairies has been certified by them, which improves their ability to market milk. They are currently working to build a new factory in a joint venture with I.A.KI.B to process 40,000 liters each day in a shift. They are pursuing ISO 22000-2005 to demonstrate compliance with applicable statutory and regulatory food safety requirements.

5.5. Consumption

- There are cultural barriers/beliefs to consumption of milk products such as "yogurt is for children." There also exists a price difference between home produced milk and processed milk along with low milk consumption in families, which produce the milk in this area, with documented regional differences.

5.6. Key stakeholders in the dairy sector

- **Rwanda Agricultural Board (RAB)** of the Ministry of Agriculture in Kigali: RAB has the mandate to cover all animal health projects in the country. According to RAB staff, mastitis is a big problem in Rwanda despite efforts in past years through various initiatives to address this problem. There continues to be a need to continue building capacity of MCCs with regard to mastitis and technical trainings to improve the milk value chain. RAB officials expressed their concern that a mastitis related research project led by the University of Rwanda was funded by Livestock Systems Innovation Lab, while RAB is the regulatory and extension service arm of the government. RAB's involvement is this type of project is essential to further develop the national mastitis control strategy to improve overall milk quality in the country.

  Currently there is little survey information on the antibiotic residue load in milk overall, and there is concern about giving too much responsibility to the MCC veterinarians, as they are conflicted because they are both distributing and selling the antibiotics. To improve this situation, RAB needs tighter regulations involving sector veterinarians and non-compliance of rational use of antibiotics. Oftentimes the same veterinarian, selling the antibiotic, is the one accepting the milk at the MCC the next day.

  RAB indicated the need for capacity building to test for antibiotic residues in animal products, especially fresh milk, as they do not currently have the capacity to do so anywhere in Rwanda. They lack both reagents and equipment. Antimicrobial resistance is a big area of interest to RAB following global guidelines from the OIE (World Organization for Animal Health).

- **University of Rwanda, School of Veterinary Medicine and Animal Science, Nyagatare**: The University emphasizes a One Health approach in curriculum development, and most of the discussion with the faculty centered on how they could gain additional academic training through participation with Livestock Systems Innovation Lab projects. There is significant interest in human and institutional capacity development opportunities and specifically the veterinary students were interested in opportunities that the Livestock Systems Innovation Lab could provide in post-graduate training, with a few having already followed up with contact requests. Dr. Dahl presented on heat stress abatement and other management interventions for dairy cows to veterinary students at all stages of training along with a visit to the recently constructed animal facilities, primarily for poultry research.

- **Land O' Lakes Rwanda Dairy Competitiveness Program II**: See for detailed information on this project: Herding Livestock Programs toward Nutrition; A Critical Analysis with a Focus on Rwanda's Feed the Future Dairy Program (McMahon, 2016).

  The RDCP II project successfully piloted a number of projects and initiatives that will need to be scaled out to develop the dairy sector further. The behavior change activities targeting consumption of milk were successful (see "Milk plays a dramatic role" for more information on this [Land O'Lakes, 2016]). The Livestock Systems Innovation Lab should build on this work and work with the RDCP II partners such as the Rwanda National Dairy Platform (RNDP) and the

Rwanda Council Veterinary Doctors (RCVD) to extend the impact to include top priorities such as increasing per capita milk consumption (choice, cold chain, cost etc.), and industry facilitation.

Further work is needed on the following aspects:

a) Research on milk quality: Only 20 of the 77 MCCs have fully satisfied the seal of quality requirements, including sampling. Industry players must develop a system of self-regulation while the government needs to move from provider to facilitator and work with RVCD to develop continuing education in support of their members.
b) There is a need for decentralization and privatization of artificial insemination (AI) with oversight from RCVD. The RCVD has the mandate for all veterinary and AI services in Rwanda.
c) The financing mechanism of the Rwandan National Dairy Platform (RNDP) needs to be evaluated and alternatives assessed, as the current set up is not financially viable. They currently focus mostly on producers and processors with input across sectors from farmers to consumers; however, they are running out of funds and membership alone is not sustaining them financially. The RNDP has the support from MINAGRI and some funding may come from there, but maybe USAID is also interested in funding them as a follow up of RDCP II. The RNDP has a school milk program that is successful and could be scaled up, but additional funding is needed.

- **International Fund for Agricultural Development (IFAD)**: In line with the National Dairy Strategy that MINAGRI launched in 2013 and building on previous initiatives, IFAD has committed $65.1 million (US) to further development of the dairy sector. For the details of the design report, click here: Rwanda Dairy Development Project (RDDP) (IFAD, 2016).

  Selection of the targeted districts was based on: (i) current level of cattle population and milk production; (ii) current and projected market development potential, including investments in milk collection centers, dairy processing plants, animal feed factories, and evolving domestic and export market linkages; and (iii) level of poverty, food insecurity and malnutrition.

  This project encompasses three main themes, including animal health (dairy production, extension services, animal reproduction and nutrition, semen collection and liquid nitrogen production, and farmer field schools), farmer and sector organization and development (training and support to farmers and MCCs), and policy development.

  The lead agency for RDDP implementation will be MINAGRI, and the main implementing body will be RAB, which will work closely with Heifer International in the development of the dairy hub model. Other key implementing partners will be the RCVD, the Rwanda Cooperative Agency (RCA), the Business Development Fund (BDF) and the RNDP.

  IFAD is open to explore collaboration with the Livestock Systems Innovation Lab, especially in the area of capacity development. The Livestock Systems Innovation Lab Management Entity should, in conjunction with the MINAGRI, contact the RCVD and RNDP to explore possibilities for collaboration. There may also be an opportunity for the Livestock Systems Innovation Lab to collaborate with RAB for testing equipment and to get the private sector involved.

- **The Rwanda Council of Veterinary Doctors (RCVD)** includes both veterinarians and animal scientists, and all those who deal with livestock in Rwanda. The RCVD emphasized the need for short courses for training of veterinary practitioners and those with allied roles in large animal veterinary care. This is because the current curriculum for Veterinary Medicine at the University of Rwanda has little on milk harvest procedures, mastitis control, artificial insemination and reproductive management, and dairy nutrition. More broadly, there is also a need to improve general record keeping on farms and the use of that information for management decisions.

- **The Rwanda National Dairy Platform (RNDP)** membership includes producers/farmers, processors, milk sellers (raw and processed), allied industry (feed sales, dairy equipment, pharmaceutical sales) veterinarians, and consumers. Because of this set-up, the RNDP could be a good platform for the Livestock Systems Innovation Lab to act as an information broker, as the RNDP is already trying to inform members on correct practices. They also assist with trade fairs, etc.

  Their strategy is to increase the production of high quality and competitive dairy products for health and poverty reduction by improving the livelihoods of the producers and ultimately contributing to the national economy. Their previous dairy "board" had only producers, sellers and processors, so the current platform has expanded upon this private sector driven platform under the Ministry of Public Service.

  The RNDP launched its 5-year strategic plan in 2015 and has eight strategies. They have worked with a grant from Land O'Lakes through the RDCP II project. They did compete for funding from the Livestock Systems Innovation Lab; however, they were unsuccessful because they did not have an international partner. The RNDP has government backing but its funding is a mixture. The will begin implementing part of the IFAD funded work, but they would still be looking for other funding.

  The RNDP goal is to improve the genetic base of the cows in Rwanda and to highlight the advantages of improved dairy cattle over, e.g., crop production, as cattle can add value from forage produced on small acreage, which is common in Rwanda. There are challenges: tickborne diseases, especially East Coast Fever (ECF) and mastitis, are often so severe that quarters are lost. There is a need for the Rwandan producers to consider their animals as an enterprise and produce in a market-oriented manner, but for that to occur more training efforts are needed.

  According to the RNDP, the MCC should become producer hubs (note: this is what the IFAD project through Heifer International aims to develop). Apart from delivering the milk, producers could buy feed and other inputs there, either paying cash (most likely) or on credit /checkoff system deducted from the milk sales.

  Another area of emphasis for the RNDP is to involve more producers into the formal sector through MCCs rather that selling informally to intermediaries and consumers.

As the dairy industry is growing, so is milk quality. The RNDP is developing a quality based milk payment system using butterfat (BF)%, protein and SNF. They are working with a Dutch University to do that. They want to increase exports from Rwanda, which is a challenge with Kenya as a neighbor with a strong dairy sector. Milk collectors were informal, but some MCCs have been formalized and are doing a better job of bringing in high quality milk. The next step will be to make them part of the cooperatives. The RNDP puts emphasis on improving the MCC as a midway stop versus use of transporters, as this will eventually improve milk quality.

- **The Rwanda Agriculture Livestock Inspection and Certification Services (RALIS)** is part of MINAGRI and is responsible for the overall coordination of all the functions of the National Plant Protection Services (NPPS) for the livestock sector, and it is responsible to deliver animal product certification services including enforcement of sanitary laws, monitoring and surveillance of animal diseases, and animal inspection and certification.

6. Recommendations

From the various visits and the stakeholders interviewed, the following potential projects could be developed further:

1. Development of curriculum and training for veterinary students and practitioners regarding cow nutrition, reproductive management, and milk harvest protocols, especially with an emphasis on the practical management appropriate to Rwanda. Mastitis prevention and treatment training are critically needed, as further development of domestic and export markets will be limited by milk quality. These activities could be coordinated and delivered in collaboration with the RCVD and at the UR School of Veterinary Medicine and Animal Science.

2. Improvement in protocols for milk testing at the MCC's, along with additional training on milk handing. There may also be a way to introduce pasteurization at the MCC's by working with IFAD to fund equipment purchases. This would be a significant opportunity to improve the wholesomeness and nutritional quality of milk.

3. Further development of training on dairy nutrition for smallholders to increase yields and animal health and productivity. It was clear that the nutrition of many Girinka cows was lacking, and the sustainability of that program is likely limited because of reproductive failures due to anovulation. A survey of the program to determine the number of Girinka cows that actually have more than one calf, and continue to provide milk to the family, is an important next step.

7. Next steps

1. Develop training materials for Training of Trainers.

2. Consult with potential training institutes to administer training courses.

3. Explore funding possibilities for the potential projects identified and outlined in section 5.

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Annex 1 - Agenda of the visit

Date	Time	Activity	Place to be visited
5-Dec-16	8:00	Team meeting	
	9:30 - 13:00	Visit milk processor (Blessed Dairies) and Farmers' cooperative (IAKIB)	Gicumbi district
	13:00 - 14:00	Lunch break	Kigali
	14:00 - 17:00	Visit Bugesera Animal Nutrition (BAN) Ltd. Feed processor, MCC & Farms	Bugesera
6-Dec-16	7:30 - 10:00	Visit University of Rwanda, Nyagatare campus, animal sciences and veterinary medicine	Eastern Province
	10:00 - 10:30		
	10:30 - 12:00		
	14:00 - 16:00		
7-Dec-16	7:30 - 8:30	Visit Eastern Province	
	8:30 - 9:30	Visit PAFI Ltd. feed processor	Rwamagana district
	9:30 - 11:00	Farm visit	Rwamagana district
	11:00 - 12:30	Input supplier / AgroVet shop and milk collection center	Rwamagana district
	12:30 - 13:30	Lunch break	
	13:30 - 15:00	Farm visit – Community kraal	Kayonza district
	15:00	Milk Collection Center	Kayonza / Rwamagana
8-Dec-16	8:30 - 10:00	Meeting RAB officials	Kigali
	10:00 - 12:30	Visit farms	Kigali
	14:00 - 17:00	Attend RDCPII / Land O Lakes closeout workshop	Kigali
9-Dec-16	7:00 - 10:30	Meeting milk collection center	Kamonyi
	11:00 - 13:00	Meet USAID Mission Rwanda	Kigali
	13:00 - 14:00	Lunch break	
	14:00 - 15:30	Meet DG RALIS	Kigali
	15:30 - 17:00	Meet Rwanda Council of Veterinary Doctors	Kigali
	17:00	Review / closeout meeting	

Annex 2 - List of persons met

Name	Function / Organization	Location
Mr. Jean Pierre Munyaburanga	Dairy farmer	Bugesera district
Mr. John Ndekezi	Manager SOCOBA Ltd.	Rwamagana district
Beneficiaries	Girinka program	Bugesera district
Mr. Emmanuel Rebero	Manager Bugesera Animal Nutritrion (BAN) Ltd.	Rwamagana district
Dr. Park Mr. Janvier Kivuye	Director Manager Gorilla Feedmill	Kigali
Mr. Jean-Claude Twagirayezu	I.A.KI.B. Cooperative	Gicumbi District
Mr. Moses Kioko Mr. Milton Ngirente	Production Manager Managing Director Blessed Dairies	Gicumbi district
Mrs. Jeanine	Production Officer, Premier Animal Feed Industries (PAFI) Ltd.	Gicumbi district
Dr. Isidore Gafarasi Dr. David Kiiza	Head of Animal Health Unit Staff of Animal Health Unit, Rwanda Agricultural Board (RAB)	Kigali
Dr. James Gashumba Dr. Martin Ntawubizi	Campus Coordinator, Nyagatare Campus Dean, School of Animal Sciences and Veterinary Medicine, University of Rwanda	Nyagatare
Mr. Aimable Ntukanyagwe	International Fund for Agricultural Development (IFAD)	Kigali
Dr. Alphonse Nshimiyimana	Executive Director, Rwanda Council of Veterinary Doctors (RCVD)	Kigali
Dr. John Musemakweri	Executive Director, Rwanda National Dairy Platform (RNDP)	Kigali
Dr. Dennis Karamuzi Dr. Felix Ngamije	Former Deputy Chief of Party, Dairy specialist, Land O'Lakes	Kigali
Dr. Beatrice Uwumukiza	Director General Rwanda Agriculture Livestock Inspection and Certification Services (RALIS)	Kigali
Mrs. Verena Ruzibuka	Agriculture and Food Security Specialist, USAID Mission	Kigali

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