RWANDA DAIRY COMPETITIVENESS PROGRAM II

CA# USAID-696-A-12-00002

FINAL REPORT
January 6, 2012 – January 5, 2017

Name of Project: Rwanda Dairy Competitiveness Program II
Regions: Northern, Southern, Eastern and Kigali Milk Sheds
Dates of project: January 6, 2012 – January 5, 2017
Total estimated federal funding: $14,999,988

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ACRONYMS AND ABBREVIATIONS

ABS  African Breeders Services, Total Cattle Management Limited
AI   Artificial Insemination
BDS  Business Development Services
COMESA Common Market for Eastern and Southern Africa
COP  Chief of Party
DPPD Dairy Public Private Dialogue
DSWG Dairy Sector Working Group
DQAL Dairy Quality Assessment Laboratory
EADD East Africa Dairy Development project
EDPRS Economic Development and Poverty Reduction Strategy
EMMP Environmental Mitigation and Monitoring Plan
ESADA East and Southern Africa Dairy Association
INGO International Non-Governmental Organization
GoR  Government of Rwanda
MCC  Milk Collection Center
MINAGRI Ministry of Agriculture and Animal Resources
MINECOFIN Ministry of Economic Planning and Finance
MINEDUC Ministry of Education
MINICOM Ministry of Trade and Industry
MINALOC Ministry of Local Government
MINISANTE Ministry of Health
MS – DSWG’s Milk Shed – Dairy Sector Working Groups
MSME Micro, Small and Medium Enterprise
NAEB National Agricultural Export Development Board
NDS  National Dairy Strategy
PLWHA People Living with HIV and AIDS
PMP  Performance Management Plan
PSF  Private Sector Federation
PSTA III Strategic Plan for the Transformation of Agriculture in Rwanda – Phase III
RAB  Rwanda Agriculture Board
RALIS Rwanda Agriculture and Livestock Inspection Services
RBS  Rwanda Bureau of Standards
RCA  Rwanda Cooperatives Agency
RDB  Rwanda Development Board
RDCP II Rwanda Dairy Competitiveness Program II
RNDP Rwanda National Dairy Platform
SOQ  Seal of Quality
SP   Service Providers
TOT  Training of Trainers
UCD  University of California – Davis
**Introduction and Program description**

This report is the final deliverable submitted by Land O'Lakes International Development for the period January 6, 2012 to January 5, 2017. The report covers program achievements for the entire life of USAID's Rwanda Dairy Competitiveness Program II (RDCP II) awarded to Land O'Lakes in January 2012. The project was designed to reduce poverty through expanded marketing of quality milk that generates income and employment, and improves nutrition of rural households. RDCP II achieved this by linking existing and new smallholder dairy producers to an expanding market demand driven by improved quality, reduced transaction costs and increased investment along the dairy value chain.

Leveraging the momentum of the first dairy project, RDSCP I, Land O'Lakes started implementing RDCP II in 2012, a five-year $15 million USAID program with the overarching goal and mission to increase the competitiveness of Rwandan dairy products in regional markets to positively impact rural household incomes associated with dairy-related enterprises. This was achieved through multiple pathways including: increasing production and production efficiency, improving market access, improving milk and dairy product quality, and increasing local demand.

**RDCP II results framework and implementation approach**

Rwanda Dairy Competitiveness Program II (RDCP II) was aligned to USAID strategic objective SO.7 with a focus on expanding economic opportunities in rural areas and a goal to make Rwandan dairy products competitive in regional markets. This was achieved through two intermediate results - facilitating Rwandan dairy products to meet COMESA standards and expanding investment in dairy processing and marketing. Figure 1 below is a schematic diagram illustrating the relationships to the USAID strategic objectives:

![Figure 1: USAID and MINAGRI officials during RDCP II close out event held in December 2016](image)
Further, the project had the following life of project targets:

- Achieve a 60% increase in the volume and value of dairy products sold
- 30 new products with the Rwanda Seal of Quality
- Achieve a 60% increase in net household income
- 7,500 new dairy related jobs created
- USD $20M leveraged in non-USG resources
- 9 policy reforms advocated for or enacted

The project goal of making Rwandan dairy products competitive in regional markets was later aligned with the National Dairy Strategy (NDS) goal, developed by the NDS working group in 2012, that states, “a competitive dairy sector providing quality dairy products which are affordable, available and accessible to all Rwandans and other consumers in the region.” While RDCP II project goal was very ambitious, alignment with the NDS goal provided a well-decentralized approach that motivated participation of all industry stakeholders towards first satisfying local demand by ensuring production of high quality milk and dairy products.

The National Dairy Strategy
RDCP II was inaugurated at about the same time that the Ministry of Agriculture and Animal Resources (MINAGRI) had started its 5-year planning cycle for the period 2013-2018 to develop the National Strategic Plan for Transformation of Agriculture (PSTA III) in line with the Government of Rwanda (GoR) Economic Development and Poverty Reduction Strategy second generation (EDPRS II). This is a sector plan integrating key activities to be prioritized in the short term. Land O’Lakes –RDCP
II was therefore tasked, through collaboration of MINAGRI and USAID, to develop a National Dairy Strategy. The strategy, which was completed and validated in April 2013, became a guiding document and a strong reference for further propelling the sector forward. RDCP II became a key industry facilitator toward ensuring the ambitious targets set in the NDS are understood. The strategy recommended restructuring of an existing industry body to form a more inclusive private sector driven Rwanda National Dairy Platform (RNDP). The platform over the years has become the industry advocacy organization representing the interest of all stakeholders in the dairy value chain including 5 clusters of producers, milk traders/transporters, processors, input & services providers as well as the consumers under the consumer association of Rwanda. Refer to Annex II for the 2013 National Dairy Strategy.

RDCP II employed a push and pull approach that combined improving farm level production of high quality milk and developing capacity of milk collection centers (MCCs) to consolidate milk for marketing, and further linking them with and facilitating buyers to increase their demand. Using this dual approach, aggregation and consolidation of high quality milk provides a firm foundation for building a sustainable market relationship with traders and processors and a catalyst for attracting additional investment. The approach is based on the understanding that Rwanda is mainly dependent on smallholder producers who own 2-3 dairy cows and rely on an efficient aggregation and bulking system for their milk markets to function properly. Land O’Lakes utilized this knowledge to prepare incentives for dairy value chain actors from farm to market. This included support to inputs access, production training, provision of small grants for equipment and milk testing kits at milk aggregation centers. This resulted in a desired push effect greatly increasing milk production from the smallholder producers. On the other end, RDCP II worked with milk traders and processors to improve their sourcing and marketing potential to increase demand for milk in the market, creating the pull effect. The project facilitated a dairy promotion campaign to further raise the awareness of benefits of hygienic milk consumption. The campaign was a multilevel approach integrating key messages for both consumer and relevant value chain participants. In addition, RDCP II utilized this campaign to influence behavior change towards milk consumption as part of a nutritious diet to improve nutrition especially for pregnant and lactating mothers and children under 5 years. This was achieved through a behavior change communication program jointly implemented with Urunana Development Communications, a local based organization in Rwanda. Figure 2 below is an illustration of the push-pull approach that facilitated to establish specific needs of various actors in the dairy value chain.
Throughout the program, RDCP II worked in 17 of Rwanda’s 30 districts with a focus on the following main pillars: farm production and productivity, milk and dairy product quality, policy and enabling environment and strengthening market access. Important crosscutting themes were integrated into the program, including gender and women’s economic empowerment, promoting demand for dairy products, technologies and business development services, and promotion of investment and export market development. The project had its direct activities in the following districts:

- **Eastern province** – Nyagatare, Gatsibo, Kayonza, Rwamagana and Bugesera; Western province – Nyabihu and Rubavu;
- **Southern province** – Gisagara, Huye, Nyanza, Ruhango and Kamonyi;
- **Northern province** – Rulindo, Musanze and Gicumbi;
- **Kigali** – Gasabo and Kicukiro district.
The map below in figure 3 highlights the targeted locations.

Figure 6: Map of Rwanda showing RDCPII milk sheds

Successful collaboration with stakeholders
To implement the program, Land O’Lakes employed a consortium of sub-partners and other stakeholders to provide necessary expertise for a successful program. The following subs are recognized for their role in the five-year program:

**Africa Breeder Services – Total Cattle Management (ABS)** led training on animal husbandry practices. This included animal feeds & feeding, disease control, breeding technologies as well as improved farm level hygiene. ABS provided support services and technical knowledge to service providers enrolled by the project from orientation to execution of expected deliverables e.g. delivery of artificial insemination services to vulnerable farmers using selected service providers, training of trainers and service providers and development of training materials for reference for different clusters of individuals (farmer, TOT and Service provider).

**Inspired International** – Developed financial products for Rwandan dairy industry actors in collaboration with local banks. This multi-step approach started with a dairy financial services survey, which informed the status of the sector and specific financing opportunities and challenges. This was followed by ongoing support to financial institutions through signed MoUs to provide training on product development through to loan appraisals tailored to dairy borrowers. Trainees developed new products and had the opportunity to test them during the life of the project. In addition, Inspired International conducted a deep dive investment analysis to develop the Rwanda dairy investment blueprint for Rwanda Development Board (RDB) as a basis to attract additional dairy investments in country.

**University of California, Davis** – Facilitated training on mastitis prevention, animal care and milk safety. UC Davis trained microbiologists on technical aspects of mastitis diagnosis & treatment and collaborated with University of Rwanda (UR) to empower vet and animal production final year
students to develop dairy management skills. Through UC Davis, RDCP II provided technical assistance to UR providing faculty hands on microbiology training including sampling, testing and control/treatment of different mastitis causing agents.

**Government of Rwanda:** Successful implementation of RDCP II was mainly achieved through very strong collaboration with the different levels of government particularly the Ministry of Agriculture and Animal Resources (MINAGRI) and affiliated agencies of Rwanda Agriculture Board (RAB) and Rwanda Agriculture and Livestock Inspection & certification Services (RALIS). The agencies’ collaboration was instrumental in building strong service provider networks in each district and provided a follow up mechanism and quality. The project received considerable support from the local government administrators and technicians in all districts through their endorsement of annual work plans and participation in project activities including farmers’ trainings, workshop and quarterly milk shed and district dairy sector working group meetings. This collaboration also served to provide mentorship to selected service providers involved in project activity implementation leading to great success of the project’s grants program.

**Highlights of program achievements**
RDCP II positively impacted Rwanda’s dairy sector in many aspects cutting across several parameters. Below is a selection of indicators that registered significant progress:

**Value of dairy product exports as a result of USG assistance:** Overall growth increased from 7M in 2013 to 12M in 2016. This was primarily a result of vibrant growth between 2012 and 2014 when dairy exports reached a pinnacle of nearly 15M USD. However, in the past 2 years Rwanda has experienced a gradual decline of dairy exports, currently estimated at slightly under 12M USD (2016). (see figure 4 below for additional details). One possible explanation for this decline is the persistent political instability observed in neighboring countries such Burundi and DRC during this period. Other possible factors that may have affected the volume of dairy exports are the increase in domestic milk consumption within Rwanda (as evidenced by increased sales of fresh pasteurized through milk zones due to additional local demand) and a drop in farm level production following a country wide severe drought experienced in Rwanda especially during May-September 2016 period. The growth in dairy exports represents a valuable source of rural income for dairy farmers located in districts bordering Eastern DRC and Burundi. Overall, the project has facilitated an enabling environment for proper recognition and tracking of dairy exports including informally traded dairy products mainly traded by border cooperatives with whom the project worked to improve the quality. Project support included provision of appropriate holding cans, bulking tanks and transportation means by use of mechanized tricycle trailers. Further, RDCP II provided milk testing to all dairy operations across all milk collections centers and processing equipment to qualifying dairy enterprises.
Number of jobs attributed to FTF implementation: During the 5 years of implementation, RDCP II recorded 12,089 (11,205 Male, 884 female) full-time converted jobs created along the dairy value chain exceeding the life of project target by 4,589 jobs. New jobs are associated with the increased production activities at farm level, operationalization of milk collection centers, increased demand for milk supply in major cities of the country, which resulted in more opportunities in milk transportation from farms to milk collection centers and processors especially in Eastern and Northern provinces, and Kigali City.

Number of rural households benefiting directly from USG assistance: RDCP II directly benefited 63,109 beneficiaries over the five-year program, exceeding the original life of project target by 28,109 households. This was achieved through a multifaceted approach used by the project team to employ a network of service providers familiar with the local environment to deliver training and follow up services to farmers in addition to direct engagement through their local leaders and extension staff. Further, RDCP II recruited a network of model farmers who received specialized training to act as change facilitators in their community. This reinforced further the service provider network as an additional extension arm further promoting adoption of technologies and impact on the ground.

Number of vulnerable households benefiting directly from USG assistance: Similarly, the project affected 29,664 vulnerable households, exceeding the original life of project target by over 15,000 households. This is attributed to strong collaboration with local district leaders and a committed network of service providers and model farmers. The project adopted the Government of Rwanda wealth classification approach to be able to reach the vulnerable.

Change in net dairy income among targeted households: RDCP II positively affected the improvement in incomes of dairy related households by providing a steady and coordinated milk market through strong linkages of dairy cooperatives to markets. Change in net dairy income among targeted households (USD) increased to a cumulative $54,300,397 against a life of project target of $9,489,425 exceeding by $44,810,972. This was achieved through business development support services offered to the cooperative leadership that strengthened their negotiation and contracting skills with buyers thereby building strong and lasting relationships. Further, the project strengthened payment systems by encouraging regular and consistent payments through local banks.

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1 National Export Development Board (NAEB) quarterly reports
Gender Equality / Women’s Empowerment: The project achieved an overall proportion of female participants in dairy related business of 38%. While RDCP II did not achieve the life of project target of 50%, the achievement is worth noting given the historical lack of women participation in dairy related activities in many districts particularly in Eastern and Western provinces where men are predominant in many economic activities. RDCP II employed multiple approaches to increase the number of women participating in project activities. The project also recorded 97% proportion of females who report increased self-efficacy at the conclusion of USG support. The project aimed to create an environment in which men and women have equal access to social, economic, and political opportunities emphasized through supported training by RDCP II staff and service providers.

Table 1: RDCP II results highlights

<table>
<thead>
<tr>
<th>Performance Indicator</th>
<th>Baseline Value</th>
<th>Original LOP Target</th>
<th>Cumulative Results (2012-2016)</th>
<th>Difference between actual results and targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value of dairy products exports (in USD)</td>
<td>$85,979</td>
<td>$137,567</td>
<td>$46,764,474</td>
<td>+$46,626,907</td>
</tr>
<tr>
<td>Number of new jobs attributed to FTF implementation</td>
<td>0</td>
<td>7,500</td>
<td>12,089</td>
<td>4,589</td>
</tr>
<tr>
<td>Number of rural households benefiting directly from USG assistance</td>
<td>0</td>
<td>35,000</td>
<td>63,109</td>
<td>+28,109</td>
</tr>
<tr>
<td>Number of vulnerable households benefiting directly from USG assistance</td>
<td>0</td>
<td>14,000</td>
<td>29,664</td>
<td>+15,664</td>
</tr>
<tr>
<td>Change in net dairy income among targeted households (USD)</td>
<td>$2,823,967</td>
<td>$9,489,425</td>
<td>$54,300,397</td>
<td>+$44,810,972</td>
</tr>
</tbody>
</table>

Overall program and performance achievements by component
RDCP II has been credited by the entire industry for exemplary performance and achievement over the last five years. Notably, throughout the close-out workshops in the respective districts, partners and service providers lauded the project’s light touch implementation mechanism as empowering to the beneficiaries. It was evident the partners acquired business skills and knowledge to do better and collaborate more meaningfully. This was further demonstrated at the project final close out workshop in December at which both the MINAGRI and USAID appreciated the level of success attained by Rwanda’s dairy sector over the last five years of the project citing major program activities that have been impactful such as the seal of quality program, shisha wumva milk consumption campaign and the establishment of the Rwanda National Dairy Platform among others. This achievement is also evident through exceeding expectations set forth by the donor at the award stage resulting in a revision of targets often to take advantage of the team’s potential to achieve more in a scale up plan across several indicators of the project.

IR1. Rwandan Dairy Products Meet COMESA Standards
Rwanda produces over 700 metric tons² of milk annually, the bulk of which is marketed through poorly regulated informal routes. This results in losses to the dairy sector, both in volume and value of dairy products marketed. RDCP II has positioned Rwanda as a hub for high quality dairy products

² National Institute of Statistics of Rwanda (NISR), Statistical Yearbook, 2016
by benchmarking local standards to regional COMESA standards and working with sector actors to achieve the same through a reward mechanism for implementing a range of improved dairy practices under the Rwanda Seal of Quality (SoQ) program. This is structured around milk collection centers as the consolidation points for milk produced by smallholder farmers. The program focused a lot of effort in mobilizing producers through multiple aggregation centers to bulk their milk through established MCCs thereby making it easier to negotiate agreements with large buyers and processors to sign long-term contracts with the farmer cooperatives. This approach has helped formalize business to allow additional business development services to be supplied around the MCCs and to build stronger milk cooperatives with improved value proposition to their members as an incentive for farmer retention. The result has been an increase in amount of milk collected through the MCCs over the years as illustrated in the figure 6 below.

Through a grant to MINAGRI-Rwanda Agriculture and Livestock Inspection and Certification Services (RALIS), RDCP II envisioned a fast growing sector, free of risks to human health, by instituting a national milk certification program that takes into account all value chain actors. In addition, RDCP II delivered milk testing equipment to various dairy businesses and led national efforts to enact a set of guidelines for production, handling and retail of milk providing a well prepared platform upon which the Seal of Quality milk inspection and certification program is anchored. The investment in equipment and training by the project has provided the lifeline for the first national milk quality certification program in Rwanda.

Under the Seal of Quality program, dairy actors that are found to comply with good milk handling practices as established by the Ministerial Order have been awarded the Rwanda dairy quality certification mark (Seal of Quality). The Seal of Quality is a compliance certificate given to those entities that will fulfil the requirements for the award covering a period not exceeding 12 months during which they will be subjected to compliance checks before approval to extend the validity of the license or withdrawal. Over the last 12 months, RALIS finished the mandatory procedures to complete a full cycle from training, inspection and audit processes for 64 MCCs and 14 dairy businesses. This provided a strong basis that the sector is now ready for scale with need for this routine to be enforced across the country as the benchmark for measuring quality to achieve industry competitiveness. In the end, 20 milk collection centers and 7 dairy small businesses

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3 RDCP II Business reports 2012 – 2015
achieved the Seal of Quality certificate. While this is a basic step, it prepares processing facilities to procure high quality milk enabling them to quickly acquire advanced industry certification from the Rwanda Standards Board (RSB). This further strengthened the complementary role of both institutions RALIS and RSB in achieving dairy sector competitiveness. These efforts have led to significant impact in the volume of milk marketed at the farm level due to increased product confidence gained by buyers in the market place guaranteeing improved revenue streams.

**Table 2: Change in value and volume of milk marketed**

<table>
<thead>
<tr>
<th>Performance Indicator</th>
<th>Baseline Value</th>
<th>Original LOP Target</th>
<th>Cumulative Results (2012-2016)</th>
<th>Difference between actual results and targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value of incremental milk sales (collected at farm-level) attributed to FTF implementation (USD)</td>
<td>4,606,135</td>
<td>31,535,461</td>
<td>66,056,652</td>
<td>+34,521,191</td>
</tr>
<tr>
<td>Gross margin per dairy cow (in USD)</td>
<td>162.22</td>
<td>251.93</td>
<td>248.15</td>
<td>-4</td>
</tr>
<tr>
<td>Volume of milk marketed by Milk Collection Centers (in Liters)</td>
<td>16,067,127</td>
<td>25,707,404</td>
<td>142,502,420</td>
<td>+116,795,016</td>
</tr>
</tbody>
</table>

In order to achieve the goal of the project, RDCP II focused on helping Rwandan dairy products meet Common Market for Eastern and Southern Africa (COMESA) standards and expand investment in dairy processing and marketing. COMESA is a regional economic community that aims to promote trade within and among member nations. RDCP II helped connect farmers to markets, mainly through farmer-based organizations, resulting in increased incremental sales, at farm-level, of over USD $66 million. The original LOP goal, was $31.5 million in incremental sales—RDCP II nearly doubled this target. Gross margin per cow increased from $162.22 to $248.15 (reference table 2 above), and volume of milk marketed by milk collection centers reached 142 million liters – an increase of over 126 million liters since year one. This achievement is a result of concerted efforts to operationalize MCCs across the different districts of operation starting with 28 milk collection centers in 2013 to 69 milk collection centers in 2016 fully operational with proper documentation of their business performance on a monthly basis. The analysis in figure 7 below of both the number of operational MCCs and liters of milk sold through the MCCs is based on those with a complete performance record obtained through RDCP II business records.

![Figure 10: MCC operationalization 2013-2016 vs increasing milk marketed through MCCs](image-url)
**Gross Margin per Cow for households in the targeted districts:** RDCP II registered increasing gross margin (GM) per cow over the years of project implementation and a slight drop registered in the last year of implementation (2016). The chart below illustrates the positive trend of Gross Margin per cow from 2013 to 2016:

![Gross Margin per cow chart](chart.png)

**Figure 11: Gross margin trend curve**

**IR1.1 Best practices employed by small holder producers and other actors**

**The model farmer approach**

A proximity peer farmer extension system was adopted by RDCP II to help farmers to improve their wellbeing by improving farm practices through peer learning. RDCP II trained a network of model farmers during the final two years integrating them in the national pool of trained facilitators under the “twigire muhinzi” model. As an exit strategy, the project team mentored trained model farmers in all five milk sheds aimed at establishing a platform for monitoring the adoption of lessons learned and utilization of technologies (e.g dry season feeding, milk hygiene, mastitis control and artificial insemination). The collaborative effort of RDCP II and district vet extension staff was essential in providing hands-on training in the field. This network established as a proximity extension strategy will continue to be a source of motivation and mentorship for community members by serving as peer educators on dairy production technologies and practices. The model farmers extension approach will continue under the supervision and support of sector and district livestock officers. The momentum of the model farmers’ operations will keep up after the end of RDCP II because of the individual commitment of farmers as well as the government effort to promote a farmer-to-farmer extension system.

![Model farmers displaying their certificates](model_farmers.png)

**Figure 12: Model farmers display their certificates after training on improved dairy husbandry**
The model farmer extension approach has been demonstrated as a decentralized dairy extension system which brings farmers together to exchange new technologies for improved practices under the leadership of their local peers. This approach has also improved farmers’ relationships through the creation of dialogue meetings and the exchange of views on their farming profession. This approach strongly linked the group of model farmers with livestock officers at sector and district levels for closer interactions in the future, which was not happening before. This interaction of model farmers with sector and district vets has created a strong and sustainable model, which will continue running even after RDCP II.

Table 3: Training and short-term assistance

<table>
<thead>
<tr>
<th>Performance Indicator</th>
<th>Baseline Value</th>
<th>Original LOP Target</th>
<th>Cumulative Results</th>
<th>Difference between actual results and targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of farmers and others who have applied new technologies or management practices</td>
<td>0</td>
<td>28,000</td>
<td>53,976</td>
<td>+ 25,976</td>
</tr>
<tr>
<td>Number of individuals who have received short term agricultural training</td>
<td>0</td>
<td>35,000</td>
<td>63,149</td>
<td>+ 28,149</td>
</tr>
<tr>
<td>Number of MSMEs receiving business development services from USG assisted sources</td>
<td>0</td>
<td>1,500</td>
<td>11,830</td>
<td>+10,330</td>
</tr>
<tr>
<td>Value of inputs and services used by members of targeted cooperatives (USD)</td>
<td>0</td>
<td>$7,364,538</td>
<td>$32,637,420</td>
<td>+25,272,881</td>
</tr>
</tbody>
</table>

In order to achieve increased investment, RDCP II had to impact the practices of smallholder producers and other actors. Overall 63,149 individuals received short-term agricultural sector productivity or food security training, with over 85% of the trainees applying those techniques in order to improve agricultural productivity at the farm-level. $32.5 million in input services was used by members of targeted cooperatives and 11,830 MSMEs; including farmers receiving business development services (BDS) training. RDCP II implemented trainings on animal nutrition, record keeping, animal hygiene, animal breeding and milk quality to improve farm and business practices. During the final project survey in August 2016, 100% of farmers surveyed acknowledged receiving training in animal nutrition, 61% on recordkeeping, 88.5% on animal hygiene, 32.9% on animal breeding and 69% on milk quality.

Adoption of farm technologies/improved practices

Overall, the project recorded a high adoption rate with over 85% trainees applying at least one of the practices/technologies for which they received training. The project recorded improvement in adoption of milk quality, milk hygiene and mastitis control technologies/practices and a significant increase in record keeping by the final year compared to 2013. The decrease in vaccinations is attributed to the fact that there were no major outbreaks of diseases that require mass vaccination of cows during the final year as was the case of 2013 when parts of Eastern province experienced Food & Mouth disease. Below is a bar graph showing rate of adoption of milk quality and disease control technologies and practices:
The adoption rate of artificial insemination among targeted households remains low compared to other farm level technologies. However, the demand for AI services was present among dairy farmers. This contradiction is explained by the inefficient supply of artificial insemination services at the decentralized level caused by limited presence of trained technicians to deliver the services. This often results in missed inseminations when the cows come on heat prompting farmers to breed with available inferior bulls. Further, during the project’s final year, the national insemination center suffered a breakdown of the only nitrogen plant in the country lasting over 6 months before it could be repaired further affecting A.I services across the entire country. During the first three years of RDCP II implementation, direct support to local service providers was given as a small grant to vulnerable farmers’ households through selected service providers to improve availability and access of the A.I services. Enrolling 11 service providers in 17 districts, 10,303 cows were inseminated belonging to 10,234 (5,879 male, 4,355 female) vulnerable individuals selected in collaboration with district and sector local leaders among the vulnerable Girinka beneficiaries. The conception rate of inseminated cows after one insemination per cow was 67% against a national success rate of 55%, improving efficiency by over 10%. This success rate is attributed to strong follow up and coordination by the project team to ensure the services are delivered appropriately.

Shortage of AI technicians (AITs) and inefficient supply system of semen are the major constraints to adoption of AI as highlighted by dairy stakeholders. In addition to this shortage of AITs, poor animal nutrition and the farmer’s inability to detect heat leads to low conception rates. Furthermore, the cost of AI services without subsidies may be too high for some smallholder farmers. This is compounded by the fact that many farmers are located further from where a single AIT may be located increasing the cost of transport significantly.
Figure 15: A.I supplies and equipment supplied with USAID grant to RCVD

Dairy farmers, representatives from MINAGRI and the Rwanda Council on Veterinary Doctors (RCVD) expressed that A.I services should be prioritized by the project moving forward. In that regard, in 2016, USAID approved a grant to train additional AITs implemented by RCVD. Altogether, 104 A.I technicians including 30 female technicians received training and A.I equipment to increase the availability of skilled professionals in 17 districts of RDCP II operation. The AITs each received an A.I kit funded by RDCP II and signed a contract for AI services to be conducted on a monthly basis. Through this training, along with other previously trained AITs, RDCP II has contributed to establishing a private sector driven A.I services platform in collaboration with RCVD.

Farm level technology adoption during 2013 and 2016

In comparison, there was a significant reduction in dairy cow feeding technologies between 2013 and 2016 with the only increase recorded in legumes, hay and mucuna forage adoption. From previous record of annual survey results, it’s evident adoption of farm technologies varies significantly between the years. This may be attributed to program activity intensity during the first 3-4 years of the program implementation with the engagement of service provider and provision of test inputs to dairy farmers.

![Feeding technologies adoption compared during RDCP II](image)

The reason for the decrease in improved feeding technologies can further be attributed to the prolonged dry season particularly in 2016, which negatively affected expected harvest and income at the household level, making it challenging to allocate extra resources to animal feeding except crop residues and hay made from more readily available forages. This is coupled with limitations of land and a traditionally low culture of concentrate feeding with a preference for fresh fodder. It can be argued that...
faced with a difficult season, farmers opt for less demanding practices with minimal investments required. This includes crop residue feeding from limited crop harvested, hay legumes and silage conserved previously in anticipation of the dry season. Notably, during the life of the project, mucuna production was promoted among others as a fast growing legume that allows multiple harvests of both the leaves and the plant pods for cow feeding.

IR 1.2 Expanded access to milk and dairy product quality monitoring and certification services

RDCP II promoted the establishment of a dairy best practices certification project under the flagship Seal of Quality (SOQ) program for dairy businesses initiated through the collaboration of the RDCP II with MINAGRI and launched in May 2013. The SOQ program was been designed as a mechanism to enhance safety, quality, quantity and consistency of Rwandan milk following a system that involves training, inspection, auditing and certification of dairy value chain actors from farmers to milk kiosk outlets. RDCP II collaborated with MINAGRI and local government partners to initiate a culture of testing milk at all aggregation and milk collection centers where RDCP II operates. This involved training a range of dairy actors from relevant institutions such as Rwanda Agriculture Board (RAB), Rwanda Agriculture and Livestock Inspection Services (RALIS) to milk quality technicians and transporters to ensure a smooth transition. This also required basic incentives to these entities including provision of testing kits to participating MCCs.

In order to institutionalize the SoQ program, and with USAID approval, RALIS received a capacity development grant to operationalize the program starting a multi-stage process that would train both staff and value chain participants to prepare for the same. This paved the way for institutionalization and operationalization of the first national dairy best practices certification facilitated through enforcement of the Ministerial Order on Milk Handling and standards requirements especially the mandatory standards on milk and milk products in the whole country. RDCP II is credited for leading the national dialogue leading to the approval and official publication of the Order of the Minister of Agriculture and Animal Resources, a critical component to achieving industry wide acceptance.

Components of the SoQ program such as awareness raising around the Ministerial Order and enforcement of milk standards targeted all value chain actors, while the certification award for complying actors is the ultimate stage of the process. To achieve the main goal of the SoQ program, which is to enhance milk product hygiene and quality through awarding Certificates of Best Practices, the following approach was followed:
• Identification and selection of beneficiaries such as milk kiosks, Milk Collection Centers and milk processing SMEs (Small and Medium Enterprises)
• Training of identified actors on milk handling and hygiene standards’ requirements as well as to ensure improved documentation and implementation including recordkeeping
• Pre-audit of selected pilot dairy enterprises
• Carry out full audit of pre-audited actors and milk sampling & testing. The audit reports will guide decision making on certificate awarding.
• Awarding certificates to dairy actors with complying systems.
• The awareness campaign on the Ministerial Order is crosscutting

In a bid to support implementation, follow up and enforcement of milk and dairy products quality, monitoring and certification, services the GoR enacted the Ministerial Order regulating milk collection, transport and milk selling. The Ministerial Order was officially adopted and published in the national gazette on February 02, 2016. Evidently, this was long into the project implementation of the mechanism launched in 2013, a step that was important to prepare the sector and the country at large. Further, a transition period of six months was allowed during which awareness efforts among dairy actors were carried out through RDCP II grant support to RALIS. Under the grant awarded to RALIS, a communication strategy to create awareness of the Ministerial Order developed and executed in the form of national and district workshops, radio talk shows, radio spots and distribution of small booklets among key dairy stakeholders. It is therefore important to acknowledge the effort and support of all stakeholders towards this final stage in a multi-stage process. The table 4 below highlights achievements by the program in line with achieving and making available the required practices and technologies to ensure Rwandans drink milk that is of good quality resulting from the program activities:

Table 4: Milk quality monitoring and seal of quality program

<table>
<thead>
<tr>
<th>Performance Indicator</th>
<th>Baseline Value</th>
<th>Original LOP Target</th>
<th>Cumulative Results</th>
<th>Difference between target and results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of new milk quality assessment technologies/protocols implemented</td>
<td>0</td>
<td>10</td>
<td>12</td>
<td>+2</td>
</tr>
<tr>
<td>Number of new products under SoQ</td>
<td>0</td>
<td>30</td>
<td>58</td>
<td>+28</td>
</tr>
<tr>
<td>Percentage of milk marketed under SoQ</td>
<td>0</td>
<td>35%</td>
<td>68%</td>
<td>+33%</td>
</tr>
</tbody>
</table>
IR 1.3 Consumer Preferences Drive Quality Improvements

RDCP II multipronged approach aimed to build on Rwandan consumer preferences for various locally made dairy products to ensure acceptance of new developments in the milk retail and distribution methods. This was determined as the critical factor towards achieving and sustaining a growing consumer demand for milk products made in Rwanda. The quality improvements at the farm level were coupled with increased consumer awareness about milk quality and importance of traceability of milk consumed at households. Over all the result was an increasing throughput of milk through established milk collection centers receiving support from RDCP II over the years resulting from a rising demand for the milk by buyers and processors. The program promoted a strong producer-buyer relationship between MCC managers and traders/processors to guarantee a stable long-term relationship allowing businesses to have a steady flow of high quality milk. The graphs below (figure 20) indicate a growing volume of milk through MCCs driven by a rising demand for clean, hygienic milk by buyers through market linkages created by the project. The gradual increase contributes to the percentage of milk marketed under the SoQ.

On a positive note the SoQ program made it possible for dairy processors enrolled in the program to put on the market a variety of products processed under the project technical or grant support from RDCP II across milk sheds. With support from the project, many cottage industries (e.g. the cheese and butter makers) learned were trained by an international cheese master trainer, a dairy consultant Kobus Mulder from South Africa. The consultant also introduced a national annual cheese and butter expo. He facilitated several trainings for different categories of stakeholders including supermarket retailers, hotel chefs as well as technicians at the various cheeseries to appreciate the diversity of products made from cheese as well as their different use in food recipes. The annual cheese and butter expo has become an industry event that the project has gradually transitioned to the RNDP. The expo usually preceded by a national competition among the cheese and butter entries made by different processors creating a great marketing platform for the winning products and brands (refer to Annex III).
Milk consumption

At program inception, a key constraint identified by the Bill and Melinda Gates funded East Africa Dairy development Project (EADDP) was a rapidly growing gap between supply of milk and a slow growth of demand. Recommendations to correct this trend were made through the national dairy strategy consultation process facilitated by RDCP II and put into action using a multipronged approach employed by the project through a national milk consumption campaign dubbed “shisha wumva” literally translated as “feel the goodness”. This approach combined use of a high visibility media campaign using a mix of radio, television, web & print media and a host of district and national workshop and seminars. The campaign was delivered around three themes: increasing generic consumption of milk, improving quality of milk delivered to consumers and promoting milk as an important source of nutrients for the family.

Table 5: Milk consumption campaign and outreach achieved by RDCP II

<table>
<thead>
<tr>
<th>Performance Indicator</th>
<th>Baseline Value</th>
<th>Original LOP Target</th>
<th>Cumulative Results</th>
<th>Difference between target and results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of promotional and educational events/program on dairy consumption implemented/conducted</td>
<td>0</td>
<td>30</td>
<td>42</td>
<td>+12</td>
</tr>
<tr>
<td>Number of people reached during the milk consumption promotional campaign</td>
<td>0</td>
<td>600,000</td>
<td>1,591,215</td>
<td>+991,215</td>
</tr>
<tr>
<td>Percentage of consumers that are aware of nutritional and health benefits of milk</td>
<td>0</td>
<td>50%</td>
<td>99%</td>
<td>+49%</td>
</tr>
</tbody>
</table>

The project efforts to sensitive the population about the nutritional benefits of milk have been lauded as effective reaching over 1.5 million people. In addition to the shisha wumva campaign, the launch of a household milk consumption campaign with Urunana Development Communications – a behavior change communication organization through a popular radio soap opera was credited for reaching out to the most vulnerable. The communication project targeted children under 5 years, pregnant and lactating women particularly highlighting household decision processes that affect family nutrition. The result was an increasing trend of household milk consumption from 2.2 liters in 2013 to 5.8 liters in 2016 resulting from increased awareness of the nutritional benefit milk.

![Figure 23: Increasing household milk consumption by year](image)
IR 2: Expanded Investment in Dairy Processing and Marketing

RDCP II aimed to increase both public and private investment in human and financial capital to enable Rwandan dairy products to become locally and regionally competitive. This called for a concerted effort and increased stakeholder engagement to improve both policy advocacy and leadership development within dairy organizations and businesses. In order to achieve the above, RDCP II employed a combination of approaches in collaboration with different national and district bodies. The project engaged all levels of government including local mayors, district authorities and national government representatives to help guide the development of local community organizations and cooperative owned MCCs. Dairy working groups were set up at district levels to facilitate important local government engagement. RDCP II also supported industry trade and advocacy groups including the Rwanda National Dairy Platform. The platform has engaged both local and national levels of government to improve the voice of different stakeholders and help guide important national policy issues. Such efforts have contributed to better alignment of market participants and have paved the way to reach ambitious targets set forth by the Ministry of Agriculture in the areas of dairy production, productivity and milk quality.

IR 2.1 Dairy Sector Leaders Empowered to Lead Development

As a starting point, RDCP II facilitated the organization of dairy industry actors starting with the Rwanda National Dairy Platform providing much needed mentorship working collaboratively with members of the platform to increase their participation in various forums. This included participation in national and regional events to showcase their work in their respective clusters as producers, processors, milk sellers, service providers and consumers. Such forums included the National Agriculture Show, the International Trade Show and East and Southern Africa Dairy Association (ESADA) annual events serving as an eye opener for participants to make commitments based on the principle of learning by seeing and exchange of knowledge and ideas. The project team also worked with various national entities to streamline membership of cooperatives and their legal status facilitating from registration to capacity building of their leaders and members alike. As a result, the project achieved strong collaboration leading to successful development of relevant policies, improved advocacy of member organizations and greater access to USG support through either grants or technical assistance to improve their business. Below is a summary table highlighting the achievements:
Table 6: Enabling a conducive environment through policy

<table>
<thead>
<tr>
<th>Performance Indicator</th>
<th>Baseline Value</th>
<th>Original LOP Target</th>
<th>Cumulative Results</th>
<th>Difference between target and results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numbers of Policies / Regulations / Administrative Procedures in development, passed or being implemented</td>
<td>0</td>
<td>9</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Number of dairy related firms and organizations newly aligned within and provided a voice by dairy sector affinity organizations</td>
<td>0</td>
<td>250</td>
<td>320</td>
<td>+70</td>
</tr>
<tr>
<td>Number of private enterprises, producers organizations, women’s groups, trade and business associations and community-based organizations (CBOs) that applied new technologies or management practices as a result of USG assistance</td>
<td>0</td>
<td>750</td>
<td>1,202</td>
<td>+452</td>
</tr>
<tr>
<td>Number of members of producer organizations and community-based organizations receiving USG assistance</td>
<td>0</td>
<td>20,000</td>
<td>25,784</td>
<td>+5,784</td>
</tr>
</tbody>
</table>

**Policy and enabling environment**

Throughout the program life, RDCP II maintained strong collaboration with key dairy sector stakeholders utilizing the national public-private dialogue framework to advance the case for dairy businesses.

**Rwanda National Dairy Platform (RNDP):** Recommended by the NDS as the main public private stakeholder interface, RNDP was created by restructuring the Rwanda Dairy Board to become a more inclusive and legally accountable institution representing the interests of the industry. Dairy sector working groups: Sector dialogue was enhanced through district-based working groups to better understand issues and strategies employed at all levels. The working groups have been instrumental in achieving sector efficiency and filling the knowledge gaps at the implementation level for both private and public sector.

**Mastitis control strategy:** In collaboration with the University of California, Davis and the Rwanda Agriculture Board (RAB), RDCP II facilitated multi-stakeholder dialogues that led to the development of a strategic plan for national mastitis control. This plan was later adopted by the RAB to spear head programs aimed at reducing prevalence of mastitis in Rwanda.

Artificial insemination training and breeding technology decentralization: RDCP II worked with private service providers to scale up their presence in local communities where the project was inseminating over 10,000 cows. Further, RDCP II worked with the Rwanda Vet Council to train and equip 102 vet technicians to increase the service coverage of artificial insemination across the 17 districts of project implementation.

**Use of plastic in Rwanda:** With the ban on plastics in Rwanda, the cost and quality of dairy packaging is a challenge to the sector. RDCP II worked collaboratively with RNDP to initiate dialogue on finding alternate methods (such as biodegradable plastics) with key agencies including Rwanda Development Board (RDB), Rwanda Environment Management Agency (REMA) and the Rwanda Standards Board (RSB). This conversation is currently ongoing with leadership from RNDP.

![Mastitis control strategy launch workshop](image)

Figure 26: Mastitis control strategy launch workshop
Ministerial Order on Milk handling and transportation: Since 2012, RDCP II worked with MINAGRI’s Agriculture and Livestock Inspection and Certificate Services (RALIS) to develop, pilot and scale up a national dairy certification program for primary value chain actors. Milk collection centers and emerging dairy businesses (SMEs) needed to adopt and practice basic milk quality control technologies leading up to the award of a Seal of Quality certificate. The award is an intermediary step preparing such businesses to aim for the quality marks provided by the Standards body in Rwanda.

Milk consumption and school feeding program: RDCP II engaged with a select team of technical experts to provide input in to MINAGRI’s strategy to sustainably scale up existing school milk programs. The program coordinated with RAB to implement the priorities into the strategy.

Investment Policy with Rwanda Development Board: With support from Inspired International, RDCP II conducted market research leading to the development of proposed investment scenarios to motivate potential dairy investors. Inspired International also hosted investor reference groups to interest them regarding opportunities in Rwanda. Further, the program worked with financial institutions to build their understanding of dairy businesses. This led to increased financial access for dairy actors including producers, transporters and processors.

Table 7: Status of policy implementation

<table>
<thead>
<tr>
<th>Policy / Administrative procedure</th>
<th>Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Establishment of Rwanda National Dairy Platform (RNDP)</td>
<td>Implementation</td>
</tr>
<tr>
<td>2. National Dairy Strategy (NDS)</td>
<td>Implementation</td>
</tr>
<tr>
<td>3. Dairy Sub working Group facilitation (Public-private dialogue)</td>
<td>Implementation</td>
</tr>
<tr>
<td>4. Ministerial Order on milk handling</td>
<td>Implementation</td>
</tr>
<tr>
<td>5. Dialogue on use of alternative packaging for dairy including bio-degradable plastics</td>
<td>Passed on to RNDP for on-going private sector follow up</td>
</tr>
<tr>
<td>6. Mastitis control Strategy</td>
<td>In progress with RAB</td>
</tr>
<tr>
<td>7. AI / Breeding decentralization-Privatization</td>
<td>In progress with RCVD</td>
</tr>
<tr>
<td>8. Investment policy with RDB implementation</td>
<td>Implementation with RDB</td>
</tr>
<tr>
<td>9. School feeding / Milk consumption program</td>
<td>In progress with RAB</td>
</tr>
</tbody>
</table>
Facilitate institutional and association capacity building

Rwanda National Dairy Platform

There exists a universal recognition among dairy actors concerning the importance of the preservation of program achievements across the dairy landscape in Rwanda as supported by RDCP II project. The support of and advocacy for the Rwandan dairy value chain actors and industry after the program has ended is clearly embedded in the mandate of the RNDP as endorsed by all actors including MINAGRI and MINICOM. There is evidence of strong commitment to strengthen the platform through the member clusters established and operationalized with USAID support. With USAID funding RDCP II has strengthened the institutional capacity and outreach ability of the RNDP and the platform is set to make its mark in the industry by recruiting key managerial and administrative staff. The project has worked very closely with the platform team in a phased hand over of RDCP II tasks and responsibilities to the RNDP over the last twelve months including hosting industry events such as the cheese and butter expo, agri-show and the international trade show at which dairy companies showcase their products initially, a roadmap to transition of key roles leading up to the ESADA was developed jointly with RNDP leadership as a mentorship plan over the last months of the project to increase RNDP ownership and leadership. Subsequently, key sector facilitating roles have gradually been transitioned to RNDP as the private member organization. Further, RDCP II has advocated for support from other public and private organizations to be channeled through RNDP to sustain the momentum gained as the program approaches closeout. The project has built committed partnerships and positioned RNDP to demonstrate their organizational ability amongst stakeholders to steer the sector forward. An important milestone during this time has been the approval of RNDP as a strategic partner in the implementation of a new IFAD funded Rwanda Dairy Development Program (RDDP). This was a primary focus of the final year implementation in addition to working with GoR agencies RALIS, RAB as well as district and provincial authorities to take issues of dairy leadership seriously for achievements to be sustained.

Business Development support to dairy SMEs

RDCP II project team delivered a strong BDS approach primarily focused on emerging dairy cooperatives and business. Dairy cooperatives have evolved to become a hub of related activities, which is beneficial to the farmers as a one-stop center for the same including animal feeds, artificial insemination, and knowledge of financial services products over and above the core activity of collecting and selling milk. This diversity of services promoted by the cooperatives motivates dairy farmers to work together. RDCP II delivered training tailored training for cooperative members and leaders and linked them with business opportunities.
with and business providers. Notably, the project utilized a Land O’Lakes cooperative management tool AgPrO over a 12-month period to assess performance and make corrective actions measurable on a quarterly basis. Employing a team of business consultants, participating cooperatives gained a lot of knowledge and made improvements in key areas of coop governance and business performance. This tool follows a cycle that starts with measuring (understanding status and identifying gaps), action planning and management (fixing identified gaps) of gaps based on key priorities of the cooperatives. The AgPrO program benefited 52 cooperatives and 17 SMEs. Parameters assessed include:

**Leadership Capacity** - The extent to which the cooperative leaders inspire, prioritize, make decisions, provide directions (strategy), and innovate.

**Adaptive Capacity** - The ability of the cooperative to monitor, assess and respond to internal and external changes.

**Management Capacity** - The ability of the cooperative to ensure the effective and efficient use of organizational resources.

**Operations Capacity** - Cooperative operations, namely staffing levels; members and non-members communication strategy; computers, database and management reporting system; building and office spaces; and legal registration status.

**Supply, Processing and Marketing** - The effective business functions like extension services; input supplies; pasture development; veterinary services; etc.

**Productivity and Financial Performance** - The measurement of how well the cooperative is performing on a number of productivity and financial indicators (refer to Annex IV: Final report on Cooperative business performance during RDCP II).

**IR 2.2 Increased Dairy-Related Investment**
Private investments in the dairy processing and marketing increased by over $6 million. This was below the expected life of project target for investments to be leveraged but is a significant achievement for Rwanda’s infant dairy sector. There is still a great need for strong investment advocacy by the private sector given the prevailing opportunities and enabling environment. In collaboration with Inspired International, RDCP II strengthened the financial services sector with the following key activities:

**Financial services survey**
Conducted in 2012, this was the first step to understanding the challenges and opportunities of financing the dairy value chain. The study helped to determine financial needs of different actors in the value chain and propose preferred interventions to achieve the desired investment outcomes. As a result, Inspired proposed five strategic recommendations as pillars of implementation of the financial services support under RDCPII as follows:

1. To address the fact that borrower appraisal by the MFIs was clearly weak. The data showed that many producers are creditworthy and that many producers are borrowing. However, those that are borrowing are not those who are creditworthy.
2. To select and work with specific SME banks with strong rural outreach to develop a structured trade financing model.
3. To work with MFIs in particular milksheds where the critical mass of creditworthy borrowers is enough to create a portfolio large enough to dedicate loans officers to dairy borrowers.
4. To work with SACCOs, MFIs and Banks with rural outreach to mobilize and hold safe dairy producers’ savings.
5. To assist commercial lenders to understand and finance large processors and wholesalers who are creditworthy but have not been able to access finance.

Over the life of RDCPII, the above pillars guided interventions in the dairy sector regarding financing, adopting a multipronged approach to address the identified gaps. RDCP II hosted a seminar for all MFIs to share the results of the research and develop a basic borrower appraisal guideline for dairy micro borrowers appropriate for the entire microfinance sector. This targeted only the credit managers from the MFIs meant to address an immediate problem commonly observed in all milk sheds. This was intended to minimize risk of having a rash of defaults among dairy micro borrowers, which, unabated, could harm the reputation of the industry. In addition, the project hosted a high-level session of CEOs of Kigali’s leading banks to discuss the results of the survey. This would mark the start of a long-term relationship through signed MoUs with KCB Bank, Duterimbere MFI, Urwego Opportunity Bank, and Rwanda Microfinance Limited (Now Letshego Bank Limited), and development Bank of Rwanda (BRD) all of which benefitted from the project in various ways ranging from tailored training, product development and on-going mentorship from a pool of experts provided by Inspired International.

Business opportunity seminars and workshops
RDCP II hosted several business opportunity seminars and workshops to provide financial institutions and business owners a platform to interact and discuss collaboration opportunities. Facilitated through a strong milkshed approach, each district had equal opportunities to showcase available services. Financial linkages were also established especially between producer cooperatives and MFIs.

Deep Dive Investment study
To attract additional dairy investment in Rwanda, the project team led by Inspired International developed strong business cases for Rwanda based on two selected scenarios – a large scale processing and a micro processing facility. Preceded by a proper regional demand analysis and in country assessment of investment opportunities. This multistage process included hosting of reference groups for both potential micro and large-scale dairy investment jointly with Rwanda Development Board (RDB). Ultimately, this led to completion of two business prospectuses for Rwanda’s dairy sector promoted by RDB at selected investment meetings.

Milk Zone franchising
Inyange Industries Limited, the largest dairy processor in Rwanda piloted a pasteurized retail kiosk dubbed “milk zone” with the aim to popularize consumption of high quality clean milk for starting with the urban Kigali market. Established in May 2012, the first milk zone faced off with direct competition with informal milk traders operating in the same vicinity but quickly gained prominence...
among consumers for supplying a hygienic and ready to drink especially to the urban busy consumer. RDCP II worked with Inyange Industries to develop a franchising model that would allow Inyange to privatize the facility and allow private traders to own the kiosks in selected locations to match the growing demand. Inspired International provided the business assessment of the pilot milk zone and developed a strong business case for franchising the facility marking a major milestone for Rwanda’s milk retail industry. The milk zone distribution in Rwanda has since grown to 80 outlets in Kigali and one in Nyagatare district. The model has been replicated by a new processor Crystal industries limited for its success, placing additional 30 milk outlets. These innovations and the increasing demand for high quality dairy products led to an additional 78,000 liters of milk processed per day by 2016. Consumers bring their own containers and buy accordingly and can re-use their container daily without paying each time for packaging. The milk zone acts as a one-stop point for variety of other products supplied by the same processor.

Table 8: Cumulative value of loans and additional investments in RDCP II district of operation

<table>
<thead>
<tr>
<th>Performance Indicator</th>
<th>Baseline Value</th>
<th>Original LOP Target</th>
<th>Cumulative Results</th>
<th>Difference between target and results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value of new private sector investment leveraged by FTF (USD)</td>
<td>0</td>
<td>20 Million</td>
<td>6.1 Million</td>
<td>-13.8 Million</td>
</tr>
<tr>
<td>Total increase in installed storage capacity (Cubic meters)</td>
<td>0</td>
<td>150</td>
<td>186</td>
<td>+36</td>
</tr>
<tr>
<td>Value of Agricultural and Rural Loans (USD)</td>
<td>0</td>
<td>2 Million</td>
<td>3.1 Million</td>
<td>+2.1 Million</td>
</tr>
<tr>
<td>Number of dairy enterprises with upgraded production facilities resulting from successful financing applications</td>
<td>0</td>
<td>2,000</td>
<td>266</td>
<td>-1,734</td>
</tr>
<tr>
<td>Liters of additional daily milk processing resulting from financing assisted by RDCP II</td>
<td>0</td>
<td>100,000</td>
<td>109,170</td>
<td>+9,170</td>
</tr>
</tbody>
</table>

Grants / Sub awards to local organization
Land O’Lakes enrolled a host of other local organizations/companies through a competitive grants program. The entities worked closely with the Land O’Lakes and collaborating partners including MINAGRI and RAB to ensure successful implementation. The robust grants program supported the implementation guided by the key project pillars. The categories of grants included:

Business innovation grants - Reduced the risk of introducing and/or bringing to scale new services and technologies that address specific business growth and development needs and opportunities with participating dairy-related farms and enterprises.
Competitive service subcontracts - Mobilized the provision of training and technical assistance and stimulated utilization of commercial business development service providers in the dairy sector.
Institutional development grants - Developed the capacity of non-governmental, governmental, parastatal, or private institutions directly involved with Rwanda dairy sector and dairy industry associations and public bodies that interact with the dairy sector.
Competitiveness investment funds - Facilitated competitiveness-enhancing research and policy reforms, as well as catalyzed industry investment and financing in dairy sector.
RDCP II selected its sub recipients using a robust application, evaluation, and due diligence process. Requests for Application(s) or Annual Program Statement (APS) with clear application guidelines and selection criteria were issued widely to solicit a broad range of applicants. The RDCP II sub award team reviewed concept notes as a preliminary review process, and selected entities were invited to submit full proposals. For top candidates, the RDCP II grants team composed of program team and grants management conducted onsite technical and financial capacity assessments prior to final
selection. As a result, RDCP II distributed grants to milk collection centers (MCCs), milk processors, milk sellers, artificial insemination service providers, feed processors, Government institutions, Universities, private companies and local NGOs as summarized in table below:

Table 9: RDCP II Grants summary table by category

<table>
<thead>
<tr>
<th>Grant Category</th>
<th>Grant provided (Rwf)</th>
<th>Types of organization supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal of Quality Grants</td>
<td>108,064,623</td>
<td>14 processors and 77 MCCs</td>
</tr>
<tr>
<td>In Kind grants</td>
<td>428,428,502</td>
<td>4 processors, 2 feed mill and 32 MCCs &amp; DQA Laboratory</td>
</tr>
<tr>
<td>Capacity Building grants</td>
<td>431,362,428</td>
<td>PSF, 2 Universities, RALIS RNDP and Urunana DC</td>
</tr>
<tr>
<td>Service Providers grants</td>
<td>370,946,730</td>
<td>12 Training &amp; AI service providers and RCVD</td>
</tr>
<tr>
<td><strong>Total Grants</strong></td>
<td><strong>1,338,802,283</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Gender Mainstreaming**

RDCP II has had a gender specialist focused on integrating women into the dairy sector and addressing constraints that limit this participation. According to the gender specialist, at the beginning women participants would often register in their husband’s name. RDCP II started working with veterinarians to integrate women into extension services. RDCP II staff also conducted informal focus groups with women participants to understand when meeting times would be most suitable for them. Both men and women were encouraged to participate in all RDCP II activities. In order to adapt to women participants’ needs, time was set aside at a monthly staff meeting to specifically discuss issues facing women’s participation in meetings.

Generally, Rwanda has strong participation by women, particularly in comparison to many of its neighboring countries. And the focus groups unanimously agreed that the project results did not seem to vary between female and male participants. To encourage equal participation of women in decision-making and income use, RDCPII utilized an SBCC campaign. Through radio, soap operas, and community theatre troops, the project tackled issues of women’s empowerment in the household, particularly in making decisions on whether milk should be sold or consumed at the household. RDCP II’s
final household survey feedback confirmed that 91% of households report equal participation and access to resources while the national level was at 73% in 2013. Increasingly, equal participation of men and women has been observed in all dairy activities at the household level.

Table 10: Proportion of women participating in dairy related activities in RDCP II districts of operation

<table>
<thead>
<tr>
<th>Performance Indicator</th>
<th>Baseline Value</th>
<th>Original LOP Target</th>
<th>Cumulative Results</th>
<th>Difference between target and results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of female participants in USG-assisted programs designed to increase access to productive economic resources (assets, credit, income or employment)</td>
<td>2012 50%</td>
<td>38%</td>
<td></td>
<td>-12%</td>
</tr>
<tr>
<td>Proportion of females who report increased self-efficacy at the conclusion of USG supported training/programming</td>
<td>2012 95%</td>
<td>97%</td>
<td></td>
<td>+2%</td>
</tr>
<tr>
<td>Proportion of target population reporting increased agreement with the concept that males and females should have equal access to social, economic, and political opportunities</td>
<td>2012 90%</td>
<td>91.0%</td>
<td></td>
<td>+1%</td>
</tr>
</tbody>
</table>

Tasks traditionally considered for women or men are progressively being equally considered appropriate for both sexes. As an example, the Eastern province, which lags behind compared to other milk sheds, is making progress in terms of gender equality. Until recently, women were not allowed to milk cows, which put them under the dependence of a male neighbor to assist in this task, especially in the case of widows. Recent cases, however, are showing that women are overcoming taboos and confidently taking over dairy tasks traditionally reserved for men. The picture figure shows a female model farmer who after following RDCP II training decided to do the cow milking in her household. Following wide sensitization by RDCP II through MCCs with the support of local administration at sectors and district level, most payment to dairy farmers for sales of milk are made through bank accounts opened mostly at local Saving and Credit Cooperatives (SACCOs) established across the country. The final household survey showed that 82% of household have opened accounts at the bank, and 83% of women confirmed they have access to the household bank account.
Environmental compliance

Throughout implementation, the project team and partners observed strict environmental stewardship from project appraisal through to progress monitoring of grants implementation. As part of the formal grants application process, prospective grantees were subjected to an environmental review. The review determines details of activities to be undertaken with USG support and their level of risk or potential hazard to the environment and human health, parties involved and individual responsibility for each activity clearly highlighting mitigation measures or activities for any identified risks. Risks are further categorized as very low risk, High-Risk and moderate or unknown risk. An environmental review report is prepared for all high risk and moderate/unknown risk activities complete an environmental mitigation and monitoring plan to ensure risk to human and environment is minimized as much as possible. Overall, RDCP II achieved significant progress towards ensuring safety of cooperative staff, improved hygiene of premises including proper disposal of waste from milk collection centers and sanitation facilities. Proper monitoring of the environment management plans allows the dairy business to remain cautious of any hazards that may harm individuals working at the facility or environment. Proper protective wear for staff and appropriate handling is emphasized. Throughout the project activities, the program remained committed to achieving high standards of environmental stewardship from the farm by employing appropriate farm technologies to the market.

Monitoring & Evaluation and Knowledge Management

Monitoring and Evaluation (M&E) has been an integral part of RDCP II and was used to enrich the quality of RDCP II interventions. The RDCP II Performance Management Plan (PMP), approved by USAID, served as a guide for RDCP II results management/measurement process and reporting. The PMP includes indicators to track results and progress made during the year. Emphasis is placed on tracking RDCP II’s impact on women and income generation as a result of project interventions at all levels of the dairy value chain. It is important to note that in addition to overall program progress assessment through monthly, quarterly reports and bi-annual surveys, RDCP II implemented activities within approved district work plans and were periodically assessed and subsequent approvals for the following year achieved. Cumulative results of the program are attached with this final report (see Annex I).

Project learning and dissemination

RDCPII has received wide coverage and documentation of key activities implemented during the project life. Notably, several articles and reports have been published in the several months leading up to the end of the project as follows:

- Herding Livestock Programs toward Nutrition: A Critical Analysis with a Focus on Rwanda’s Feed the Future Dairy Program - A report of the Center for Strategic and International Studies (CSIS) Global Food Security Project (GFSP) which aimed at showcasing how a FTF project in Rwanda utilized its position to address existing gaps in nutrition information by embarking on a behavior change communication campaign in partnership with a local organization, Urunana Development Communication. The report recommends ways in which other FTF programs could also
leverage their resources to integrate similar messages even though their original goal was not to address nutrition. RDCP II Chief of Party Dennis Karamuzi attended the launch of the report in Washington D.C together with RDCP II AOR Ms. Fina Kayisanabo of USAID Rwanda (visit https://www.csis.org/analysis/herding-livestock-programs-toward-nutrition to download a copy of the report).

- **Case Studies on facilitating systemic change**: A synthesis of cases from Ghana, Senegal, Zambia and Rwanda – a report prepared with funding from USAID Leveraging Economic Opportunities (LEO) project. This case study highlights an early stage example of systemic change in the dairy industry, as RDCP II’s efforts to introduce milk quality grades and standards into the industry, along with new aggregation and output models, is starting to alter the norms and practices of key actors (processors, outlet stores), building incentives for these behaviors up and down the supply chain (refer to Annex V).

- **Efficiency gains in dairy production systems decrease GHG emission intensity**: A case of Rwanda Dairy Competitiveness Program II: - A series analyzing low emissions agricultural practices in USAID development projects. As part of the broader effort to frame a strategic approach to Low Emission Development (LED) in the agricultural sector, several case studies, including this one, quantify the potential climate change mitigation benefits from agricultural projects and describe the effects of low emission practices on yields and emissions. Systematic incorporation of such emission analyses into agricultural economic development initiatives could lead to meaningful reductions in GHG emissions compared to business-as-usual emissions, while continuing to meet economic development and food security objectives (refer to Annex VI).

- **Learning from Feed the Future Programs about Gender Integration and Women’s Empowerment**: Compiled Case Submissions solicited from Feed the Future partners through a Call for Cases about Feed the Future Learning on Gender Integration and Women’s Empowerment, released in April 2016. The publication features Rwanda’s Immaculee Kayitesi, a project beneficiary from Nyanza district. The story highlights RDCP II’s conscious efforts to engage women at different points along the value chain. It also demonstrates a positive trend in self-efficacy, self-confidence, and equity among the project’s female beneficiaries. It is evident that through capacity building and creating business opportunities for women, people like Immaculee are able to transform an idea into a profitable company (refer to Annex VII).

- **RDCP II Impact report**: A publication of Land O’Lakes International Development with funding from USAID. The report highlights major achievements of the project spanning 10 years of USAID dairy sector financing in collaboration with Land O’ Lakes International Development. The report also presents selected success stories to demonstrate how the working in collaboration with the GoR’s MINAGRI and private sector stakeholders, Rwanda’s dairy sector has been positioned to grow. It also identifies key areas of focus that must be sustained for the industry to maintain this growth momentum (refer Annex VII).

**Final close out event**

Following several district close out workshops hosted in September 2016, and following successful conclusion of all major project commitments, RDCP II hosted a final close out workshop on December 8, 2016. Three Stones Consulting Limited expertly facilitated the event and related
logistics. The event brought together 110 participants from a cross section of the major dairy stakeholders were hosted to a mini exhibition showcasing a range of dairy activities and services promoted during the life of the project including cheese & butter processors, extension services (A.I delivery, mastitis control & milk testing), and industry facilitation through Rwanda National Dairy Platform (RNDP). The exhibition was followed by a formal ceremony officiated by The Permanent Secretary MINAGRI Mr. Jean Claude Kayisinga, USAID Rwanda Mission Director Marcia Musisi-Nkambwe and selected private sector partners who represented project participants to share testimonials of their collaboration with RDCP II and Land O’Lakes. The colourful ceremony was concluded with a cocktail over a selection of dairy beverages and snacks (refer to Annex IX).

Challenges and lessons learned
While RDCP II has been largely successful and exceeded most indicators as set out in the project management plan, it is important to highlight some challenges, lessons learned, and recommendations for further progress of Rwanda’s dairy sector. A selection of some challenges is listed below:

- **Low artificial insemination output resulting from low conception rates**: There is one facility that produces nitrogen and the government is increasingly unable to meet production demands. Consequently, there is limited availability of nitrogen without which artificial insemination technicians (AITs) cannot safely transport the semen. In addition, the number of skilled practicing A.I.Ts per district remains low in a country where the technology remains the method of choice for improving local breeds. There is a great need to further decentralize A.I. input distribution by training more private inseminators and investing in A.I. infrastructure.

- **Governance of dairy cooperatives**: Overall, the management of dairy cooperatives is a recognized driver for performance as a business. While this is a known fact, many coop boards and members do not put much effort into ensuring this is achieved. Several cooperatives have been forced to close due to malfunctions caused by their leaders. The fact that the vast majority of dairy producers in Rwanda are smallholder farmers makes it relevant to depend on group marketing hence further increasing the need to invest in corporate governance of these dairy cooperatives.

- **Drought and disease outbreaks**: Drought as experienced across the country in 2016 in May to September pose a serious risk to the dairy industry that is still largely subsistence and small scale in nature. According to the Ministry of Agriculture and Animal Resources (MINAGRI), Rwanda faced the worst drought in 60 years⁴. In addition, livestock diseases remain prevalent in most districts especially in Eastern province. These include tickborne diseases and as well as zoonotic diseases such as Foot and Mouth Disease (FMD). Improved disease control and surveillance is important.

- **Dairy supplies and equipment sourcing**: While the project supported many dairy businesses to obtain dairy equipment and supplies, there is still a gap created by a lack of readily available in country supply of most of the required supplies such as milk coolers, insulated tanks for transportation as well as basic testing kits and processing equipment. This renders procurement of such supplies costly compared to other regional countries. This often demotivates enterprising business men and women who want to venture into business but often must wait for grants.

Way forward
RDCP II identified some critical factors that should propel Rwanda’s dairy sector forward among others as follows:

⁴ [http://www.newtimes.co.rw/section/article/2016-09-16/203577/](http://www.newtimes.co.rw/section/article/2016-09-16/203577/)
Consumer demand must continue to increase. Future efforts will need to continue to develop end markets and promote innovative products that meet diverse consumer needs. The Shisha Wumva and Urunana campaigns were very successful at reaching both urban and rural audiences and helping drive per capita milk consumption from 40 liters to 59 liters per year by the end of the project. Still, more efforts are needed to increase per capita consumption to 80 liters per year by 2020. In addition, more is required by the private sector to more effectively market and target messaging to new and emerging segments in the Rwanda dairy market.

Milk quality has seen significant improvements; however, both positive and negative reinforcement by MINAGRI will be required to signal the importance and seriousness of this issue. Incentives for high quality and compliance to standards can be best rewarded through market incentives including promotion and marketing of such enterprises. Likewise, where there are compromises in quality and food safety issues – appropriate and fair penalties must be administered.

Farmer productivity needs to continue to increase so that dairy farming is a more profitable business. To reach the Government of Rwanda’s production goals by 2020, crossbreed cows need to produce 9.2 liters per day and pure breeds must produce 13.3 liters. This can be achieved, but farmers need access to affordable, high quality inputs and services. Decentralized services such as artificial insemination and early diagnosis and treatment of prevalent infections such as mastitis remain critical. These factors should remain priorities for the Rwanda Council of Veterinary Doctors.

Farmer groups and cooperatives need to be further strengthened to improve service delivery to members and to market milk to buyers. The advocacy of value chain actors through the RNDP is critical to properly addressing industry issues as they emerge. Ownership and accountability is important amongst value chain actors to objectively dialogue about their respective roles from farm to fork (or glass).

Private sector investment must continue for the industry to scale up. It is important to incentivize entrepreneurs who command a great deal of knowledge of the local dairy industry in order to stimulate both innovation and value addition. Local entrepreneurs will motivate larger industry players to acquire and set up businesses, confident that the prevailing conditions will remain favorable.
Annexes

Annex I: FtF MS Table


Annex III: New dairy products developed through Seal of Quality program

Annex IV: Final report on Cooperative business performance during RDCP II

Annex V: Case Studies on facilitating systemic change – LEO report

Annex VI: Efficiency gains in dairy production systems decrease GHG emission intensity

Annex VII: Learning from Feed the Future Programs about Gender Integration and Women’s Empowerment

Annex VIII: RDCP II Impact report

Annex IX: Final project close out event report
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<th>Indicator / Disaggregation</th>
<th>Baseline Value</th>
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<th>2013 Achievement</th>
<th>2014 Annual Achievement</th>
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<tr>
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<tr>
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<td>5,996</td>
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| 4.5.2(23): Value of incremental sales (collected at farm-level) | $4,606,135.00 | $0.00 | $4,606,135.00 | $23,865,088.56 | $27,136,268.77 | $10,449,160 | $31,535,461 | N/A |

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<th>4.5.2(27): Number of members of producer organizations and community based organizations receiving USG assistance</th>
<th>0 0</th>
<th>8,275</th>
<th>10,082</th>
<th>5,089</th>
<th>2,338</th>
<th>25,784</th>
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<td>0</td>
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<td>0</td>
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| 4.5.2(36): Value of exports of targeted agricultural commodities as a result of USG assistance (for bilateral missions) | $85,979.00 | $0.00 | $7,096,830.00 | $14,919,659.69 | $13,208,511.25 | $11,539,473 | $46,764,474 | $137,567 | N/A |

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<th>1,293</th>
<th>5,185</th>
<th>4,333</th>
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<td>2015 Annual Achievement</td>
<td>2016 Annual Achievement</td>
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<td>Original LOP Target</td>
<td>Scaled up Target</td>
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<td>$1,782,168.68</td>
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<td>$2,823,967.12</td>
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<td>68%</td>
<td>35%</td>
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<td>2012-2017 Cumulative Achievement</td>
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<td>Scaled up Target</td>
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<td>42</td>
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<td>GNDR-2: Proportion of female participants in USG-assisted programs designed to increase access to productive economic resources (assets, credit, income or employment)</td>
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<td>38%</td>
<td>38%</td>
<td>39%</td>
<td>38%</td>
<td>38%</td>
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<td>GNDR-3: Proportion of females who report increased self-efficacy at the conclusion of USG supported training/programming</td>
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<td>76%</td>
<td>88%</td>
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<td>97%</td>
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<td>GNDR-4: Proportion of target population reporting increased agreement with the concept that males and females should have equal access to social, economic, and political opportunities</td>
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<td>85%</td>
<td>84%</td>
<td>90.3%</td>
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FINAL REPORT

REPUBLIC OF RWANDA

MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES (MINAGRI)

National Dairy Strategy

April 2013
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<td>African Development Bank</td>
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<td>AGDP</td>
<td>Agricultural Gross Domestic Product</td>
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<td>Alliance for a Green Revolution in Africa</td>
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<td>Artificial Insemination</td>
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<td>African Union - Inter-Agency Bureau for Animal Resources</td>
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<td>MOVI</td>
<td>Measurable Objectively Verifiable Indicator</td>
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<td>Acronym</td>
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<td>NDFU</td>
<td>Nyagatare Dairy Farmers Union</td>
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<td>National Dairy Strategy</td>
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<td>NGO</td>
<td>Non-Governmental Organization</td>
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<td>Organization International Epizootic</td>
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ACKNOWLEDGEMENTS

The development of the National Dairy Strategy (NDS) was a combined effort of a number of concerned individuals in both the public and private sectors who gave generously of their time and effort. Staff from both the Ministry of Agriculture and Animal Resources (MINAGRI) and the Ministry of Trade and Industry (MINCOM) provided valuable support and insights for the development of the dairy strategy.

The NDS team members traveled to all the five milk sheds and met with public and private sector stakeholders including border custom officials, input suppliers, producers, processors and final consumers. We want to thank them for their time and for generously providing information.

Finally, the team expresses our gratitude to USAID/Rwanda for funding the NDS and to the staff of USAID's project, Rwanda Dairy Competitiveness Program - II, for their guidance and support in arranging meetings and in providing logistics for the team to prepare the NDS.
EXECUTIVE SUMMARY

The dairy subsector is important to the economic development of Rwanda, and dairy offers a pathway out of poverty for large numbers of households keeping livestock and for those who provide services and value addition throughout the supply chain. The current "farm gate" value of milk is approximately Rwf 79.7 billion (US$129.70 million). The dairy subsector contributes 15 percent to agricultural gross domestic product (AGDP) and 6 percent to gross domestic product (GDP). Dairy's contribution to GDP is likely underestimated when considering ancillary products that can be attributed to dairy, e.g. hides, meat, traction/carting and manure. Dairy is a strategic commodity for Rwanda.

The Government of Rwanda (GOR) in its Vision 2020 set the country on a course in 2000 to become a middle-income country by the year 2020. The country has achieved significant positive growth since 2001 with 7 to 8 percent average annual rates of growth in GDP. Vision 2020 has six pillars and three cross-cutting issues, and dairy supports each pillar and cross-cutting issue directly or indirectly with its contribution to GDP, household income, and job creation, just to mention a few of the impacts.

This National Dairy Strategy (NDS) is timely because of its contribution to the Strategic Plan for the Transformation of Agriculture in Rwanda – Phase III (PSTA-III) being prepared for the Economic Development and Poverty Reduction Strategy (EDPRS). A number of meetings were held with stakeholders in both the public and private sectors to guide the preparation of the NDS. For this reason, the NDS is a "living" document to be used by stakeholders in both the public and private sectors in preparing, planning, allocating budgets and implementing policies. The NDS is also timely because the dairy subsector faces pressing challenges (and opportunities) over the next five years. The NDS is a roadmap to identify potential roadblocks and to prepare for removing them. Several challenges facing the subsector are as follows:

- The number of improved dairy cattle will increase and the potential exists for the production of 650,000 mt of milk in 2017 without NDS interventions.

- An adequate supply of feed and the knowledge of how to prepare feed rations are challenges to improving productivity for dairy producers.

- Costs of production (COP) of milk in Rwanda are higher than in neighboring Kenya and Uganda, where production and processing benefits from economies of scale and the farm to consumer cold chain is better developed. This, combined with the transport costs required to reach these markets, makes Rwanda's milk less than price competitive to trade in these countries. However, there appear to be market opportunities to the west, in Burundi and the Democratic Republic of Congo (DRC), where production and processing are under-developed and milk COP is relatively high.

- The marketing costs beyond the farm gate to final domestic consumers are also high. Farmers' share of the final retail price is low (less than 30% for milk sold through the alternative milk sector (AMS) to less than 20% if farmers' milk is sold through the formal sector) when compared to international standards of 50 percent. This is due to both the scale of production and processing as well as development of the cold chain.
• On the demand side, consumer demand for both raw and processed milk is not increasing fast enough to clear the projected supplies of raw milk because of affordability, accessibility and availability of milk.

• Milk quality is an issue of concern for the majority of milk marketed through the AMS and this limits domestic and export market opportunities.

• The retail price of processed dairy products is high compared to milk in the AMS, which impacts demand and diverts consumers to purchasing "loose" milk (unpasteurized).

• The GOR does not currently have a dairy policy, and private stakeholders in the dairy subsector are not organized or able to effectively advocate for needed regulations and investments.

The NDS takes a balanced demand and supply side approach with a market-driven orientation. Production and marketing have to be in lockstep so that production does not outpace marketing. At the same time, the GOR has placed the country on a path to being a middle-income economy. This goal creates certain expectations from the GOR for the dairy subsector to reduce poverty and also provide an affordable, wholesome food supply. The dairy subsector is poised to deliver on the GOR’s vision.

The NDS identifies the necessary policies for achieving the production and marketing objectives. Furthermore, the strategies for implementation are formulated within an environment of public-private partnership (PPP). The overarching vision for the next five years is that an implementation body composed of private sector stakeholders will drive the strategy in collaboration with the ministries – primarily, the Ministry of Agriculture and Animal Resources (MINAGRI) and the Ministry of Trade and Industry (MINICOM) – on a number of dairy development issues. Without this strong PPP, there will certainly be a disconnect between production and marketing, both within the GOR as well as between the GOR and the private sector.

A dairy subsector without an NDS would see production of 650,000,000 liters (l), thus creating a surplus of 100,000,000 l of milk in 2017 because of a projected population growth rate of 2.75 percent. The surplus is projected to increase to 200,000,000 l in 2020. It is critical that the market, both informal and formal, absorb and monetize this production in order to drive the economic incentives that can pull the dairy industry to a scale sufficient to make it more cost competitive domestically and regionally. Without market incentives and profitability at the producer level, farmers may cut back on feeding their dairy animals, may choose not to milk their cows (evening milking), or sell their dairy cattle for slaughter because milk cannot be sold. The potential for milk production at scale and the economic promise of the dairy sector will be lost.

The NDS envisions both supply and demand side interventions to realize this promise. While demand for dairy and meat products is projected to increase naturally due to increasing population, urbanization, rising disposable incomes and changes in the demographic structure of the population, the rate of natural demand increase is not likely to be sufficient to absorb the approaching supply bulge. Currently 1/3 of Rwandan consumers consume no dairy products, as identified in the East African Dairy Development (EADD) consumer survey. To create the necessary market pull needed to reach scale, the NDS envisions targeted marketing interventions designed to increase the consumption of milk and milk products from its present level of 40 liters per person per year (l/p/yr) to approximately 80 l/p/yr in 2020, as well as to
reorient consumer demand toward processed, as opposed to raw, dairy production through promotion of its health and hygiene benefits.

On the supply side, the NDS envisions assisting the domestic industry to expand the number of improved dairy cows that are more productive (cross-bred cows) than local Ankole cattle, and cows have to be better fed and managed. Building on GoR’s efforts to develop milk collection infrastructure and the cold chain, producers will have to become more market-oriented and commercialized, selling through their milk cooperative. Dairy product diversification (value addition) also will help absorb additional volumes of milk produced. Advertising campaigns for the latter will be required to stimulate consumer interest in what may be new product lines for many Rwandan consumers. As domestic demand and processing volumes grow, milk COP will fall, enabling processors to better tap export markets in countries in the region.

The potential benefits are large if the NDS is properly implemented within a PPP framework. The financial cost of the NDS is an estimated Rwf 15 billion (US$24.4 million). The cost is spread over five years and three main components: production, marketing, and policy. A small budget is provided for an implementation unit for monitoring and evaluation. Each component has a number of sub-objectives and each sub-objective has a list of activities with a budget, timeline and objectively verifiable indicators (OVI). The size of the total budget is small compared to other recent strategies proposed, such as the Post-Harvest and Handling Strategy (PHHS), with a budget of Rwf 188.8 billion (US$307 million).

Some activities proposed are within the budgets of MINAGRI and MINICOM so new funds would not always be necessary. Additional investments will be forthcoming as the NDS proves successful. These funds could be from the private sector in plant and equipment and from donors in support of school milk programs and market promotions. Ultimately, these investments (GOR, private sector, and external donors) in the dairy subsector make an important contribution to GDP (currently at approximately 6 percent). With the NDS, dairy's contribution to GDP is projected to increase in 2017 to 8 percent. The following are some of the more important specific interventions envisioned:

1. The GOR will support a vision and strategy for a vibrant and progressive dairy subsector that supports the efficient and safe production, processing and marketing of milk. The Rwanda Agricultural Board (RAB), as the main implementer in terms of funding of the Gir'inka program, will need to take a lead role in development of the dairy subsector.

2. Support the functioning of the Rwanda National Dairy Board (RNDB) as an industry body to create a PPP at both the national and regional levels. The Private Sector Federation (PSF) would play a key role in supporting the development of the RNDB. The RNDB, with the help of the PSF, would create a dynamic, private sector-led dairy forum to address industry needs with government agencies. Topics for public-private dialogue and forums include:
   a. Access to land for forage and dairy production;
   b. Land zoned for dairy production;
   c. Advancement of the "Igikumba Cy'umudugudu" – village kraal model;
   d. Milk quality industry standards and set up process for certification;
   e. Enforcement of contracts for delivery of products and services; and,
3. Donors will support the GOR’s market-driven approach that places priority on meeting the increasing market demand for convenient, quality (hygienic) and affordable milk and milk products, based on market access and targeted to agro-ecological conditions in a milk shed.

4. The reorganized RNDB could help manage a targeted dairy marketing campaign to increase domestic consumption of milk to keep pace with increased milk produced. The milk campaign will promote both the introduction of milk to the non-consuming segment and increase milk consumption among current consumers by highlighting the nutritional benefits of milk as key messages.

5. Concurrently on the supply side, support the upcoming Seal of Quality (SoQ) effort, a testing and certification regime at each level of the value chain to be implemented by the Rwanda Agriculture and Livestock Inspection Service (RALIS) and the RAB. Value chain actors that meet standards will be awarded with the right to display the SoQ brand mark, symbolizing their adherence to quality standards. In conjunction, a parallel marketing effort will highlight to consumers the benefits of safe dairy products, driving increased demand for such products. (Summary description of SoQ program in Annex 8.6.)

6. Support identifying and supplying regional export opportunities, especially in value-added dairy products such as cheese and fermented milk. Burundi and Eastern DRC have been identified as the markets offering highest export potential. Particular attention will be placed on promoting the aspects of safety and quality as unique to Rwanda.

7. GOR will provide knowledge-based skills to SMEs (individuals, coops, and private firms) to better adopt innovative solutions to filling technological gaps and removing constraints for delivery of inputs for producing, processing and marketing of milk and milk products.

8. The GOR will support both formal and informal milk channels with the long-term goal of moving actors in milk and dairy value chains from the informal to the formal. Pilot tests will be undertaken to create small businesses and support leadership among women’s groups, youth and farmers to enhance the marketing (feed, concentrates, mineral blocks, etc.) and retailing of dairy products in urban areas.

9. GOR will strengthen existing producer groups and the formation of new market-oriented producer associations/cooperatives and build up the professional capacity of existing primary cooperatives and cooperative unions. Business development services will assist access to credit to provide services in the procurement of inputs, collection of bulk milk, and the sale of dairy products.

10. For inputs and input services, expand existing services and foster market incentives for new entrants that reward risk-takers who invest their time and resources in new business ventures to provide quality inputs and services to dairy producers and processors:
   a. Focus on AI and veterinary services relying on the private sector;
   b. Contracting for services between groups of producers and input suppliers – forage seed, fodder, genetics and animal health;
c. Development of private rural farm stores linking input suppliers and input services with farmers, coops, and producer groups;

d. Availability of micro-credit to support dairy groups and SMEs; and,

e. Provision of matching grants, loan guarantees, etc.

11. Expand the proven model of dairy “lead” farmers who will be the catalyst for the testing of innovative “good dairy management practices” which will flow to their contact farmers to adopt improved practices for increased productivity and expansion of dairy herds. This will need to be linked as part of the Gir'inka program with the "Igikumba Cy'umudugudu" village kraal model being promoted for designating a lead farmer for the village shed.

12. Support the strengthening of public sector research targeted to specific high potential agro-ecological areas for improved dairy production systems and link the results of the research to lead farmers and their contact farmers:

a. Forage varietal trials and inter-cropping systems;

b. Dairy rations using local agricultural by-products;

c. Pasture management and zero grazing systems;

d. Nutrient recycling of organic materials for pasture and crop development;

e. Production of feed grains and oilseed crops for animal production; and,

f. Identify best crossbred animal management systems for different agro-ecological zones.

13. Roll-out an extension model involving input suppliers, rural farm stores, coops and processors in on-farm demonstrations and training of collectors and members of dairy cooperatives. This can be done with close linkage to the GOR's dairy specialists, sector agro-vets, NGOs, and rural agro-dealers.

a. Link “lead” and “contact” farmers to the GOR’s training activities through the sector agro-vet and district dairy specialist.

b. Provide technical packages – training manuals (e.g. forage seed production, silage making) – to the lead farmers and their contact farmers in the targeted milk sheds.

14. Support the training of dairy specialists at the training center at Masaka, V-Tec, and other vocational training centers with technical support in training people for jobs in value-added activities.

15. Harmonize tax and trade policies (Value Added Tax – VAT, customs, and duties) in line with Common Market for East and Southern Africa (COMESA) and regional trade organizations, and increase the trade in dairy products to Burundi and the DRC. Initiate a policy of VAT holiday for processors on finished products.

The incremental benefits of the NDS are measured in new job creation and increased incomes for dairy farmers. (Other benefits can be calculated, such as improvement in nutrition, but data is more qualitative.)

- The incremental increase in jobs created with the NDS is above the natural increase in jobs by 34,924.
• The economic value of job creation on the national economy is as follows:
  o direct income received by new workers is Rwf 8.43 billion (US$13.7 million); and,
  o the indirect effect (multiplier is 2 times) is Rwf 16.9 billion (US$27.4 million).
• Increase in share to producers from the net incremental sales value with the NDS:
  o direct income from sales of additional milk is Rwf 18.55 billion (US$30.2 million); and,
  o the income multiplier (indirect effect, 2 times) is Rwf 37.1 billion (US$60.4 million).

The net present value of the flow of net benefits for the first five years of the NDS is an estimated Rwf 4.8 billion (US$7.8 million). This is based on a conservative estimate of an opportunity cost of capital of 18 percent. The payback period for when the flow of benefit turns positive is at 3.25 years. The internal rate of return on the investment is 47 percent. The indicators point to investments in the NDS for the dairy subsector which are feasible.
1. VISION, MISSION, GOAL AND OBJECTIVES

Dairy production is a pathway out of poverty for many rural households in Rwanda. For this pathway to be sustainable, stakeholders have to be market-driven. Market demand and the forces that drive it (income, population, prices, and cultural factors) influence daily buying/selling decisions at all stages of the dairy value chain. The markets determine the profitability of milk production, processing and marketing and will guide investments in the subsector.

The VISION for the Rwanda dairy subsector is to contribute effectively to the growth of the national economy and improve the standard of living for the largest number of Rwandan households in a sustainable and environmentally sound manner. The dairy policy is to contribute directly to achieving Rwanda’s Vision 2020's short, medium and long-term goals. The NDS will also contribute to achieving the Millennium Development Goals (MDGs), especially in the areas of food security, gender empowerment, and poverty reduction.

The MISSION of the dairy subsector is to create conditions for the provision of wholesome, affordable milk products to benefit the largest numbers of consumers for both the local and regional markets on a sustainable basis.

The GOAL is for a competitive dairy sector providing quality dairy products which are affordable, available and accessible to all Rwandans and other consumers in the region. (Dairy Sector Working Group, July 2012)

1.1. Objectives

The NDS has three broad objectives which, when taken together, will achieve maximum benefits to the larger Rwandan society: production/ecosystems, marketing (all activities involving value-added and transformation beyond the farm gate), and policies (institutions, programs, governance). (See Figure 1.1.) The darkened area in the figure, called the nexus, is where all the forces intersect and is the focus of the NDS and its activities. The NDS will be successful if multiplicative benefits of economic efficiency and equity result in the maximization of social welfare benefits to the Rwandan society.

Figure 1.1. Paradigm of an Integrated NDS

[Diagram of the Paradigm of an Integrated NDS]
1.1.1. Dairy Production/Ecosystems

Dairy production needs to fit within the landscape of land, livestock and people (men and women) of Rwanda. By being part of an integrated system, livestock is both compatible with and supports a healthy ecosystem. With a healthy ecosystem, we can increase livestock productivity (not just more dairy cows, but rather more production and better quality milk per livestock unit). The objective is to improve productivity, increase competitiveness and raise the quality standards of milk at the household level and throughout the value chain.

1.1.2. Dairy Marketing

Dairy marketing objectives include increasing milk consumption, creating consumer awareness of the health benefits of consuming processed (as opposed to locally-pasteurized) milk, and creating increased willingness to pay for processed and value-added products. When realized, increased consumer demand and expanded markets will lead to increased cost competitiveness from economies of scale in production, collection, transport and processing.

1.1.3. Policy Environment and Institutional Framework

A conducive policy environment needs to entice new investments. Regulatory policies support an open and competitive dairy subsector. Necessary as well is an institutional framework which supports business transactions. Ultimately, an efficient and progressive subsector will provide the greatest amount of benefit to all participants in the value chain from producer to the final consumers of milk. Our objective is to strengthen institutions for effective policy support and monitoring to achieve a competitive and sustainable dairy subsector.

1.2. Guiding Principles

The guiding principles of the NDS are to support the national development goals of the country through an integrated systems approach that will:

- Create a platform for a PPP for the dairy subsector that promotes inter-ministerial cooperation, improves business conditions for the private sector, and leads to cost-effective allocation of public resources in support of the dairy subsector based on principles of equity, fairness and gender;
- Guide the GOR in its facilitative role in strengthening the dairy value chain that encourages best business models and practices;
- Build professionalism in all industries in the subsector to improve the performance of all dairy activities undertaken by stakeholders from households to final consumers to encourage transformation to commercial business;
- Recognize smallholders and cooperatives as the preferred business model to reduce poverty, increase incomes and improve food security in rural areas;
- Promote operational efficiencies and reduce transaction costs beyond the farm gate which will lead to improved quality and competitive prices for dairy products for consumers; and,
• Support increased consumption of quality processed milk through an effective integrated SoQ marketing program targeted at different key segments of the population, including current milk consumers, non-consumers and both rural and urban consumers.

The guiding principles of the NDS are consistent with the six pillars of Vision 2020, which are as relevant today as they were in the year 2000:

1. Good Governance – The cooperatives are a cornerstone of rural development, but they have been weakened by governance issues. It will be important to refocus efforts for members to understand how their cooperative needs to be managed and that the membership governs through their board of directors.

2. Transformation of Agriculture – The dairy subsector is a transformative force in agriculture with the opportunity to create high value products for both the domestic and regional markets.

3. Private Sector – Entrepreneurs in the dairy subsector are the leaders who are responsible for growing the subsector. The profitability and competitiveness of the subsector will drive investments.

4. Human Resource Development – As the dairy subsector grows, it will contribute on multiple levels to creating good jobs, developing modern skill sets, and engaging women and youth in these opportunities. Technical education is a keystone to sustainability and competitiveness of the subsector.

5. Infrastructure Development – Because milk is a highly perishable commodity, it has to be collected, transformed and marketed. The backbone in development of the subsector requires roads, electricity, water and research/training institutions to create the opportunity for the value addition in milk. District governments with community participation will have to engage in the rehabilitation and maintenance of feeder roads and other infrastructure.

6. Regional Economic Integration – For the subsector to realize its potential growth, the industries will have to tap regional markets to sell products, generate foreign exchange, and encourage competitiveness.

2. ANALYSIS

The prospects for achieving the target of the NDS to increase consumption of milk and dairy products depend on the current situation. Success is dependent on a number of factors as Rwanda moves towards becoming a middle-income economy in 2020. The analysis is based on a value chain approach using SWOT (strengths, weaknesses, opportunities and threats) analysis. (This section draws upon the expanded analyses found in Annex 8.2. In addition, related issues and context are elaborated upon in Annexes 8.2.a and 8.2.b and a series of preferred policy statements derived in Annex 8.2.c.)

2.1. Current and Projected Scenarios for the Dairy Subsector

2.1.1. Current Situation

Rwanda produces approximately 445,000,000 l/yr of milk with an estimated farm value of Rwf 70 trillion (US$115.3 million). A number of market participants operate in the milk value chain. The farmers' share
of the final consumer price of milk can be as low as 16 percent compared to countries with modern dairy industries. The cattle inventory is 1.33 million and 28 percent are improved dairy cows producing 82 percent of the milk produced. National productivity is low. The AMS controls the largest percentage of the milk sold beyond the farm gate.

Current consumption of milk is approximately 40 l/person/day (l/p/dy). Overall consumption is not keeping pace with natural expansion in milk production, especially because the outlook is for the growth in demand to remain relatively flat. The reasons are the low purchasing power of consumers relative to the price of milk and the lack of diversity and accessibility to milk products.

2.1.2. Projections to 2017 and 2020 without the NDS

The outlook is for surplus milk to 2017 and beyond based mainly on the number of improved dairy cattle. The national herd is expected to expand to 1.67 million cattle in 2017 and 1.92 million in 2020. Milk production in 2017 could be an estimated 650,000,000 l/yr. A surplus is projected of 100 million liters in 2017. In 2020, the surplus would increase to 200 million liters.

2.1.3. Projections to 2017 and 2020 with the NDS

The goal of the NDS is to double milk consumption to 80 l/p/yr in 2020 matching the goal of Rwanda becoming a middle-income country. Based on population growth estimates, 1,161 million liters of milk will be required in 2020. Milk production will have to increase 13 percent per year to meet this target. At the same time, milk intake by current consumers will have to increase, as well as non-consumers to start drinking milk. A balanced dual-approach to the dairy subsector is needed.

2.2. Production and Productivity Factors

Rwanda has five primary milk sheds and each milk shed has unique characteristics requiring selective interventions on feed, water, breeds and management. Production systems vary by milk sheds and can be either extensive (Nygatare) or intensive (zero grazing in Gibumbi and Kigali). Highest production costs are in the intensive systems because of additional labor and feed costs. Based on field surveys, the return on capital invested in dairy production ranged from 16 percent in Gishwati to over 30 percent in Nygatare. Farm-gate milk prices vary between wet and dry seasons because of supply. An opportunity to smooth-out the milk sales to avoid the selling of most milk in the low price season would benefit farmers.

2.2.1. Natural Resources

Rwanda is one of the most densely populated countries with an average of 444 persons per square kilometer, and average farm size is less than .5 ha per household. Balancing dairy production with land availability has to be a key part of the NDS. Marginal and hillside lands in crops in GOR's Crop Intensification Program (CIP) would be better suited for forage production.

2.2.2. Animal Health

Animal health supplies and equipment are in adequate supply, and the GOR does not provide direct subsidies to producers to purchase these items. Over 1,000 agro-vet shops operate throughout the country which opens access to dairy producers for inputs. What is limiting is the lack of service providers with adequate knowledge and transportation to support dairy producers. (A high incidence of mastitis affects...
There is a shortage of practicing veterinarians (only 11 veterinarians out of 90 are in private practice), and there is a shortage of trained para-vets to work with producers. GOR's sector vets have to care for 3,150 cattle, on average. Training and education institutes will have to be upgraded and expanded to meet the deficit in trained specialists which fits within the Vision 2020 plan.

### 2.2.3. Breeding and Genetics

The dairy subsector requires a clear GOR policy on an array of issues dealing with the future genetic profile for Rwanda's dairy herd. The GOR's bull station, the quality of the semen and the delivery services are in need of review if the goal for production in 2020 is to be realized. GOR's subsidy for semen keeps the price low for farmers; however, the performance of the program is not advancing the industry. Privatization of the AI service, removal of the subsidy and greater reliance on imported semen may be a better alternative for the GOR. A benefit-cost analysis may show that purchasing proven, quality semen internationally will be more effective in improving the genetics of the national herd. Attaching private AI inseminators to a milk chilling center (MCC) may be a method to improve outreach to producers.

A fundamental weakness with breed and genetic improvements is the lack of an identifier system for dairy cattle. Herd records and bull performance measure by progeny testing would improve successive generations of dairy cows. Sustained genetic improvements will not occur using locally bred dairy bulls with these tracking programs. Complementary work with the Gir'inka program could improve cow identification, as well as cooperation with the MCC system as first points of contact with dairy farmers.

### 2.2.4. Feeds and Feeding

The main constraint to increasing milk production is feed and feeding practices. The CIP program utilizes most of the high quality crop production areas, constraining the production of quality forages. (The exception would be the Gishwati area in the Northwest milk shed.) Furthermore, producers lack the modern techniques to conserve forage in the dry season and profitably prepare feed rations for crossbred and purebred dairy cows. Producers need to increase their production of quality forages and use of alternative feeds including hay, silage, crop by-products, agro-industrial by-products and concentrates in the feed mix. Private suppliers of forage seeds and hay are attractive business opportunities important in the commercialization of the dairy industry, and producers with access to land could benefit from this activity. Rwanda lacks a national animal feed policy, and feeding strategies need to vary by the milk shed to include the evaluation of the CIP program and other good rotational grazing management systems.

Feed concentrate is important in a modern dairy subsector, as well as supporting other livestock enterprises. Concentrate feed costs around Rwf 160 to 190/kg and for most of the year milk prices do not justify the cost of using concentrate feed. With oilseed and cassava processing plants coming online within the next year, these factories may help to lower the cost of feed ingredients. A national animal feed policy needs to examine the investment in these facilities and other processing and mixing plants planned in the future. There is a private sector feed industry emerging, and dialogue needs to occur on the best pathway for growing the private industry. A study of the feed industry in Rwanda is recommended.

### 2.2.5. Access to Finance

Smallholder dairy enterprises offer a steady source of cash flow for rural households. It is important to identify those dairy producers that are creditworthy. In a recent study, 43 percent of dairy farmers were
found to be creditworthy, which is positive for reaching the NDS production goal set for 2020. Creditworthy producers tend to be those who can hold down investment costs in fixed assets, keep production costs per liter of milk low, and sell both morning and evening milk. Financial lenders – micro-finance institutions (MFIs), savings and credit cooperatives (SACCOs) and banks – need skills to identify worthy producers, train loan specialists, and conduct appraisals. The opportunity exists for special lending programs that adopt structured trade financing strategies so that repayment of the loan is recovered through deductions from milk sales, as is practiced in Kenya, South Africa and Uganda. This repayment program will minimize borrowers' default risk. Once finance is flowing, the increased milk supply can create other opportunities for commercial processors and wholesalers to access financing based on economic volumes of throughput. At that point, commercial lenders can be assisted to develop strategies and products to finance these larger investments.

2.2.6. Extension

Dairy producers lack information on modern dairy practices within a "whole farm business" approach. This includes improving cow husbandry, nutrition and feed sources, animal health and genetics. Extension is a critical constraint to attaining higher targets of milk through increased productivity of dairy cows. GOR carries out agricultural extension with its funds or with assistance from donors like the International Fund for Agricultural Development (IFAD) and NGO projects (RDCP, EADD and IFAD-supported KWAMP and PAPSTA) implemented by NGO staff or the GOR contracting local staff. There are currently six dairy specialists, and one agro-vet in each sector (416 in total), but they are constrained by lack of mobility and dairy knowledge to service an expanding dairy industry that is becoming more sophisticated. The RAB has identified MCCs through the MCC Hub project for transfer of knowledge, but this program will stretch its existing resources to service the planned number of MCCs. More field dairy specialists will result in increased productivity.

2.2.7. Infrastructure

Roads, water and electricity are important to obtaining the cost efficiencies required for the development of the dairy subsector. Producers without good road access receive the lowest average cost per liter of milk. A dairy cow requires large volumes of clean water daily (a cow producing 10 – 12 l/day needs 40 to 50 l of water per day). Water development within MINAGRI's Livestock Infrastructure Support Project (LISP) and road construction within MININFRA are important to subsector development. At present only 14 percent of poor and rural households have access to electricity. The MININFRA strategy calls for greater efforts to expand access to electricity into rural areas, and it includes the development of biogas from cattle for rural households. This fits with the NDS to expand the opportunities for biogas production. Solar power is another option, especially for MCCs to heat water, and the conversion of diesel engines to operate on bio-fuels produced in Rwanda.

2.3. Milk Collection and Distribution

Efficient collection of milk is a critical and indispensable link between producers and processors if the dairy subsector is going to be competitive in the region. The AMS takes upward of 75% of all the milk marketed (350,000 l/yr) with only a small share taken by the MCCs selling to processors. This partly explains why MCCs are currently at a low level of profitability. There are 61 MCCs, and several are not functioning. MCCs have a higher fixed cost structure than the AMS operators, which makes it harder to
be profitable unless utilization rates are high. The location, size and operation of MCCs have to be
designed to the needs of producers to rapidly collect their milk (morning and evening) and convey it to
bulk chilling for transporting to processors. The MCC-processor channel has the potential to expand and
to maintain the quality of milk necessary for further processing.

The strength of the MCC is in acting as a cooperative to assist smallholder producers with an array of
services that are not provided by the AMS. The weakness is that MCCs are not managed effectively for a
number of reasons. Management of the MCC can be poor with minimal oversight, and trainings are
needed to upgrade the skills for directors, staff and producers. MCCs can serve as a business hub for
delivery of services, once the core business of collecting, chilling and selling milk is profitable.

2.4. Milk Processing

There are approximately 25 processing factories country-wide with a total processing capacity of 160,000
liters per day. Only 15 to 20 percent of this capacity is being utilized. For Rwandan processors to begin to
utilize this additional capacity, they must undertake changes in quality, price and product diversification.

The processing cost of pasteurized package milk is over 50 percent of the retail price. With increased milk
production through MCCs and improved quality (lower rejection rate), processing costs will be reduced
by as much as 20 percent. To reach the milk target set for 2020, the milk processing industry will need to
utilize its established capacity and new plants will need to open. The plant in Mukamira in the Northwest
will be an important addition for processing milk from the Gishwati region. Processing plants will need to
expand their equipment to introduce new products and package types. Local manufacturing companies
can develop packaging materials that can help to reduce the final retail price to consumers.

The majority of processors are producing identical products. Manufacturers need investments in new
equipment and training in product development and standard sanitary operating procedures (SSOPs). This
will allow for the development of more specialized dairy products. The processing industry needs to
absorb surplus volumes of milk and convert into shelf stable products. Powdered milk plants give the
option of being able to store and reconstitute powder at a later date when raw milk is not abundant or pack
in suitable packs (either bulk bagged or canned) and sold as an export product into the DRC. Given the
large surplus of raw milk projected for the coming years, it would make more sense to look into an
operation that could eventually incorporate two drying facilities each with a capacity of approximately
150,000 liters per day (approximately 15 tons of powder each). The approximate cost of setting up a
green field milk powder plant with a capacity of 40,000 liters per day could be upwards of US$1.5
million.

2.5. Distribution and Marketing

2.5.1. Domestic

The main consumer outlets in urban markets for milk are milk bars and retail stores. The opportunity
exists to improve the hygiene of milk in milk bars for a large number of consumers and improve the
image of milk in general to increase consumption. Promotion of certified safe milk and the benefits of its
consumption should be highlighted as a key new intervention, highlighting the risks of consumption of
the non-traceable AMS product. Domestic processors face the threat from imported processed milk from
more competitive producers in the region. Ultra-heat treatment (UHT) milk is the most common product
sold throughout the Central Lakes Region, and currently Inyange, the only processor, is not price competitive.

2.5.2. Regional Exports

A study of the regional markets found an untapped potential exists for dairy products from Rwanda. The regional population is over 150 million people and the middle class segment is growing with greater amounts of discretionary income. High rates of urbanization are enlarging the middle class who will purchase dairy products. The market research focused on five key urban areas of Bujumbura, Bukavu, Goma, Kampala, and Mwanza. These urban centers have middle class consumers who could purchase Rwandan dairy products over the next five years.

The two markets offering immediate opportunities are Burundi and the DRC. The opportunity exists to promote branded Rwandan dairy products in the Uganda market because they are cost competitive and there is the perception that Rwandan products are high quality. The latter perception can be reinforced through implementation of the quality and testing aspects of the SoQ program, coupled with marketing efforts to promote the SoQ.

The target for Rwandan milk exports is to reach US$18 to $20 million per year by 2017. Initially, the emphasis would be mainly on low-cost packaged milk products and value-added products. Private sector processors and cheese makers could develop suitable products and packaging sizes for Burundi and DRC. A shelf-stable yoghurt offers attractive market opportunities. Polybags, not permitted for sale in Rwanda, could be targeted exclusively for the export market, and they would be one-tenth of the price of currently imported expensive packaging. Two other packaging types to explore are Ecoloean and Eclester. Additional trade investigations to Burundi and DRC are necessary to develop trade links to distributors.

2.6. Policies

A conducive policy environment will be important to reach the targets set out in the NDS. As rural wages increase and the cost of land (value) increases, there will be pressure to increase herd size and scale-up operations. Currently, the GOR lacks a clear policy on the dairy subsector to address these issues. The Gir’inka program is the cornerstone for the GOR for dairy, but it is time to transition to having a complete subsector approach rather than a narrow focus on cows for poverty alleviation to include initiatives beyond the farm gate. GOR’s investment policy in infrastructure will need to include roads, water, electricity and training and research institutions that benefit specifically the dairy subsector. To achieve this, government budgetary support to livestock needs to approach 30 percent of the agricultural budget, which itself needs to be at least 10 percent of the annual GOR budget. The GOR will need to provide incentives to entice private sector investments in input supply, milk production, transportation, processing and marketing of dairy products. Incentives can include tax holidays for new investors or waivers on the VAT to allow competition with the AMS. The promotion of an SoQ throughout the dairy value chain would elevate the stakeholders to improve quality from the farm to the final consumer. The Rwanda National Dairy Board (RNDB) exists, but it is not able to advocate for the necessary changes in policies required to meet the challenges facing the subsector if the country is to reach the target of 80 l/p milk consumption in 2020 as envisioned in the NDS.
2.7. Conclusions from the Analysis

The analysis leads to several conclusions in key areas.

2.7.1. Production and Productivity

Four priority areas are as follows:

1. Extension program to convey the necessary information to producers through lead farmers and cooperatives, agro-vets, and sector vets. Farmer championed initiatives have been proven to be successful and sustainable for farmer-based education programs – farmer field school (FFS) or some type of farmer structured and led activity.

2. Appropriate research programs on forage production systems, genetics and cattle nutrition, and linked to the extension program in no. 1 above.

3. Reduction in production costs through the promotion of a holistic management program including the expansion of the village kraal program.

4. Utilization of existing vocational and university institutions to train dairy specialists and others to enter the dairy subsector (V-Tec and university certification programs in animal husbandry and health).

2.7.2. Value Addition and Marketing

The top priority areas are the following:

1. Develop and test an alternative milk collection system that reduces the capital costs and introduces more scalable satellite centers, appropriate transport and bulk chilling and tankers.

2. Infrastructure investment by the GOR, districts and donor partners in roads, electricity and water.

3. Expand training center at Masaka to serve as a center for new product development for cheese, yogurt and other processed products.

4. A national campaign to increase consumption of milk and dairy products. The campaign should target various segments of the Rwandan population. Key goals will be increased consumption of milk by existing consumers and consumption of milk by those who are currently not consuming any dairy products. Inter-ministerial collaboration will help ensure campaign effectiveness, especially when targeting segments such as children and new consumers. (See Annex 8.6 for the SoQ concept, which will be introduced during 2013 by the USAID-funded RDCP-II project.) It is intended to scale up this initiative from pilot into a national program with key collaborating GoR partners.

2.7.3. Policy Development

The following are the top priorities:

1. Establish a sustainable public-private partnership for leading the dairy subsector.

2. Restructure the RNDB to serve as a catalyst for driving the necessary changes and helping identify processes for expansion of sales in both Rwanda and neighboring countries.
3. Initiate a dairy export strategy to expand cross-border sales of value-added dairy products. This could be managed by a functional RNDB in collaboration with the Rwanda Development Board (RDB) and/or MINICOM.

4. Develop within the Ministry of Education (MINEDUC) and the Ministry of Health (MINISANTE) a comprehensive dairy nutrition education targeting women and children about the importance of dairy in their diet.

3. DAIRY SUBSECTOR STRATEGIC PLAN

The NDS is an ambitious effort to transform the dairy subsector into a set of market-driven industries. The strategy is composed of four components (#1: milk production, productivity, quality and standards; #2: milk collection, processing, consumption and trade; #3: policy interventions that improve production, processing, consumption and trade; and, #4: implementation and coordination of the NDS) that support segments along the dairy value chain. (Annex Figure 8.4.6.1.) The components, when taken together, create multiplicative benefits for the stakeholders and the general economy.

Each component has a primary objective with a set of milestones (see Table 3.1.). The global milestone for each component is measurable to determine the status of reaching the objective for the component. Each component's objective has a number of sub-objectives with activities and with output indicators. Each activity identifies which ministry, agency or the private sector would have primary responsibility for implementation. (See Annex Table 8.3.10.2. for the list of activities by component/objective and sub-objective.)

3.1. Component 1. Milk Production, Productivity, Quality and Standards

Currently, milk production is approximately 450,000,000 l in 2012. The objective for component 1 is to increase production of milk to 810,000,000 l in 2017 to keep pace with population growth and to be on track to reach 80 l/p/yr in 2020. The milestones for this objective are the following: 2.2 million l/d of milk is entering the commercial system; all MCCs are profitable and fully operational at 100 percent of their installed cooler capacity; over 70,000 new jobs created; and, income of dairy households in the Gir'inka program increases by 20 percent over the baseline. MINAGRI is the lead ministry and the Rwanda Bureau of Standards (RBS) and the Rwanda Agriculture and Livestock Inspection Service (RALIS) assist on improving the quality standards of milk. The budget is Rwf 4.93 billion (US$ 8.02 million).

3.1.1. Sub-Objective (SO) 1.1. Lead Farmers (LF) & Group Kraal, Activities 1.1.1. - 1.1.7.

To increase production, the focus is on developing strong groups of dairy farmers and reducing their costs of production through economies of scale. The target is for a total of 750 lead farmers (LF) with each LF having 10 followers. The village "kraal" program can improve the Gir'inka program by increasing the rate of technology/management adoption by smaller producers. The village kraal program will be expanded based on results from pilot tests (Activity 1.1.3 and 1.1.4). Each kraal will have 20 households sharing a common shed and receiving public and private services, e.g. health care, AI and water. USAID through its projects and implementing partners will support piloting the kraal approach. The kraal program can also benefit from a program to install 5,000 biogas units as part of the National Domestic Biogas Program.
(NDBP) supported by SNV and MININFRA. The main actors are: MINAGRI, RAB, districts and private sector agro-vets. The budget is Rwf3.487 billion (US$5.670 million).

3.1.2. SO 1.2. Input Supply - Advisory Services, Activities 1.2.1. - 1.2.3.

This sub-objective (SO) targets the input delivery system so that dairy producers have access to necessary inputs from suppliers in their district. The indicators of improvement are the number of transactions by producers and the value of inputs used in the dairy operation. The main actors are: RAB, RDB and districts. The budget is Rwf 332.1 million (US$540,000).

3.1.3. SO 1.3. Seed Multiplication & Forage and Hay Businesses, Activities 1.3.1. - 1.3.6.

The strategy addresses the need for new small businesses to be started in seed production, forage cultivation and sales. The new businesses can be targeted to existing dairy farmers who have the land rights to use the land for forage production. Included in the activities is building feed mixing businesses to support the dairy producers. At least 30 percent of the new businesses will be women owned. A national feed supply study will be done in the first year at a cost of Rwf 36.9 million (US$60,000). The output is to establish a commercial feed supply. The main actors are: RAB, RDB and districts. The budget for this SO is Rwf 587.4 million (US$955,200).

3.1.4. SO 1.4. Increase Milk Production on Medium to Large Farms, Activities 1.4.1. - 1.4.4

The purpose is to improve the farm management of commercial dairy operations. The training will be targeted to farm managers who are employed by absentee owners. Men and women will be targeted as recipients of this program. We would expect that production will increase by at least 25 percent over the baseline for these commercial farms. The main actors are: MINAGRI, RAB, MINERENA, and WDC. The budget is Rwf 255.8 million ($416,000).

3.1.5. SO 1.5. Access to Finance Linking to Milk Sales Revenues, Activities 1.5.1. - 1.5.4.

Dairy producers can access financing through a mechanism of structured contracts using milk checks as collateral and payment to financial institutions. The indicators of success are that farmers have accessed loans, established bank accounts to receive payment of their milk checks, and pay off their loans. The main actors are: MINAGRI, RAB, BRD Development Fund (BDF), Banks, MFIs, and SACCOs. The budget is Rwf 119.9 million (US$195,000).

3.1.6. SO 1.6. Train Dairy Extension Specialists for Districts, Activities 1.6.1. - 1.6.2.

There are 416 sector agro-vets, but they lack the skill sets, time and resources to carry out their functions. Thirty (30) dairy specialists would be trained and posted to the districts to conduct producer programs, and better train and supervise sector vets in dairy programs. The dairy specialist can also work with private agro-vets and supplier dealers. The dairy district vet will be responsible for overseeing the development of the LF groups and village kraal program. The objective is for district dairy specialists, with the help of sector vets and private agro-vets, to train 10,000 dairy producers by the end of the fifth year. The main actors are: MINAGRI, RAB, RNDB, and districts. The budget for this SO is Rwf 150.7 million (US$245,000).
### Table 3.1. NDS Simplified Logframe

<table>
<thead>
<tr>
<th>Overall Goal</th>
<th>OVI</th>
<th>MOVI</th>
<th>Risks and Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>To reduce food insecurity through an efficient post-harvest, private sector system delivering milk and dairy products to the people of Rwanda</td>
<td>MDG Targets 1, 4 and 5 being met by changes in income, diet and livelihoods</td>
<td>Government Reports on State of the Nation, Economic Reports, UN Reports</td>
<td>Government Reports on State of the Nation, Economic Reports, UN Reports</td>
</tr>
</tbody>
</table>

#### Component 1. Improving Milk Production, Productivity, Quality and Standards

<table>
<thead>
<tr>
<th>Sub-Objective:</th>
<th>OVI</th>
<th>MOVI</th>
<th>Risks and Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Lead/Model farmer system development</td>
<td>750 Lead Farmers in place</td>
<td>Records of Groups Names; Monitoring Reports</td>
<td>Lead Farmers continue to support farmer groups.</td>
</tr>
<tr>
<td>1.2 Input Supply and Advisory Services small-scale dairy operations</td>
<td>x No. of transactions, qty of sales</td>
<td>Records of sales; Monitoring Reports</td>
<td>Suppliers see the benefit of improved linkages</td>
</tr>
<tr>
<td>1.3 Business diversification and income generation for both men and women in seed multiplication and forage production</td>
<td>30 businesses created, at least 30 percent women; 200 ha of total forage land increased</td>
<td>Business records and registration; Monitoring Reports</td>
<td>Suitable land is identified for improved forage production supporting businesses</td>
</tr>
<tr>
<td>1.4 Increase milk production in high potential areas for commercial size farmers</td>
<td>13 percent per year increase in milk supply</td>
<td>Milk production and sales records; Monitoring Reports</td>
<td>Consumer demand rises in the period of the Strategy</td>
</tr>
<tr>
<td>1.5 Improve access to finance and formal payment systems for the development of the dairy sector</td>
<td>500 farmers access loans over the 5 years</td>
<td>Loan records; Monitoring Reports</td>
<td>Records are accurate</td>
</tr>
<tr>
<td>1.6 Livestock Extension Advisory Services</td>
<td>10,000 farmers receive specialists dairy support per year starting year 1.</td>
<td>Records of contact sessions by extension workers; Monitoring Reports</td>
<td>Critical number of applicants interested and able to participate</td>
</tr>
</tbody>
</table>

#### Component 2. Milk Collection, Processing, Trade and Consumption

<table>
<thead>
<tr>
<th>Sub-Objective:</th>
<th>OVI</th>
<th>MOVI</th>
<th>Risks and Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Improved efficiency and reduced losses in the collection of milk</td>
<td>x % of milk is saved through better handling techniques introduced</td>
<td>MINAGRI statistics on production and employment and MCCs; Monitoring Reports</td>
<td>Processing efficiencies take longer to introduce; individuals move into other sectors; information is freely available</td>
</tr>
<tr>
<td>2.2 MCCs become major consolidation points for formal and AMS sectors</td>
<td>All MCCs utilize all their capacity (ca 182,000 lts/day) to collect, chill and deliver milk to the processors</td>
<td>MCC records on utilization; Monitoring Reports</td>
<td>Utilization rates are not met</td>
</tr>
<tr>
<td>2.3 Increased proportion of milk processed for sale</td>
<td>Increased milk going through formal sector by 75% of the baseline</td>
<td>MCC records on utilization; Monitoring Reports</td>
<td>Utilization rates are not met and demand remains low</td>
</tr>
<tr>
<td>2.4 Product Diversification and Packaging</td>
<td>A range of alternative packaging options are available in the domestic market place</td>
<td>Package descriptions and packages themselves; Monitoring Reports</td>
<td>Alternative packaging remains costly</td>
</tr>
<tr>
<td>2.5 Increased cheese production and sales</td>
<td>Increased cheese production meeting RBS standards by x kg over base by year 5; increased sales leading to generation of x number of new jobs</td>
<td>Cheese production records accepted; sales records of processors; Monitoring Reports</td>
<td>There may be technical difficulties in getting increased production levels up and consumer demand may remain low</td>
</tr>
<tr>
<td>2.6 Increased sales of affordable dairy products</td>
<td>Retail handlers and outlets properly handling and marketing quality milk</td>
<td>Training program records and attendance certificates issued; Monitoring reports</td>
<td>Not sufficient critical mass of interested people participating in the sessions and therefore certified</td>
</tr>
<tr>
<td>Component 3. Policies, Interventions that improve production, processing and marketing</td>
<td>Objective: Institutional strengthening for policy support to achieve a competitive and sustainable dairy subsector</td>
<td>ca. 10% of agricultural budget is dairy sector development and ca. 30% to livestock</td>
<td>Government budgets; private sector investment reports; Monitoring Reports</td>
</tr>
<tr>
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</tr>
<tr>
<td>Sub-Objective: 3.1 Productivity and Animal Health</td>
<td>Increase milk per animal by 25% by end of yr 4</td>
<td>MINAGRI statistics; Monitoring Reports</td>
<td>Animals are well managed</td>
</tr>
<tr>
<td>Sub-Objective: 3.2 Policy review to improve logistics and road network for collecting milk in rural areas</td>
<td>At least 200 km of roads to MCCs</td>
<td>Road reports and completion documents; Monitoring Reports</td>
<td>No unforeseen issues with data collection or road construction</td>
</tr>
<tr>
<td>Sub-Objective: 3.3 Improve electrical access to dairy producers and MCCs</td>
<td>x Number of MCCs connected by 2015</td>
<td>Connection confirmation through MCCs records; Monitoring Reports</td>
<td>No unforeseen issues with MCC connections</td>
</tr>
<tr>
<td>Sub-Objective: 3.4 Market Research to expand outlets both domestic and regional for milk through the formal milk channels</td>
<td>Formal milk sales increased by 10% by year 3</td>
<td>MINAGRI statistics; Monitoring Reports</td>
<td>Difficulties getting accurate statistics</td>
</tr>
<tr>
<td>Sub-Objective: 3.5 Build Capacity Program for enhancing skills in the dairy sector</td>
<td>Increase the number of graduated dairy specialists and technicians by 10% each yr</td>
<td>Graduation lists; Monitoring Reports</td>
<td>Not sufficient critical mass of interested people participating in the sessions</td>
</tr>
<tr>
<td>Sub-Objective: 3.6 Improve the business environment conducive for the development of dairy sector</td>
<td>Private sector investment increases by x billion Rwf per year in dairy activities above the figure in 2012</td>
<td>Private sector investment statistics; Monitoring Reports</td>
<td>Private sector may see greater opportunities in other sectors</td>
</tr>
<tr>
<td>Sub-Objective: 3.7 Promote safe, wholesome dairy products that meet both domestic and foreign market standards and demand</td>
<td>Study completed by end of year 1 and then tabled at the public-private platform in mid-year 2</td>
<td>Study; Monitoring Reports</td>
<td>Delays getting study underway</td>
</tr>
<tr>
<td>Sub-Objective: 3.8 Increasing domestic milk consumption through public awareness campaigns and national emphasis on milk quality certification and safety</td>
<td>Per capita consumption of milk doubles to 80 l/p/yr</td>
<td>MINAGRI/ National Statistics Unit; Monitoring Reports</td>
<td>Statistics will need to be representative and freely available</td>
</tr>
<tr>
<td>Sub-Objective: 3.9 Increased volumes of Rwandan dairy products sold within the region through emphasis on branding, quality, value addition and targeted trade missions</td>
<td>Regional exports increase</td>
<td>Minicom cross border records</td>
<td>Private sector will need to invest resources in exploring regional opportunities</td>
</tr>
<tr>
<td>Sub-Objective: 3.10 Establishment of Public-Private Platform to Harmonize Dairy Sector Competitiveness and Guide Investment</td>
<td>Two policies passed by GOR by yr 3; and private investors plan x billion Rwf in dairy sector beginning Yr 4</td>
<td>Policy Document produced; Monitoring Reports</td>
<td>Policy may take longer to debate/delays</td>
</tr>
<tr>
<td>Component 4. Implementation and Coordination</td>
<td>Objective: Efficient oversight of NDS implementation and coordination of activities and investments leading to greater competitiveness and management of the sector</td>
<td>Established and fully operational NDS Unit</td>
<td>Complementary investments may not be needed to deliver the strategy</td>
</tr>
<tr>
<td>Sub-Objective: 4.1 Implementation and Operating costs of Implementation including M&amp;E activities</td>
<td>Established and fully operational NDS Unit</td>
<td>External Annual Performance Assessment</td>
<td>Complementary investments may not be needed to deliver the strategy</td>
</tr>
</tbody>
</table>
3.2. Component 2. Milk Collection, Processing, Trade and Consumption

The objective is to improve milk collection so as to have better quality of milk, which will increase processing efficiencies and reduce costs because of greater economies of scale. Processors will be able to purchase a greater volume of milk and be more competitive. The main actors are: MINICOM, which will have a lead role in many SOs with the support of MINAGRI. The budget for this component is Rwf 3.9 billion (US$6.34 million).

3.2.1. SO 2.1. Improve Efficiencies in Milk Collection, Activities 2.1.1. - 2.1.3.

A first step will be to conduct a study on the feasible solutions to collect the largest quantities of milk in each of the main milk sheds. This can be done by the RDCP-II project with the help of a local consultant. Training and pilot tests will be conducted on best practices to collect milk by traders and the MCCs. The main actors are: MINIAGRI, LISP, and LOL’s RDCP-II. Budget is Rwf 311.3 million (US$506,000).

3.2.2. SO 2.2. MCCs become Consolidation Points for all Raw Milk, Activities 2.2.1. - 2.2.5.

All MCCs will be functioning and profitable through a number of initiatives and training programs. MCCs will operate at the installed capacity of their coolers. A few MCCs will pasteurize and cool milk for bulk sales to schools in the area and to Community Health Clinics in their sector. The main actors are: MINICOM and RAB will take the lead in this activity. MINEDUC will assist with the school feeding program, and MINISANTE with the Community Health Clinics. The budget is expected to be Rwf 3.088 billion (US$5.021 million).

3.2.3. SO 2.3. Increase the Utilization of Plants' Capacity, Activities 2.3.1. - 2.3.3.

More milk will go through the formal sector by an increase over the baseline of 75 percent. Training and equipment upgrades will be bank financed for milk and cheese processors. The main actors are: MINICOM, RBS, RDB, and private processing plants. The budget is estimated at Rwf 104.6 million (US$170,000).

3.2.4. SO 2.4. Diversification of Product Lines to Increase Sales, Activities 2.4.1. - 2.4.5.

Product variety is the focus of this SO and engages processing and marketing to have an effective program for outreach to processors and cheese makers. Processors will broaden their product lines. The activities will increase the capacity of processors to utilize equipment to bring new products to the market. Increasing the array of value-added products is a key means of absorbing additional volumes of milk produced. Knowledge of consumption preferences is important to ensure appropriate diversification is pursued. Assistance to commercial lenders is needed for them to better understand and finance creditworthy borrowers. Processors will be assisted in access to finance for product development. The main actors are: MINICOM, RBS, Banque Rwandaise de Developpement (BRD), and BDF. The budget is Rwf 227.5 million (US$ 370,000).

3.2.5. SO 2.5. Increase Cheese Production and Sales, Activities 2.5.1. - 2.5.2.

A coordinated approach is required to upgrade the technical skills in the cheese-making sector. The opportunity exists to professionalize cheese-making based on promoting best production practices to provide more consistent and superior cheese products. Cheese makers will receive training in better
processing methods to improve the quality and diversity of products, not just the standard gouda cheese. Cheese plants can take advantage of financial packages from lenders to improve their operations. The main actors are: MINICOM with involvement from RBS, RDB and financial institutions such as Bank Populaire Rwanda (BPR) and BDF. The budget is Rwf 98.4 million (US$160,000).

3.2.6. SO 2.6. Increased Sales of Safe Dairy Products, Activities 2.6.1. - 2.6.2.

Professionalizing milk-handling activities, coupled with enforcement of milk-handling requirements based on a certification system, will assist in promoting the benefits of consuming safer dairy products. The activities are directed at wholesalers and retailers of milk on the proper handling and promotion of milk products. The activities include working with milk bar operators and dairy companies on ways to increase consumers' access to pasteurized milk. Milk bars that participate in training would be certified and receive a plaque to display in their establishment. The main actors are: MINAGRI, RALIS, RNDB, RBS and the Rwanda Milk Sellers Association (RMSA). The budget estimate is Rwf 71.586 million (US$116,000).

3.3. Component 3. Policies, Institutions and Interventions to Improve Dairy Subsector

As a policy-driven component, a milestone is for over 10 percent of the national budget to be allocated to agriculture and, of this amount, 30 percent to be allocated to the livestock subsector of which dairy would receive 50 percent. Interventions are systems based on creating synergies in production and marketing. The main actors are: MINAGRI, MINICOM and RNDB. The budget is Rwf 4.095 billion (US$6.66 million).

3.3.1. SO 3.1. Livestock Productivity Improved, Activities 3.1.1. - 3.1.4.

Activities include studies to examine the cost-benefits of certain interventions such as the importation of semen versus a bull station at Masaka. The activities will result in average milk production increasing 75 percent by the end of year four for 10,000 dairy households. Activities address feeding systems, reproduction evaluations, and animal health delivery services. The main actors are: MINAGRI would be the lead ministry and will work with MINICOM and RDB. The budget is Rwf 159.9 million (US$260,000).

3.3.2. SO 3.2. Enhance Planning of Feeder Roads for Milk Collection, Activity 3.2.1.

MCCs and communities are to be part of the decision process for selecting feeder roads to be constructed or rehabilitated. A study is planned on the current and planned MCCs and the demand for road access. After GIS mapping of dairy-related facilities, the results will be presented to the relevant district administrative unit for roads. (See maps in Annex Figures 8.4.4.10. - 11.) The main actors are: MININFRA, MINAGRI, MINALOC, and districts along with donor agencies. Budget estimate is Rwf 30.75 million (US$50,000).

3.3.3. SO 3.3. Improve Access to Electricity for Dairy Producers and MCCs, Activity 3.3.1.

This activity will examine ways to improve sources of electricity to dairy producers, village kraals and MCCs to reduce costs of operations. The activity will include pilot tests of alternative energy sources, such as wind, solar and biogas. The main actors are: MININFRA, districts, EWSA, and MINAGRI to plan for providing reliable electricity to dairy units. The budget is Rwf 30.75 million (US$50,000).
3.3.4. SO 3.4. Market Research to Expand the Markets for Milk, Activities 3.4.1. - 3.4.3.

Activities will include market appraisals and trade missions to Burundi, the DRC and other countries to increase sales of Rwandan dairy products. A concrete export market-led approach for specific products should be developed based on knowledge of potential opportunities in these neighbouring markets. The project will link to E-Soko, and the use of market prices will be conducted by MINAGRI. The main actors are: MINICOM as lead ministry with the involvement of RNDB, RDB, and the National Agricultural Export Board (NAEB). The budget is Rwf 455.1 million (US$740,000).

3.3.5. SO 3.5. Build Capacity with Skills in the Dairy Subsector, Activities 3.5.1. - 3.5.2.

Technical skills in dairy need to be improved through training programs. The main actors are: MINICOM, MINAGRI, WDA, and RNDB, as well as T-VET and Masaka Training Center. The budget estimate is Rwf 332.1 million (US$540,000).


Stimulate private investment in the dairy subsector by introducing financial packages, business feasibility studies, tax policies to defray investor costs, and public sector promotion. Financial institutions will set up specialized lending to investors in the dairy subsector. Access to investment capital, in most cases, will be much simpler if working capital can easily be met by Rwanda’s banks. The main actors are: MINICOM, as well as financial institutions lending to prospective investors. The budget for this SO is Rwf 289.05 million (US$470,000).

3.3.7. SO 3.7. Safe Dairy Products for Domestic and Regional Markets, Activities 3.7.1. - 3.

This set of activities will address safe handling of milk along the value chain. This approach is essential if Rwanda is to pursue the goal of increasing regional market share. Trained technicians will be needed along the value chain to train, inspect, audit and certify that a quality milk chain exits. The Food Safety Manual will be updated for dairy products in line with COMESA standards. A plan to meet these standards can be done in forums and training sessions. The goal is for household food expenditures on dairy products to increase by 50 percent over the available baseline level. The main actors are: RBS, MINICOM, MINAGRI, RNDB, RAB, RALIS and private dairy businesses. The budget is Rwf 694.95 million (US$1.13 million).


A main pillar of the dairy strategy is to increase the awareness among the general population of the benefits of consuming dairy products. A nationally coordinated campaign will be targeted at different segments of the population identified in the EADD Dairy Market Research. A campaign of this nature will require inter-ministerial collaboration, in particular MINAGRI, MINISANTE, and MINEDUC to ensure a consistent message and approach towards increasing consumption. The RNDB will take leadership in the awareness program. The school milk program will be expanded to include more schools and students for the next five years. MINAGRI and MINEDUC will be active on the school program, and MINISANTE will take the lead on the health and nutrition activities. The main actors are: RNDB, MINAGRI, MINEDUC, and MINISANTE. The budget is Rwf 1.9 billion (US$3,090,000).
3.3.9. SO 3.9. Increasing Regional Exports of Milk and Dairy Products

Increasing volumes of Rwandan dairy products sold within the region through emphasis on branding, quality, value addition, product diversification, and targeted trade missions. The main actors are: MINICOM, RNDB, RDB, RBS, and the private sector.

3.3.10. SO 3.10. Public-Private Partnership (PPP) for Dairy Subsector

These activities will establish and promote a platform for public-private stakeholders (e.g. associations) to plan and carry out the NDS for the next five years. The platform will be used to convene forums (link to studies conducted under 3.2.1., 3.4.1., 3.4.3., 3.6.4., and 3.7.3.) and establish a database of stakeholders/institutions/NGOs in the dairy sector. The main actors are: MINAGRI, MINICOM, RAB, PSF, RNDB, RBS, banks, and private sector representatives. The budget is Rwf 264.5 million (US$430,000).

3.4. Component 4. Implementation and Coordination of the NDS

Implementation of the NDS is important. The three components require constant attention to roll out activities in a timely manner. Only with constant monitoring will the NDS yield the expected results envisioned for the dairy subsector over the next five years. The RNDB is the key organization leading this component. The main actors are: MINAGRI and MINICOM to have oversight for restructuring and guiding the RNDB. These ministries with their respective agencies will monitor the progress of the NDS. The estimated budget for this component is Rwf 2.002 Billion (US$3.26 million).

3.4.1. SO 4.1. Effective Implementation and Monitoring of the NDS

The activities include the formation of the public-private partnership, review of the by-laws and the legislation to form the RNDB, and management oversight and monitoring. The main actors are: MINAGRI as the lead agency with MINICOM in a supporting role with their respective agencies and the RNDB. The budget for this SO is estimated at Rwf 2.0001 billion (US$3.255 million).

4. STAKEHOLDERS' ROLES IN IMPLEMENTATION

The development of the NDS was the effort of individuals from both the public and private sectors. Meetings were held with groups and individuals. (A list of participants is found in Annex 8.5.) The roles of key stakeholders in the implementation of the NDS are outlined below.

4.1. Government of Rwanda

The two primary ministries that were engaged directly in the development of the NDS were MINAGRI and MINICOM. Their leadership was important in obtaining insights into the preparation of the NDS and they will play key roles in the implementation of the NDS. (See Table 4.1. for their roles in the NDS.)
4.1.1. Ministry of Agriculture (MINAGRI)

MINAGRI will take the leadership role in implementation of the NDS. Currently it is conducting a number of programs with dairy producers and MCCs. Three important agencies under MINAGRI to implement the NDS are the RAB, RALIS and the NAEB.

4.1.1.1. Rwanda Agricultural Board (RAB)

RAB will be the agency responsible for oversight of research and extension on behalf of MINAGRI. RAB operates advisory services in five zonal offices to provide guidance to the district agricultural and sector livestock officers. RAB will liaise with RNDB on issues important to the private sector.

4.1.1.2. Rwanda Agricultural and Livestock Inspection Service (RALIS)

RALIS is responsible for safe import and export of agricultural and livestock products to ensure compliance with all regional and international regulations. RALIS works closely with RAB, NAEB and RBS in the export and import of dairy products to and from regional markets. It will be important to engage RALIS in effective programs to efficiently export dairy products to Burundi and the DRC under the NDS.

4.1.1.3. National Agricultural Export Board (NAEB)

NAEB was reorganized combining the Tea Board, Coffee Board and the Horticulture Board into one organization. The NAEB’s mandate has been expanded to develop policies and strategies that now include livestock and animal product exports. The NAEB will implement the NDS by providing guidance on standard settings, processing sites, and promoting dairy exports to Burundi, the DRC and other countries.

4.1.2. Ministry of Trade and Industry (MINICOM)

MINICOM prepared a draft dairy strategy before the NDS began indicating their areas of interests. MINICOM will focus on commercial development and trade of dairy products beyond the farm gate.

4.1.2.1. Rwanda Bureau of Standards (RBS)

RBS is responsible for ensuring that all products on the market are safe to protect the health of the consumer, and secondly to promote grades and standards which facilitate trade. RBS provides training and sensitization for key stakeholders.

4.1.2.2. Private Sector Federation (PSF)

PSF is the professional organization, dedicated to promoting and representing the interests of the Rwandan business community. It is an umbrella organization composed of nine professional chambers. The dairy platform is part of the Chamber of Agriculture and Livestock. The PSF will play an important role in strengthening the RNDB and advocating for private dairy businesses.

4.1.2.3. Rwanda Cooperative Agency (RCA)

RCA plays a critical role in providing capacity building to producer cooperatives. RCA carries out audits of the primary cooperatives and will prosecute cooperative leaders of fraud. RCA needs to be
stretched so that a cooperative’s administration is transparent. RCA can recommend risk management approaches to producer cooperatives.

4.1.2.4. National Cooperatives Confederation of Rwanda (NCCR)

NCCR brings together different cooperative federations of Rwanda with the aim of providing support in establishing proper governance structures that ensure accountability amongst member federations, unions and cooperatives. The NCCR can facilitate cooperatives (SACCOs and MCCs) to create employment and expand access to income-generating activities.

4.1.3. Rwanda Development Board (RDB)

RDB is the investment arm of the GOR seeking investors. Food processing is a priority for the GOR. In some cases, the RDB will support funding a "greenfield" project and then sell or lease the building to a private company. The construction of the Mukamira dairy plant in the Northwest region is an example of this business model, as well as the feed mill in the economic free zone. GOR can consider tax incentives on agricultural inputs and equipment. Currently, tax holidays are not in the tax code. The RDB's target is to have private businesses generate US$5 – 10 million in export sales of dairy products by 2017.

4.1.4. Other Ministries

Other ministries can be engaged with MINAGRI in joint activities to have a successful NDS.

4.1.4.1. Ministry of Education (MINEDUC)

MINEDUC carries out a school feeding program, and it would be appropriate to integrate the MINAGRI's "one cup of milk per child" with the MINEDUC program. A joint program with a budget for incorporating the two programs together would be recommended. Brazil has a school feeding program which costs around US$.15 (Rwf 92/child) per child per day, and parents do some cost sharing.

4.1.4.2. Ministry of Local Government (MINALOC)

The Ministry of Local Government (MINALOC) is responsible under the decentralization policy for transferring powers, authority, functions, responsibilities and the requisite resources from central to local governments or administrative divisions. MINALOC is a critical partner in supporting the district and sector leadership in executing their roles in prioritizing economic development strategies and activities for their constituencies and coordinating program implementation and service provision of other ministries.

4.1.4.3. Ministry of Finance (MINECOFIN)

A number of banks operate in Rwanda and some of them lend to agriculture. Some banks are local, such as the Banque Commerciale du Rwanda (BCR) and Bank of Kigali (BK), BRD and BPR. In addition, MINECOFIN oversees a number of MFIs. In most cases, commercial dairy farmers are using their own equity funds to support their dairy operation.

4.1.4.4. Ministry of Health (MINISANTE)

MINISANTE supports a multi-sector strategy joining with other ministries like MINAGRI on food production and MINISANTE focused on nutrition education and sensitization. MINAGRI has the "one
cup of milk per child" and the Gir’inka program. MINISANTE stresses a balanced diet that includes milk. MINEDUC has a program on child education and nutrition and the Ministry of Gender and Family Promotion advocates for good nutrition in the family. This effort makes up the National Multi-Sector Strategy for the Elimination of Malnutrition. The total budget is US$25.4 million, which ends in June 2013. MINISANTE supports Community Health Workers (CHWs) who act as volunteers and can receive funding under the "performance based funding." Milk consumption is part of their education program.

4.2. Public-Private Sector Partnership

4.2.1. Rwanda National Dairy Board (RNDB)

Interviews conducted with members of the board of the RNDB proved to be important in designing the steps for rejuvenation of this important organization. The RNDB is not a statutory or legislative body but rather operates as a quasi-private entity. Funding support has come from the GOR and from external donors (USAID). Board members spoke about the need to both restructure and refinance the organization with a professional full-time management team.

4.2.2. Dairy Sector Working Group (DSWG)

The DSWG is chaired by the permanent secretary of MINAGRI and members of the group are from both the public and private sectors. The group offers a sounding board for soliciting ideas and comments on the NDS. The DSWG has guided the NDS as part of the PSTA-III.

4.2.3. National Dairy Farmers Federation of Rwanda (NDFFR)

There are 82 primary dairy cooperatives in Rwanda. Some of these cooperatives have a MCC, and some have their own union. In Nygatare, there is the Nygatare Dairy Farmers Union (NDFU). There are 17 cooperative MCCs, but only 11 are working at present. The union office is in Nygatare town. Primary cooperatives are grouped into unions. The district unions then become part of the National Dairy Farmers' Federation of Rwanda (NDFFR). The NDFFR will be an important organization for improving the performance of MCCs.

4.2.4. Dairy Quality Assurance Laboratory (DQAL)

DQAL is a private laboratory service established in 2010 with support from USAID. DQAL is conducting testing on raw milk and processed milk products. The lab receives funding from GOR in the form of free use of a building, electricity and water. USAID provided funds for the equipment in the lab valued at US$75,000. The number of tests conducted each day is 30–80, and the costs for various quality tests are very low. The implementation of the SoQ program will need the involvement of the DQAL.

4.3. Private Sector Companies and Cooperatives

Private sector companies are strongly encouraged to participate in dairy projects with a special attention to investment in feed mills and dairy processing plants. Cooperatives are a viable business model for producers, and they need to be strengthened with good operational systems.
4.3.1. Private Sector Companies

A number of input supply companies play important roles in the development of the subsector. These firms will be engaged in improving delivery of feed, veterinary supplies, and animal health services. Dairy processing companies, such as Inyange, Savannah, Nyanza, and the new plant in Mukamira will be important players in the implementation of the dairy strategy.

4.3.2. Financial Institutions

The majority of Rwanda’s banks and MFIs were visited during the preparation of the NDS. Unlike many neighboring countries, many of the lenders were very eager to engage in financing the sector. Some of the banks and all of the MFIs were willing to finance producers if they had appraisal skills and specialist products (to minimize their risk) to address the sector. Several of the banks, and even those driven by purely private sector values, also had an interest in financing the larger commercial players. The larger lenders also noted that their willingness to lend to commercial dairy enterprises will be driven by their capacity to assess the businesses on the basis of their opportunities and risks, and to deliver finance using appropriate products and strategies. To realize this, they will require both reliable data and technical assistance to develop products and policies from application through recovery. Many financial officers noted weakness in the MCCs. It is understood that BRD will organize workshops to strengthen the MCCs.

4.4. NGOs and Development Partners

A number of NGOs and donors are supporting the dairy subsector. Interviews were conducted with representatives of NGOs and donor agencies, and they provided insights and data for preparing the NDS. Several representatives are members of the DSWG.

4.4.1. Bill and Melinda Gates Foundation – East African Dairy Development (EADD)

The EADD project, funded by the Bill and Melinda Gates Foundation (BMGF), is in its final year in Rwanda. The focus of the project has been in three districts of the eastern milk shed (Gatsibo, Nyagatare and Rwamagana) with their headquarters in Nyagatare. Heifer International (HI) is the lead institution for the project, which includes partners Technoserve, African Breeder Service Total Cattle Management, International Center for Research on Agro-Forestry (ICRAF), and International Livestock Research Institute (ILRI). The BMGF is the donor agency. The project has made good strides in assisting dairy farmers in production and marketing through MCCs as dairy business hubs. EADD brings a regional perspective to Rwanda from other similar projects in Kenya and Uganda.

4.4.2. SNV Netherlands

SNV has had a sustained presence in the dairy industry in Rwanda for several years, and it is currently focused on the northwest region for dairy production. SNV is working in the biogas industry, which can support dairy development.
4.4.3. USAID

4.4.3.1. Rwanda Dairy Competitiveness Program (RDCP-II)

USAID funded the Rwanda Dairy Competitiveness Program starting with phase one in 2007 and then a continuation with phase two in 2012. Land O’Lakes, Inc. (LOL) has been the implementer. The NDS is funded by USAID, and Land O'Lakes oversees the preparation of the NDS.

4.4.3.2. Rwanda Agro-Dealers Development (RADD)

This project is building the capacity of over 1,400 agro-vet shops throughout Rwanda. Many of the operators of these shops are trained veterinary technicians. The operators have an interest to expand and offer animal health supplies and equipment to dairy producers. A number of veterinary supply businesses are based in Kigali and supply these agro-vet shops on a regular basis.

4.4.3.3. Rural Feeder Roads Improvement Program (RFRIP)

There are a number of feeder road initiatives being undertaken by the GOR and their development partners USAID, the World Bank (WB – two districts), the European Union (EU – seven districts), the African Development Bank (AfDB – a few km), the Netherlands (five districts), and IFAD (one district). USAID plans to rehabilitate around 500 to 600 km of feeder roads at a cost of between US$45,000 - $50,000 per km. The district administration has agreed to establish a fund of 10% of the construction cost for annual and periodic maintenance. The RFRIP has targeted eight districts (Gatsibo, Nygatare, Nyanza, Kayonza, Rwamagana, Kamonyi, Ruhango, and Nyabihu) which are all in one of the five milk sheds. Maps have been prepared to determine the roads, and locations of the chilling centers, cheese processing units, animal feed production centers and veterinary clinics. (See Annex Figures 8.4.4.10. - 12.) Community participation is part of the selection process and their agreement to participate in road maintenance.

4.4.4. Heifer International (HI)

HI is supporting dairy farmers with the distribution of improved dairy cows to rural households. This program has been operating for over ten years. HI staff is very knowledgeable about needed policies.

4.4.5. Send A Cow

This non-profit organization is based in the UK, and it has been active in supplying dairy cattle to rural households in Rwanda.

4.4.6. World Food Program (WFP)

The WFP is active in the Central Lakes region and there is the opportunity to supply milk to the Purchase for Progress (P4P) program. The P4P makes cash purchases of local commodities.
Table 4.1. Institutions Responsible for Components and Sub-Objectives of the NDS

<table>
<thead>
<tr>
<th>Components and Sub-Objectives (SOs)</th>
<th>Objective Summary</th>
<th>Core Management Institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component 1. Improving Milk Production, Productivity, Quality and Standards</td>
<td>Objective: Improved production and supply channels, quality and standards of milk produced at household, smallholder and commercial producer levels</td>
<td>MINAGRI, RAB</td>
</tr>
<tr>
<td>SO 1.1.</td>
<td>Lead/Model farmer system development</td>
<td>MINAGRI</td>
</tr>
<tr>
<td>SO 1.2.</td>
<td>Input supply and advisory services to small-scale dairy operations</td>
<td>RAB, districts</td>
</tr>
<tr>
<td>SO 1.3.</td>
<td>Business diversification and income generation for both men and women in seed and forage production</td>
<td>MINAGRI, MINICOM, RDB</td>
</tr>
<tr>
<td>SO 1.4.</td>
<td>Increase milk production in high potential areas for commercial size farmers</td>
<td>RAB</td>
</tr>
<tr>
<td>SO 1.5.</td>
<td>Improve access to finance and formal payment systems for the development of the dairy sector</td>
<td>MINICOM, BRD, MINAGRI</td>
</tr>
<tr>
<td>SO 1.6.</td>
<td>Livestock extension advisory services</td>
<td>MINAGRI, RAB, districts</td>
</tr>
<tr>
<td>Component 2. Milk Collection, Processing, Trade and Consumption</td>
<td>Objective: Improved milk collection, processing and product distribution to reduce costs and increase benefits from economies of scale leading to greater uptake and competitiveness</td>
<td>MINICOM, MINAGRI</td>
</tr>
<tr>
<td>SO 2.1.</td>
<td>Improved efficiency and reduced losses in the collection of milk</td>
<td>MINAGRI, RAB</td>
</tr>
<tr>
<td>SO 2.2.</td>
<td>MCCs become major consolidation points for formal and AMS sectors</td>
<td>RAB</td>
</tr>
<tr>
<td>SO 2.3.</td>
<td>Increased proportion of milk processed for sale</td>
<td>MINAGRI, MINICOM</td>
</tr>
<tr>
<td>SO 2.4.</td>
<td>Product diversification and packaging</td>
<td>MINICOM, MINAGRI</td>
</tr>
<tr>
<td>SO 2.5.</td>
<td>Increased cheese production and sales</td>
<td>RBS, MINICOM</td>
</tr>
<tr>
<td>SO 2.6.</td>
<td>Increased sales of affordable safe dairy products</td>
<td>MINAGRI, RBS, RALIS</td>
</tr>
<tr>
<td>Component 3. Policies that improve production, processing and marketing</td>
<td>Objective: Institutional strengthening for policy support to achieve a competitive and sustainable dairy subsector</td>
<td>MINAGRI, MINICOM, Private sector</td>
</tr>
<tr>
<td>SO 3.1.</td>
<td>Productivity and animal health</td>
<td>MINICOM, MINAGRI</td>
</tr>
<tr>
<td>SO 3.2.</td>
<td>Policy review to improve logistics and road network for collecting milk in rural areas</td>
<td>MININFRA</td>
</tr>
<tr>
<td>SO 3.3.</td>
<td>Improve electrical access to dairy producers and MCCs</td>
<td>MININFRA, EWSA, districts</td>
</tr>
<tr>
<td>SO 3.4.</td>
<td>Market research to expand outlets both domestic and regional for milk through the formal milk channels</td>
<td>MINICOM, MINAGRI</td>
</tr>
<tr>
<td>SO 3.5.</td>
<td>Build capacity program for enhancing skills in the dairy sector</td>
<td>MINICOM, MINAGRI, WDA</td>
</tr>
<tr>
<td>SO 3.6.</td>
<td>Build capacity program for enhancing skills in the dairy sector</td>
<td>MINICOM, MINAGRI</td>
</tr>
<tr>
<td>SO 3.7.</td>
<td>Promote safe dairy products that meet both domestic and foreign market standards and demand</td>
<td>MINISANTE, MINAGRI</td>
</tr>
<tr>
<td>SO 3.8.</td>
<td>Public awareness program on increasing domestic milk consumption</td>
<td>MINISANTE, MINAGRI</td>
</tr>
</tbody>
</table>
SO 3.9 | Increased volumes of dairy products exported | MINICOM, RDB, RNDB, RBS
---|---|---
SO 3.10. | Establishment of public-private platform to harmonize dairy sector competitiveness and guide investment | MINAGRI and MINICOM (delegating to their departments or agencies)
Component 4. Implementation and Coordination | Objective: Efficient oversight of NDS implementation and coordination of activities and investments leading to greater competitiveness and management of sector | RNDB
SO 4.1. | Implementation and operating costs of implementation | RNDB

### 5. IMPLEMENTATION FRAMEWORK FOR THE NATIONAL DAIRY STRATEGY

The implementation plan is the fourth component of the NDS. The partners must make sure that the plan is realistic and performance-based. (See Figure 5.1 below.)

#### 5.1. Institutional Partners

Institutions involved in the oversight, coordination and implementation of the NDS include:

- MINAGRI is the host institution and will be responsible for policy direction. The RAB, as its implementer, shall ensure that strategic interventions and actions in the NDS are mainstreamed in the District Development Plans (IMIHIGO). The relevant budget resources shall be earmarked for transfer to districts to facilitate implementation in line with the decentralization policy strategy. The National Agricultural Export Bureau (NAEB) will also serve as an implementer and promote exports assisting the dairy processors to export to regional markets.

- MINICOM is a key coordinating partner and has the responsibility to ensure that businesses in the NDS value chain are market responsive. In addition, MINICOM has a policy responsibility of ensuring value addition and the development of Micro, Small and Medium Enterprises (MSME) along the dairy value chain. The RBS will support dairy companies to improve the quality of their products to be competitive with other companies trading in the region. The Private Sector Federation (PSF) is a national umbrella organization for private sector institutions, organizations and individuals that plays the role of advocacy and promotion of members’ business interests. The functioning of the PSF is organized around chambers and platforms that cut across various sectors of Rwanda’s economy. The PSF’s advocacy and members’ business interests promotion role focuses on horizontal issues such as taxation, business registration and regulation as well as investor protection and business closure process among others. The vertical issues relating to advocacy and members’ interests promotion are delegated to sector-specific platforms.

- The Rwanda Development Board (RDB) is charged with improving the business environment for investment promotion. It also has the responsibility of promoting public-private partnerships to facilitate private sector development in taking on its increasing role and responsibility to lead Rwanda’s development process as envisaged in Vision 2020. In this respect, RDB's role is to promote investments along the dairy strategy value chain and guide the PPP process in the
oversight, coordination and implementation of strategic interventions and actions envisaged in the National Dairy Sector Strategy.

- The Rwanda National Dairy Platform (RNDP) is the formation of a public-private partnership to allow for the advocacy and promotion of members’ business interests which can be effectively articulated and solutions to challenges sought. In addition, the RNDB may highlight and advocate for solutions to issues relating to policy oversight, coordination and implementation aspects identified and reflected in the NDS as well as those that may arise in the course of its implementation.

- Stakeholders are the entrepreneurs and businesses engaged in production, processing and marketing of milk and dairy products. These stakeholders elect the board of directors of the RNDB representing clusters from the dairy value chain.

5.2. Proposed Framework

The appropriate framework for effective implementation of strategic interventions and activities envisaged in the NDS shall be shaped and guided in the form of public-private partnership. (See Figure 5.1.) MINAGRI and MINICOM are the primary originators of the NDS, and these ministries will guide the policies in the NDS in line with Vision 2020. MINAGRI and MINICOM will in turn support their respective implementing agencies (RAB, NAEB, PSF and RBS) in carrying out the NDS. By virtue of its role in promoting PPPs, RDB shall be one of the implementing partners, and it will interact with the RNDB leaders.

5.2.1. Rwanda National Dairy Platform - RNDP (Forum for Public-Private Partnership)

The NDS is to have a strong private sector orientation, which advocates for businesses. The RNDP will be enlarged in an effort to catalyze firms to be proactive in implementing the NDS. The platform will encompass the directors of the RNDB representing the industry members and shall be comprised of producers (farmers), processors and milk sellers. The platform will allow for representatives of public sector institutions to interact with dairy service providers, such as feed manufacturers, livestock inseminators, veterinary services and supplies, among others, who can provide support to the RNDB. To ensure sustainability of the RNDB, its members shall pay an annual membership fee to defray the costs of running a functional secretariat. Development partners will be asked to financially support the board.

5.2.2. Rwanda National Dairy Board - Secretariat (RNDB-S)

The RNDB-S is the implementing arm of the RNDB and carries out the programs of the RNDB. The RNDB-S operates with activity plans and performance targets set in consultation with the board of directors and the implementing advisor partners including government. The executive director of the RNDB-S will be a business professional who will lead the secretariat's staff.

5.2.3. GANTT Chart

A timeline is important in reaching the milestones established in the logframe of the strategy. Please refer to the Performance Monitoring Plan (PMP) for a logframe of milestones, and the suggested monitoring and audit activities planned in the NDS. A GANTT chart is presented in Table 15.4.8.2. for discussion by all stakeholders on the necessary steps to be taken in the 2012/2013 budget year.
Figure 5.1. Schematic of the Implementation Framework of the NDS

*Vision*

**Government of Rwanda - VISION 2020**

**Implementation Framework**

- **Policy Level**
  - MINAGRI
  - **RAB + Partners**
  - RALIS, NAEB, RDB, PSF, RBS

- **Implementation**

- **Forum**
  - PPD (Public Private Dialogue)

- **Advocacy**
  - RNDP / Secretariat

- **Private Sector Stakeholders**
  - Inputs
  - Dairy Producers
  - Trader Transporters
  - Processors
  - Milk Sellers

**ECONOMIC CLUSTER**
- MINICOFIN
- MINICOM
- MININFRA
6. FINANCIAL IMPLICATIONS

6.1. Financial Analysis

The implementation of the dairy strategy will require financial resources from both the private sector as well as from the GOR and its development partners. Both public and private sector investments will be needed to reach the target of 80 l/p/yr by the end of 2020.

6.1.1. Private Sector

The private sector will make investments in a number of areas as the quantity of milk increases, and markets are developed in both Rwanda and the region.

- Input Suppliers
  - Feed mills with the capacity to store, process and bag commercial feed
  - Artificial inseminators in equipment kits, liquid nitrogen tanks, cell phones and motorbikes
  - Financial institutions will invest in training personnel in undertaking risk assessment and borrower creditworthiness for specialized financial products for the dairy industry

- Producers
  - Village kraals for 10 – 20 households to hold 20 – 40 head of dairy cows
  - Forage equipment for cutting and baling hay
  - Satellite Collection Centers: producer cooperatives to collect more milk at distances greater than 5 kilometers from the MCC.
  - MCCs for bulking milk from the smaller Satellite Collection Centers

- Transporters
  - Milk cans: conversion from plastic containers to aluminum cans within five years
  - Small mini-vehicles to transport milk from satellite to MCCs - motorized trikes
  - Milk tankers to collect milk from MCCs to processing plants

- Milk Chilling Centers (MCCs)
  - Lab equipment
    - Testing equipment for mastitis
    - Other tests for quality and grading of milk
  - Small pasteurizing equipment: used at a few MCCs to pasteurize milk for the loose container milk market in rural areas, e.g. schools and other institutions

- Processing plants
  - Milk powder plant which could be attached to an existing operation, e.g. the Mukamira plant to absorb large quantities in the flush season
  - Small to medium fluid milk products for export to Burundi and the DRC, other micro-processors of cream cheese, yogurt, etc. (shelf stable products)

- Wholesalers and distributors
  - Mini-warehouse depot for storing product for regional distribution
  - Refrigerated trucks to distribute finished products to local outlets and to export

- Retailers
  - Refrigerated display cases in retail outlets
  - Self-service milk dispensers
  - Milk bars to upgrade equipment to improve hygiene and refrigeration
6.1.2. Public Sector

The public sector will make a number of strategic investments in an array of activities that will accomplish the objective to reach 80 l/p/yr. The aggregated list of investments by components/objectives and sub-objectives is found in Table 6.1. The total budget is Rwf 14.9 billion (US$24.28 million). There are a number of projects underway or in the planning stage, which will be sources of funds to meet the recommended activities:

- Gir’inka - one cow per household
- "One Cup of Milk per Child" program
- School feeding programs
- IFAD-supported project for water development and MCCs
- Livestock Improvement Support Project
- Feeder road project in collaboration with development partners to link MCCs to processors
- Electrical transmission lines for access by rural households, MCCs and private feed mills

6.2. Return on Investment for NDS

6.2.1. Without the NDS

Under the current situation without the NDS in place, current livestock numbers will naturally increase to 1,670,000 cattle in 2017. With conservative estimates using the same milk yields per type of dairy cow, the production of milk will increase to 1.74 million l/d or 635,939,000 l/yr. With an estimated population in 2017 of 13.488 million people, per capita consumption would be 47.50 l/p/yr. Milk consumption per capita increases only 18.75 percent from 2013 to 2017. The annual growth rate is 3.75 percent. Rwanda has not moved rapidly to close the gap with the WHO-recommended milk intake of 200 l/p/yr. Without the NDS, surpluses of milk will be 100,400,000 l of milk from just the natural growth in the national herd's milk production from the improved dairy cows and this surplus is expected to double in 2020.

6.2.2. With the NDS

The NDS proposes policies, strategies, activities and budgets in four components. The cost of the NDS is Rwf 14.99 billion (US$24.38 million), which is allocated over five years. (See Table 6.1.) The allocation by component is as follows:

- Component #1: Production and Productivity - 33%
- Component #2: Value Addition and Marketing - 26%
- Component #3: Policy - 27%
- Component #4: Implementation and Monitoring - 14%

The largest portion of the budget (46 percent) will occur in the second year of the five-year plan.
### Table 6.1. NDS Budget summary by Component for Five Years (USD and Rwf)

<table>
<thead>
<tr>
<th>Budget by Component</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Rwf</th>
<th>USD</th>
<th>% Breakdown by Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component 1. Improving Milk</td>
<td>-</td>
<td>200,000</td>
<td>138,375</td>
<td>323,375</td>
<td>4,652,500</td>
<td>1,279,000</td>
<td>1,159,000</td>
<td>269,000</td>
<td>4,933,068,750</td>
<td>8,021,250</td>
<td>33%</td>
</tr>
<tr>
<td>Component 2. Milk Collection, Milk Processing, Trade</td>
<td>-</td>
<td>-</td>
<td>164,140</td>
<td>166,450</td>
<td>4,566,750</td>
<td>616,750</td>
<td>662,400</td>
<td>167,400</td>
<td>3,901,492,350</td>
<td>6,343,890</td>
<td>26%</td>
</tr>
<tr>
<td>and Consumption</td>
<td>100,000</td>
<td>180,000</td>
<td>80,000</td>
<td>660,000</td>
<td>1,290,000</td>
<td>1,450,000</td>
<td>1,430,000</td>
<td>1,470,000</td>
<td>4,095,900,000</td>
<td>6,660,000</td>
<td>27%</td>
</tr>
<tr>
<td>Component 3. Policies, Interventions that improve</td>
<td>64,250</td>
<td>109,250</td>
<td>64,250</td>
<td>469,250</td>
<td>1,290,000</td>
<td>1,450,000</td>
<td>1,430,000</td>
<td>1,470,000</td>
<td>4,095,900,000</td>
<td>6,660,000</td>
<td>13%</td>
</tr>
<tr>
<td>production, processing and marketing</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td>Component 4. Implementation and Coordination</td>
<td>164,250</td>
<td>489,250</td>
<td>446,765</td>
<td>1,619,075</td>
<td>11,146,250</td>
<td>4,082,750</td>
<td>3,788,400</td>
<td>2,373,400</td>
<td>14,932,286,100</td>
<td>24,280,140</td>
<td>100%</td>
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<tr>
<td>Totals by Qtr and Year</td>
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#### NDS Budget Summary by Total Component Cost for Five Years (USD and Rwf)

<table>
<thead>
<tr>
<th>Budget by Component</th>
<th>Rwf</th>
<th>USD</th>
<th>% Breakdown by Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component 1. Improving Milk</td>
<td>4,933,068,750</td>
<td>8,021,250</td>
<td>33%</td>
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<tr>
<td>Component 2. Milk Collection, Milk Processing, Trade</td>
<td>3,901,492,350</td>
<td>6,343,890</td>
<td>26%</td>
</tr>
<tr>
<td>and Consumption</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Component 3. Policies, Interventions that improve</td>
<td>4,095,900,000</td>
<td>6,660,000</td>
<td>27%</td>
</tr>
<tr>
<td>production, processing and marketing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Component 4. Implementation and Coordination</td>
<td>2,001,825,000</td>
<td>3,255,000</td>
<td>13%</td>
</tr>
<tr>
<td>Total</td>
<td>14,932,286,100</td>
<td>24,280,140</td>
<td>100%</td>
</tr>
</tbody>
</table>
The cattle herd will increase from 1.33 million head to 1.67 million head in 2017, and the distribution of dairy cows by class (local, crossbred, and purebred) will remain unchanged from 2012. In 2017, the annual production of milk will increase to 810,558,000 l/yr or 2,220,000 l/day. Per capita consumption is estimated at 60.55 l/p/day. The NDS would result in an incremental increase of 174,600,000 liters of milk. In 2020, milk production will increase to 1,161,498,000 l/yr or 3,200,000 l/day. The per capita consumption of milk will be 80 l/p/yr from 611,000 improved dairy cows in 2020. The yield per cow will increase to 2.4 l/d for local, 9.2 l/d for crossbred, and 13.3 l/d for purebred cows.

The incremental benefits with the NDS program are measured with two indicators:

1. The average increase in new jobs after taking into account the natural growth in new jobs times the value of annual wages earned. (Each additional 5,000 l marketed off the farm creates one new job in the dairy subsector.)

2. Ten (10) percent of the value of the additional milk produced goes to the dairy household.

At the end of 2017, the following outputs occur:

- The incremental increase in new jobs in five years created with the NDS (above the natural increase in jobs) is 34,924.

- The economic impact of job creation on the national economy is as follows:
  - Direct income in wages received by new workers is Rwf 8.43 billion (US$13.7 million); and,
  - The indirect income multiplier (two times the direct effect) is Rwf 16.9 billion (US$27.4 million).

- Increase in share to producers from the net incremental sales value with the NDS:
  - Direct income from sales of additional milk is Rwf 18.55 billion (US$30.2 million); and,
  - The indirect income multiplier (two times the direct effect) is Rwf 37.1 billion (US$60.4 million).

The net present value of the flow of net benefits over the five years of the NDS is an estimated Rwf 4.8 billion (US$7.8 million). This is based on a conservative estimate of an opportunity cost of capital of 18 percent. The payback period for when the flow of benefit turns positive is at 3.25 years. The internal rate of return on the investment is 47 percent. These are positive results indicating the suitability of investing in the NDS for the improvement of the dairy subsector.
7. PERFORMANCE AND MONITORING PLAN (PMP)

The GOR has set out in Vision 2020 that the country will reach middle-income status by the year 2020. The performance of the NDS will be judged on the dairy subsector contribution to reaching a target of production that is commensurate with this income status and complementary in contributing to the economy, as well as to the nutritional wellbeing of Rwandans. Both goals are closely linked. The Performance and Monitoring Plan (PMP) sets out in detail the steps to ensure that objectives are met necessary to achieve the goals of Vision 2020. The results from interventions in Component 1 (production, productivity) will need to show progress towards production of 1.161 billion liters in 2020. Similarly, the results from interventions in Component 2 (marketing and value addition) will lead to per capita milk consumption reaching 80 l/p/yr in 2020, which will meet the expected milk production. A careful balancing act occurs through policies (Component 3) necessary to ensure that both sets of interventions (production and consumption) are on-schedule and balanced. The PMP is the tracking tool that complements the NDS to assist those stakeholders responsible for overseeing this transition. The PMP is set up with two main purposes: (1) implementation monitoring and (2) results monitoring.

7.1. Implementation Monitoring

The framework for the NDS is such that MINAGRI and MINICOM (and their implementing agencies) share dual roles in setting the vision and the policies to achieve the stated goals for the dairy subsector by 2017 and beyond. In addition, the RNDB is tasked with the day-to-day operation on the part of the private sector to ensure that interventions are started on time and that stakeholders are continually engaged in the progress. Communication is vitally important to ensure that all the principal stakeholders fully participate in the public-private partnership.

Each component of the strategy has a number of sub-objectives with activities to be carried out. Key institutions have been identified, and whether they are in the public or private sectors. These implementers will need to be engaged on a regular basis (with progress reports every month for the first six months as an activity begins and then once per quarter after that.) Identification of resource flows (sources and uses of funds) is important to ensure that funding for capital costs or operating costs are released in a timely manner. The release of funds becomes part of the "mid-term" and "end of program" evaluation when estimating the financial returns on the investments made in the dairy subsector. A preliminary estimate of 47 percent for a return on investment for the NDS has been presented in the strategy based on ex-ante projections. It will be important to conduct an ex-post analysis after the initial five years to determine the actual deviation to the initial estimate.

7.2. Results Monitoring

The interventions are designed to achieve outputs which when taken together lead to the outcomes expected from the NDS. In preparing the NDS, it is evident that baseline data from which to measure progress towards the goals in 2017 and beyond are not available. An initial task is for the NDS implementation team to establish credible baseline estimates. At the heart of the NDS lies the intention to do things better, more efficiently as well as more effectively in the interest of milk production minimizing losses and maximizing capacity available. Accurate measurements depend on benchmarking the current situation. There is simply insufficient information about dairy production and transportation and levels of
surplus milk in the country. Some benchmark indicators do exist from MINAGRI and other sources, but these will require review and confirmation. Other indicators or benchmark points will require specific study based on surveys. For example, these could include:

- Milk production by target groups by milk shed for lead farmers and village kraals and their costs of production;
- MCCs and their satellite centers and the costs of chilling and transporting a liter of milk;
- Processors and how they utilize their install capacity, products manufactured and costs of production;
- Demand in the domestic end-markets by segments (retail, food service, and institutional – school feeding); and,
- Demand in Burundi, the DRC and other countries (product types, package sizes, quantities and prices) and a standardized protocol to collect information from the Rwandan customs service on the import and export of dairy products.

7.3. Logframe

The logframe is a matrix in which the four components of the strategy are linked in a "cascading" effect beginning from the goal. Outcomes lead to outputs, which lead to activities and to the necessary resources (inputs) to carry out the interventions. The framework is logical and allows for understanding critical linkages in project design and implementation. In the NDS, the logframe identifies a number of objectively verifiable indicators (OVI), which act as a measuring stick of performance. These indicators set the conditions for success, and for the most part the NDS uses quantitative data, which can be measured. Indicators have been developed to be as Specific, Measurable, Appropriate, Realistic and Time-bound (SMART) as possible and for them to last the duration of the strategy.

The NDS has a number of indicators that have measurable outputs. The initiation and timing of the activities are important for achieving long-term outcomes that are sustainable after the project period ends in 2017. The accompanying logframe for the NDS includes a short description of the activity under a sub-objective, as well as the steps for measuring and validating the expected outputs. (See Table 3.1.) In addition to the OVIs, a short description is provided in the table on how the OVIs will be measured (Measurable Objectively Verifiable Indicator - MOVI) to verify the impact of the activity and eventually the sub-objective. The last column in the table presents a risk assessment of possibly why the indicator may not be realized. (See Annex Table 8.3.10.2. for the longer version logframe by components and sub-objectives.)

7.4. Reporting

Reporting is an essential part of the overall success of the NDS. Reporting serves several purposes. Sketching out the structure of the reports will facilitate data gathering. (See full PMP report on prototype forms for collecting and reporting information.) Since reports will be regularly produced, a consensus is needed on how to store and analyze the data. The reports need to be tailored to specific readers. If the private sector is the target, then this may change the format of the report versus for the public sector agency. Finally, reports will need to be disseminated to stakeholders and this needs to be agreed to in the
planning stage of who is responsible for the communication program. A pertinent question is the form of distribution – paper or digital. If a larger audience is envisioned, then newspaper, television or radio may prove useful. The planning on reporting procedures needs to occur in the first quarter of 2013 and be put into a planning document. The reports become important to keep policy makers current on the progress to achieving targets for the dairy subsector set for 2017 and beyond.

7.5. Time Frame

An illustrative time chart showing tasks in the PMP over the five years of the NDS is illustrated in Annex Figure 8.4.10.1. The chart breaks out activities by quarter and identifies representatives from key ministries for tasks to be performed.
Annex III. New dairy products developed through the Seal of Quality program

New Products June 2016

<table>
<thead>
<tr>
<th>District</th>
<th>Name of Dairy enterprise</th>
<th>New products developed</th>
</tr>
</thead>
</table>
| Nyabihu | Ingabo Dairy             | 1. Ricotta cheese (300g),  
|          |                          | 2. Ricotta cheese (600g),  
|          |                          | 3. Panimi cheese (600g),  
|          |                          | 4. Panimi cheese (300g),  
|          |                          | 5. Halloumi cheese (300g),  
|          |                          | 6. Halloumi cheese (600g),  
|          |                          | 7. Feta cheese (300g),  
|          |                          | 8. Masdam cheese (1kg),  
|          |                          | 9. Masdam cheese (3kg)  
|          |                          | 10. Unsalted butter (250mg) |
| Rubavu   | Fromagarie La Reine      | 11. Fermented milk “ikivuguto”-500ml  
|          |                          | 12. Strawberry-flavoured yoghurt-250ml  
<p>|          |                          | 13. Vanilla-flavoured yoghurt-250ml |
| Bugesera | KOPEZIRU Cooperative     | 14. Fermented milk-5 litres |
| Gasabo   | Lift-up Trading Company  | 15. Fermented milk-5 liters |</p>
<table>
<thead>
<tr>
<th>Region</th>
<th>Company</th>
<th>Product Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kicukiro</td>
<td>Inyange dairy enterprises</td>
<td>16. Tetra fino-packaged UHT milk-500ml</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17. Salted Butter-500g</td>
</tr>
<tr>
<td></td>
<td></td>
<td>18. Unsalted butter-500g</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19. Unsalted butter-250mg</td>
</tr>
<tr>
<td></td>
<td>Imena dairy</td>
<td>20. Fermented milk-1 litre</td>
</tr>
<tr>
<td>Gicumbi</td>
<td>Blessed Dairies</td>
<td>21. Unsalted Butter-500g</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22. Unsalted Butter-250g</td>
</tr>
<tr>
<td>Bugesera</td>
<td>Crystal fresh dairy</td>
<td>23. Fermented milk-5 litres</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24. Fermented milk-3 litres</td>
</tr>
<tr>
<td>Nyagatare district</td>
<td>Nyagatare yoghurt and ice-cream processors Ltd</td>
<td>25. Straw berry-flavoured Yogurt-250ml</td>
</tr>
<tr>
<td></td>
<td></td>
<td>26. Ice-cream-250ml</td>
</tr>
<tr>
<td>Rwamagana</td>
<td>Indatwa processing company</td>
<td>27. Plain yogurt-250ml</td>
</tr>
<tr>
<td></td>
<td></td>
<td>28. Straw berry-flavored Yogurt-250ml</td>
</tr>
<tr>
<td></td>
<td></td>
<td>29. Vanilla-flavored Yogurt-250ml</td>
</tr>
<tr>
<td>Rulindo</td>
<td>Kalisimbi Ghee processors</td>
<td>30. Ghee-500g</td>
</tr>
<tr>
<td>New Products September 2015</td>
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<tr>
<td>-----------------------------</td>
<td></td>
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<tr>
<td><strong>Kicukiro</strong></td>
<td><strong>Inyangi industries</strong></td>
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<td></td>
<td>35. vanilla flavored milk</td>
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<tr>
<td></td>
<td>36. strawberry flavored milk</td>
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<td></td>
<td>37. chocolate flavored milk</td>
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<tr>
<td><strong>Nyanza</strong></td>
<td><strong>Rusatira Dairy Cooperative (RUDACO)</strong></td>
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<tr>
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<td>38. Fermented milk “ikivuguto”</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Rubavu</td>
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<tr>
<td>Kicukiro</td>
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<td>Inyange</td>
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<td>Gicumbi</td>
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<tr>
<td>Gasabo</td>
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<td>Nyanza</td>
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Final Report on Cooperative Business Performance

Background
Rwanda Dairy Competitiveness Program (RDCP II) has been a 5 year USAID funded program implemented by Land O’Lakes International Development since 2012 with the goal to increase the competitiveness of Rwandan dairy products in regional markets. The project was designed to reduce poverty through expanded marketing of quality milk that generates income and employment, and improves nutrition of rural households. RDCP II achieved this by linking existing and new smallholder dairy producers to an expanding market demand driven by improved quality, reduced transaction costs and increased investment along the dairy value chain. In the framework of activity closeout process, Land O’Lakes International Development hired the services of two consultants to carry out an assessment on the current status of cooperatives (milk collection centers) supported by RDCP II in 17 district covered by the program.

Objectives
The main objective of this assignment was to determine the overall status of the cooperatives (Milk Collection Centers) supported by RDCP II in 17 Districts.

The specific objectives were:

- To analyze the cooperatives performance in terms of governance, management and marketing capacity.
- To identify challenges or barriers faced by cooperatives and factors critical for smooth operation and success.
- To examine the effectiveness of the cooperatives role as business services providers.
- To examine the cooperatives' financial strength
- Recommend strategies for sustainable growth of the cooperatives.
- Develop a comprehensive status report

Key Activities
The assignment based on primary data collected during RDCP II implementation for both the business and Ag-Pro program. However, secondary data was also used, to ensure an effective qualitative and quantitative analysis.

An illustrative list of tasks/activities to be undertaken include:

- Review of all data and information collected during RDCP II implementation
- Compile information by category: governance, management, sales, finance, services, etc.
- Identify gaps in available information and propose method / approach of bridging the gaps in available information.
- Organize and complete the soft filing system of data and information
- Conduct information interpretation and present summary data analysis by cooperative, district and milk shed
- Develop a narrative status report
Deliverables
Expected deliverables of the assignment were as follows:

- Inception Report with detailed methodology and data collection plan, work schedule and description of deliverables within 4 days of signing the contract.
- Summary data analysis of cooperatives by district and by milk shed (presented in excel format).
- Summary status of cooperative by district and milk shed using Ag-Pro (PM2 tool) analysis approach (presented in excel format).
- Soft documents of all information on cooperatives classified in folders and files by category of information, by districts and milk shed.
- Draft narrative status report.
- Final Report incorporating feedback from RDCP II management team (electronic copy PDF and word format).
- Organize one day workshop for feedback and learning with Cooperative representatives in line with the proposed assignment.

5. Duration

It was expected that the assignment will be completed within 15 working days from the date of signing the contract.

Methodology to bridge some gaps

- Refer to data available and use the average method to fill in where possible.
- Review of all data and information collected during RDCP II implementation.
- Compile information by category: governance, management, sales, finance, services, etc.
- Organize and complete the soft filing system of data and information.
- Identify gaps in available information and propose method / approach of bridging the gaps in available information.
- Conduct information interpretation and present summary data analysis by cooperative, district and milk shed.
- Develop a narrative status report.

Narrative of the report

a. General overview:
Under the BDS component, RDCP II directly and indirectly supported 83 milk collection centres; 74 owned by dairy cooperatives and 9 managed by individual enterprising personnel (RUDACO, UBUMWE, MAGIRIRANE, HADJI, INDAKEMWA, LIFT UP, KIVU, KARENZI and FATUMA dairies). It is important to note RDPD II started out with 28 cooperative which increased over time to 83 as highlighted here above. As at the close of the project, 48 cooperatives were fully functioning, 11 mid functioning, 15 low functioning and 9 not functioning. Functionality was determined based on number of liters collected and sold and frequency of operation, that is to say cooperatives collecting and selling 500 liters and above per day and operating all days were considered fully functioning, those collecting 200-499 liters were considered mid functioning whereas those collecting and selling 70-199 liters per day were considered low functioning and those collecting 0-69 liters were considered not functioning. Of the supported
cooperatives, 52 of them received direct support under the RDCP II-AgPrO program which specifically focused on improved Leadership and business management practices. Under the AgPrO PROGRAM, it is important to note that some cooperatives were assessed but did not want to adopt; these were dropped, others were not operational or on and off so they did not participate as required. More were assessed but due to a number of other factors such operational level, did not benefit directly and such include Kirebe Kamate, Terimbere Mworzi Mbare, COOPAG, BCRK, BNRT, and Uruhongore Ngoma. Others like Ejo Heza and KOAGIRWE in Bugesera received indirect support of the program. The table below indicates a summary of MCCs supported by milkshed, district as well as functionality:

<table>
<thead>
<tr>
<th>MILK SHED</th>
<th>DISTRICT</th>
<th># of MCCs/ Cooperatives</th>
<th>Fully Functioning</th>
<th>Mid-functioning</th>
<th>Low functioning</th>
<th>Not functioning</th>
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<td><strong>4</strong></td>
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<td>MUSANZE</td>
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<td>3</td>
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<td>0</td>
<td>1</td>
<td>3</td>
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<td></td>
<td><strong>Sub total</strong></td>
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<td><strong>11</strong></td>
<td><strong>5</strong></td>
<td><strong>2</strong></td>
<td><strong>6</strong></td>
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<td>SOUTH</td>
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<td>RUHANGO</td>
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<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td><strong>Sub total</strong></td>
<td><strong>21</strong></td>
<td><strong>15</strong></td>
<td><strong>2</strong></td>
<td><strong>1</strong></td>
<td><strong>3</strong></td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td></td>
<td><strong>83</strong></td>
<td><strong>48</strong></td>
<td><strong>11</strong></td>
<td><strong>15</strong></td>
<td><strong>9</strong></td>
</tr>
</tbody>
</table>

*Source: RDCP II Cooperative directory by district*

Key success factors for cooperatives that performed throughout the project life included but are not limited to; willingness to adopt good leadership and best business management practices and embracing new technologies, market oriented mindsets, good leadership, governance and management within cooperatives/MCCs, strategic location of their business entities, bulking and transportation facilities, availability of milk buyers, adoption of seal of quality standards and the role of the local leadership to mention but a few.
The major contributing factors to these MCCs not functioning can be attributed to poor leadership and management skills, lack of willingness to adopt best practices, milk shortage in dry season, deprived location of MCCs, poor quality of milk to meet processor standards, poor negotiation and lack of marketing skills, lack of transportation means to deliver milk, presence of seasonal and unreliable milk buyers, lack of business drive and not considering the milk business as their primary income generating activity and in some cases MCCs/cooperatives being run by individuals with personal interests and for others not being dairy farmers rendering them less interested in the dairy business and its development.

b. AgPrO program

**PM2 assessment and implementation results**

PM2 is Performance Measurement and Management tool under the AgPrO program. It is a Land O’Lakes M&E tool used to measure change in cooperative management capacities. This tool follows a cycle that starts with measuring (understanding current status and identifying gaps), action planning and management (fixing identified gaps) of gaps based on key priorities of the cooperatives. The AgPrO program benefited 52 cooperatives and 17 SMEs. Details of these cooperatives and SMEs; milk shed, District and names are seen here below:

<table>
<thead>
<tr>
<th>Milkshed</th>
<th>Cooperative/SME</th>
<th>District</th>
<th># Coops</th>
</tr>
</thead>
<tbody>
<tr>
<td>South</td>
<td>1. Terimbere Mworozi w’inka</td>
<td>Kamonyi</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>2. Uruhimbi Rwizihiye Rukoma</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Amizero y’Aaborozi Rugobagoba</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. COOPEKA Kayenzi</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. KOAGIB</td>
<td>Ruhango</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>6. Turengere Aaborozi</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. COOPAGIKI</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. RUZICO</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. Indakemwa Mugandamure</td>
<td>Nyanza</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>10. GIRAMATA MWOROZI Cooperative</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11. GWIZUMUKAMO BUSORO Cooperative</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>12. JYAMBERE MAYAGA Cooperative</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>13. TWIYORORERE KIYAMBERE MUYIRA Cooperative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Region</td>
<td>Cooperative Name</td>
<td>District</td>
<td>Count</td>
</tr>
<tr>
<td>--------</td>
<td>------------------------------------------------------</td>
<td>----------</td>
<td>-------</td>
</tr>
<tr>
<td>North</td>
<td>Agiragiteraka – Kinigi</td>
<td>Musanze</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Koperative Iwacu Zirakamwa – Muhoza</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CTSOR - Rulindo</td>
<td>Rulindo</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>COGAK</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CEMO Nyabihu</td>
<td>Nyabihu</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Bugeshi Tuzikamire Kabumba</td>
<td>Rubavu</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>KOAIBU Urumuri</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cooperative Turwanye Bwaki (CTBK)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cooperative URUHONGORE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>East</td>
<td>Katabagemu Farmers’ cooperative (KAFCO)</td>
<td>Nyagatare</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Abashumbabeza dairy cooperative (ADC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Matimba Tworore Kijyambere (MATWOKI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Muvumba Zirakamwa dairy cooperative (MZDC)</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Rwabiharamba Dairy Farmers Cooperative (RDFC)</td>
<td></td>
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<tr>
<td></td>
<td>Kamate Dairy Marketing Cooperative (KAMDAMACO)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kiziguro Dairy cooperative (KDC)</td>
<td>Gatsibo</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Murambi Dairy Cooperative Society (MUDACOS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rwimbogo Dairy Cooperative (RDC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mubali Farmers’ Cooperative Society (MUFCOS)</td>
<td>Kayonza</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Koperative y’aborozi ba Ndego (COABONDE)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gahini farmer’s cooperative (GAFCO)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dukundamatungo dairy cooperative (CDA)</td>
<td>Rwamagana</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Koperative Kamirabose (KOKA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dukorerigihugu Farmers’ cooperative (DUFACO)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kigali</td>
<td>KOZAMGI</td>
<td>Gicumbi</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>COOPEMOBU</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>KORA Mworozni</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Borozzi Twisungane Kabuga</td>
<td></td>
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<tr>
<td></td>
<td>COOVIGI</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BMCC</td>
<td>Bugesera</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>CODECOL</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>KOINDAMU</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>KOPEZIRU</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>KOAGIRWE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ejo Heza Cooperative</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gasabo Zirakamwa</td>
<td>Gasabo</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td><strong>52</strong></td>
</tr>
</tbody>
</table>
Performance results by capacity for cooperatives supported under the USAID-RDCP II Land O’Lakes, AgPrO program are provided here below- the blue bars indicates the before-baseline and red represents the endline position after intervention:

1. **Leadership Capacity**

Leadership capacity refers to the extent to which the cooperative leaders inspire, prioritize, make decisions, provide directions (strategy), and innovate. It includes the mission; overarching goals, overarching strategy, shared beliefs and values, board composition and commitment, board governance and board involvement and support. It also includes the manager experience and standing, manager organizational leadership / effectiveness, manager analytical and strategic thinking, manager financial judgment, and ability to motivate and mobilize members.

Performance by milkshed and district differed, Gatsibo in the East being number one, followed by Kamonyi, Kayonza, Ruhango, Musanze, Rwamagana, and Nyagatare. In the Eastern Milkshed Leadership improved from 49% to 68% due to a number of factors such as acceptance to adopt best practices. We observe positive change in cooperatives like Rwimbogo (RDC), MUDACOS, MZDC and MATWOKI. In the south cooperatives such as COOPEKA, Terimbere Mworozzi w’Inka, Amizero y’aborozi, Giramata Mworozzi Nyagisoi to mention but a few have improved tremendously.
In the North cooperatives like Agiragitereka Kinigi, KOPIZ, CEMO, CTBK, and KOAIBU Urumuri have improved leadership practices. In the Kigali milkshed, cooperatives like BMCC, CODECOL, KOINDAMU, KOPEZIRU, COOPEMOBU, KORA Mworazi and KOZAMGI performed well in leadership. Cooperatives such as Agiragitereka Kinigi, CODECOL, KOINDAMU, KOPIZ to mention but a few were not functioning due to bad leadership prior to RDCP II. CTBK, Kora Mworazi and KOZAMGI were not functional MCCs, the program helped them to improve leadership and start operating as business. Below is a chart to show performance in leadership capacity by milkshed:

Figure 1: Assessment of Leadership Capacity

<table>
<thead>
<tr>
<th>Milkshed</th>
<th>Leadership Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>East</td>
<td>68%</td>
</tr>
<tr>
<td>South</td>
<td>57%</td>
</tr>
<tr>
<td>North</td>
<td>52%</td>
</tr>
<tr>
<td>Kigali</td>
<td>49%</td>
</tr>
</tbody>
</table>

*Source: Cooperative PM2 assessment results*

## 2. Adaptive Capacity

Adaptive performance capacity refers to the ability of the cooperative to monitor, assess and respond to internal and external changes. It includes the strategic planning; evaluation/ performance measurement; evaluation and organizational learning; partnerships and alliances; members and non-members; and member involvement. It looks at how a cooperative is able to seek own solutions to existing and potential business challenges.

Results from the field indicate that cooperatives in the eastern milk shed take position number one in achieving targets under the adaptive capacity, followed by the South, Kigali then North. These results
can be attributed to a number of factors including the reality that many cooperatives in the east have received a lot of support over a long period of time hence have embraced change. Cooperatives in the South upon realizing that milk business is profitable have injected in much effort to find solutions for their own businesses. Kigali and Northern milk shed have as well improved in the way they previously looked at the milk business and are currently driven by strategizing on identifying best solutions towards business development and growth and ensuring they secure trust from cooperative members. Below is a chart indicating change in adaptive capacity:

Figure 2: Assessment of Adaptive Capacity

Source: Cooperative PM2 assessment results

3. Management Capacity

The management performance refers to the ability of the cooperative to ensure the effective and efficient use of organizational resources. It includes staff background and experience; dependence of staff on the manager; shared goals/performance targets; financial planning and budget; management of financial operations; financing and access to financial services; operational planning; organizational processes; decision-making processes; management of knowledge; recruitment, development and retention management; and recruitment, development and retention of general staff.

For so long, cooperatives have been operating without any guiding principles and reference documents such as books of accounts yet cooperative leadership wasn’t aware of the law No 50/2007 governing cooperatives organization in Rwanda as it is amended today’s provisions which was impending its development and it was difficult for them to assess cooperative past performance; cooperative financial resource’s mismanagement was a daily norm. As a result of the AgPrO support, cooperatives have improved under this component. Cooperatives’ BODs now know their roles and responsibilities and their level of accountability which are contributing positively to changes being implemented and experienced
in their respective cooperatives, budgets are being drawn annually, BODs and supervisory committees are checking records to ensure that all incomes and expenses are documented and follow operational and strategic plan and annual operation plans in their daily operations.

To strengthen their operations and in order to implement proper bookkeeping and filing, some cooperatives like CDA, CTSOR, Rwimbogo- RDC, Fatuma Dairies, Agiragitereka-Kinigi that didn’t have Managers, accountants recruited them within their means. Below is a chart that indicates change in management practices across the 4 milksheds:

Figure 3: Assessment of the Management Capacity

![MANAGEMENT CAPACITY](chart)

**Source:** Cooperative PM2 assessment results

4. Operations Capacity

This capacity refers to cooperative operations, that is to say staffing levels; members and non-members communication strategy; computers, database and management reporting system; building and office spaces; and legal registration status.

To strengthen cooperatives operations, Cooperatives that didn’t have accountants were advised to recruit competent (skilled) ones to support them especially in record keeping and filing and to prepare well documented and files business reports such as the P&L. For those with accountants, they were advised to ensure adherence to human resource policies developed and Rwanda labor law to limit the staff turnover which is costly for the organisation.
Cooperative that recruited new staff include CTSOR, Agiragitereka-Kinigi (After the existing one failed to deliver and resigned). In addition, CTSOR and Agiragitereka-Kinigi recruited milk receptionists and cleaners., CDA recruited a Manager and accountant. The employees are assiting cooperatives in their daily operations ensuring that cooperative activities are run smoothly.

Cooperatives like KOPIZ, CEMO, Agiragitereka-Kinigi, Rwimbogo, CDA, KOZAMGI, KORA Mworozi, COOPEKA, Koaibu-urumuri have upgraded their MCC to meet quality standards as per ministerial order determing collection, transportation and sales of milk in Rwanda. Cooperatives which had inadequate operational premises were advised to speed up the renovations and necessary repairs. Due to technical assistance and field staff’s advise and regular visit to cooperatives, cooperatives hygiene have improved, MCCs are cleaned by recruited cleaners, milk quality procedures are in place and are being applied.

**Member communication strategy:** In the beginning, the communication was not done well for many cooperatives, done through mobile phone and letters for some cooperatives or done on adhoc. Cooperative were advised to improve that aspect and to date, cooperative members receive letters especially to meetings and SMS for updates on payment or any other information by their cooperative leaders.

**Computers, databases & Management reporting:** Through mentorship and coaching; some supported cooperatives bought computers to facilitate them address and improve documentation and filing systems; and reporting. Many of them were legally registered, but cooperatives such as Terimbere Mworozi w’Inka in the south registration documents are still at the district level with hope to get RCA registration very soon. Cooperatives that had computers were assisted with a semi-automated accounting system designed in excel that they are currently using to record milk purchases, sales and expenses (costs incurred) and at the end of the day be able to determine whether their business is making profit or not hence draw informed decisions.

**Building and office space:** Most of the MCCs are operating in buildings subsidized by the government. As such, some these buildings were not kept in good shape at the start of this program. With technical assistance, cooperative boards have been advised to renovate these buildings in order to keep them in good condition as well as compliance with quality. Examples of such cooperatives include Dukundamatungo Kigabiro (CDA), COOPEKA Kayenzi, Rwimbogo (RDC), MATWOKI to mention but a few. MCCs like Mugomero MCC were facilitated to install two hand wash areas (one in front of the toilet and another in the MCC premises to be used by the milk transporters before pouring milk into the cooler). The supported cooperatives migrated from collecting milk using plastic jerrycans to stainless steel milk cans.

**Legal status:** At the beginning of the program, some cooperatives were incorporated but certificates of registration were not yet published in the Official Gazette or the Republic of Rwanda. Such cooperatives included JYAMBERE Mayaga and others whose publication was recently completed and hence, and are now fully recognized hence they can negotiate for a loan among others. The figure below show the trend in operations across the 4 milksheds.
5. Supply, Processing and Marketing

This capacity looks at effective business functions like extension services; input supplies; pasture development; veterinary services; artificial insemination; on-farm trainings in milk hygiene; practices at the milk collection centers; infrastructure development; using installed production capacity; and products marketing.

Through trainings on doing dairy farming as business; the supported cooperatives established demonstration farms near the cooperative premises for two purposes: to conduct animal fodder multiplications and have pasture seeds at the MCC near the cooperative members, as well provide incomes when they are sold.

Over the period, technical assistance encouraged cooperatives to be more involved in farmer extension services and enable them to enjoy the benefits of being cooperative members, facilitate farmers to access inputs by creating a dairy hub model where farmers can access all services needed in order to increase dairy farming income. Veterinary services being paramount and important in dairy farming, it was taken into consideration, on farm training and marketing. Veterinary services have enabled cooperatives to increase milk quality and the MCCs’ milk rejection has decreased considerably. Below is a chart which indicates progress by cooperatives by milkshed under this capacity.
6. Productivity and Financial Performance

This capacity is of key importance and it means measurement of how well the cooperative is doing on a number of productivity and financial indicators. It includes capacity utilization; target milk rejections at the milk collection center; milk rejections from sales; net profit margin; liquidity ratio (current assets/current liabilities); total liabilities/total assets; inventory turnover; and capital structure (equity to total assets).

Before RDCP II Technical Support through AgPro, cooperatives’ reports presented mismatching of figures, poor milk reconciliations that were giving rise to conflict between cooperatives, milk transporters and/ or farmers. The difficulty was to know the improvement needed and where and when it was needed rendering it very difficult to evaluate cooperative past performance for remedial process. To facilitate evaluation and learning, cooperative managers and or accounts and other staff were trained and assisted in proper bookkeeping and accounting systems focusing on improved documentation and recommended filing system’s implementation. As a result, MCC managers/accountants are now able to prepare and maintain all records that portray a true image of cooperatives’ businesses, monthly well documented Profit and Loss account that reflect cooperative’s business status prepared and submitted to BOD which in turn uses them for future planning and decision making.

It can be noted that in the north, there was a drop in this capacity. This is due to the fact that milk supplies to MCCs have been subjected to quality tests hence poor quality milk is not accepted. It is important to note that the trend will increase with the introduction of the ministerial instructions. Specifically, cooperatives were guided on how to record the monthly revenues generated and
expenditures incurred and compute gross profit, the operating and administrative costs, the amount of tax due, the net profit and the amount of money to be retained in the cooperative in the form of statutory reserves and the actual dividends to be given to members. Accountants of these cooperatives were given a standard format of business reporting template and are now using them. Filing and documentation within cooperatives assisted were improved; positive results are observed at Kora Mworzi, Boroziti Twisungane Kabuga, KOINDAMU, COOPEMOBU, KOZAMGI, BMCC, CDA, RDC, MATWOKI, MUDACOS, Amizero y’Abrorizi, COOPEKA, Terimbere Mworozzi w’Inka, RUZICO, Gwizumukamo Busoro, KIDACO, Agiragitereka Kinigi, CEMO and KOPIZ to mention but a few.

This will help them to review business reports, analyze and understand them well before presentation to the general assembly and draw informed decisions for improvement, expansion and investment. As a result/outcome cooperatives’ chairpersons bought books of accounts that are being used in daily cooperative financial and non-financial management thus transparency in cooperative management and reporting.

All supported dairy cooperatives/ SMEs have received mobilizations on increasing milk production/volumes received and sold; reducing milk rejections through improved hygiene; reducing expenses to get high liquidity overcoming cash flow issues; and addressing annual balance sheets-addressing asset constraints of their businesses. They have been coached in environmental compliances and its benefits. 64 MCCs were evaluated for quality and compliance and 20 of them were certified whereas of the 17 SMEs evaluated, 7 were certified for adherence to Ministerial Order N° 001/11.30 of 10/02/2016 regulating the collection, transportation and selling of milk and standards requirements especially the mandatory standards on milk and milk products. Some of the key activities that contributed to their success included but were not limited to consistency in milk volumes collected and sold, improving quality of the milk, engagement with community and value proposition to farmers and market, improving business premises such as tiling with granites in the milk reception area, cooling, and laboratory room; paving of MCC premises, fire extinguishers, investing in staff attire and equipment maintenance, etc.

Following this support, there has been great change in reports which were not done regularly or not done at all but thanks to Land O’ Lakes-RDCPII technical assistance under its BDS component, there is remarkable change in cooperative reporting which has greatly contributed to the acquired and reported program numbers. Below is a chart that indicates trend in performance for this capacity per milkshed.
However, this capacity often constrained by lack of IT equipment such as computers, printers and internet as well as the greed, attitude and personalized business approach that still prevails among some cooperative leaders.

c. Business reports

All available data of the cooperative businesses were well consolidated and compiled for analysis. In annex to this report are results of the analysis and the individual cooperative business reports per year from 2013 to June 2016. We have further indicated the funder for each of the MCCs/cooperatives. It is key to note that farmers/cooperatives are interested in owning the MCC premises so that they can easily renovate and or use these as collateral to acquire financing.

The analysis of business reports has looked at seven (7) key cooperative/MCC business aspects; Milk volumes, spoilage/rejection, price, sales, expenses, profitability and dividends with clear indications of the trend over the years by milkshed, district and MCC/cooperative. Results of the business reports revealed the following:

Milk volumes: Results indicate that milk volumes increased by year. Further to this, milk volumes were high in the Eastern province because there is a quite huge number of MCCs out which 12 are fully functional and the fact that they have had reliable market for all their produce. It is important to note that milk volumes for 2016 are for only 6 months.

Source: Cooperative PM2 assessment results
In addition, the number of MCCs supported increased from 28 to more 74. In some areas of the country such as Kayonza milk volumes dropped due to prolonged dry seasons.

![Milk volume sold](image)

**Figure 7: Business reports from RDCP II supported MCCs/Cooperatives**

**Spoilage/rejection:** Milk rejection increased from 2013 to 2014 because this is when the SoQ implementation took place (fully started) and MCC technicians started testing milk seriously. Also, MCCs acquired knowledge on not accepting poor quality milk. Rejections declined in 2016 because farmers had been trained and acquired best quality skills and knowledge in general hygiene and mastitis control-improved herd management. This is was a very significant indicator that MCCs used through the SoQ kits donated by RDCP II.

![Milk spoilage/Rejection](image)

**Figure 8: Business reports from MCCs/Cooperatives**

**Price:** It was noted that price increases in the dry season. In 2016 we counted 6 first months only. Comparing other years (2013-2015), milk price increased consistently due to increased milk quality and increased consumption as a result of the Shisha Wumva RDCP II program and
market linkages created. Below is a chart indicating the trend in price for purchasing and selling milk at farm level and MCC respectively.

![Milk price variation per year](image)

**Figure 9: Business reports from cooperatives/MCCs**

**Sales:** Milk revenues increased from 2014 due to RDCP II intervention. The intervention included re-opening of closed MCCs such as COTEGI/COGAK and KOINDAMU, opening of new MCCs such as KOAMAZI, increased milk production at farm level, increased milk price, market linkages such as linking CTSOR to Angeanna, Twisungane Kabuga and Kora Mworozwi to Crystal bottlers and introduction of new products into the market, to mention but a few. The chart below shows the trend in sales by milk collection centres.
Expenses: It was noticed that costs deferred based on region/location of MCC. Kigali milk shed make quite huge expenses due to transport costs. In Northern milk shed there is domination of informal milk marketing and most of milk is transported using bicycles. Other costs include electricity, cost of running a generator, cost of maintenance, board fees to mention but a few. Additionally, it was noted that some of the milk collection centre employees are reluctant to record some of the expenses. The figure below indicates expenses/costs incurred by the MCCs.
Figure 11: Business reports from MCCs

**Profitability:** Profitability increased from 2014-2016 due to a number of factors such as the introduction of AgPrO as a means to solve management issues at MCC level as a result of the Mid-term evaluation recommendations. The SoQ program helped to increase milk quality at the MCC level which implied that more volumes passed through the MCC and were sold to the market with minimized rejections by the buyers opposed to how it was before the program. MCC were advised continuously on how to reduce undesired costs for their businesses, identifying market for business financial health and in the long run sustainability. The figure below indicates the trend in business profitability for the MCCs over the period.

![Profitability (Net profit)](image)

Figure 12: Business reports from MCCs

**Dividends:** Because RDCP II understood the fact that cooperatives must create value for their members and that the leadership should reward members at the end of a financial year in form of dividends to
encourage community and members to be happy to belong to such cooperatives, MCCs were advised to calculate dividends and statutory reserves from profit earned. As a result, cooperatives have provided dividends to their members during general assemblies. The graph below indicates that MCCs in Eastern Province stand well in terms of sales and saving for members compared to other milk sheds. This gives hope that farmers are likely to continue operating at MCCs for more business and enjoying economies of scale together thus building trust around their cooperatives.

![Dividend/Statutories](image)

**Figure 13: Business reports from MCCs**

It is worth noting that although dividends in the Kigali milk shed seem low, cooperatives like IAKIB stand out. This cooperative goes a step further to buy health insurance for its members beyond dividends of at least Frw15000 received by each cooperative member at the end of the year.

It is worthwhile important to note that business reports have improved year by year due to continued mentorship and coaching by program staff and collaboration with other development partners such as Send A Cow Rwanda, African Evangelical Enterprise-Rwanda and the proven support from the district and sectors (local leadership) in following up and enforcing good practices at MCCs.

d. **Additional materials**

Documents developed by the business and AgPrO team of STTAs are available and well filed in folders.

**AgPrO stand at the closeout ceremony**

Materials for the AgPrO stand during the closeout event were compiled and presented during the event. These included:

- Screen slides of the AgPrO cycle and some activity pictures
- AgPrO complete module
- PM2 handouts
- PM2 assessment results/charts
- Documents:
  - Strategic plan_BMCC
  - Action plan_Kora Mworzi
Discussions with the M & E Specialist and the Finance Director on Dec 1, 2016 the meeting concluded that the scope of work changes from what it was in the original contract to:

- Compiling available business data and submit those per year
- Complete PM2 analysis and submit report
- Facilitate AgPrO exhibition on Dec 8, 2016

e. Challenges

Leadership: Some cooperatives were slow to embrace change which was mainly attributed to poor leadership, a challenge that was presented to district cooperative officers and other stakeholders for remedial actions.

Governance and management: bad or lack of appropriate management and leadership skills and misunderstanding of the importance of good leadership and management in building a sustainable business. After ascertaining the need for change, the final stage of change management involves monitoring the results from the organizational changes and making appropriate adjustments. However, RDCP II observed a kind of unfavorable behavior, aptitude and perception on the side of some cooperatives/SMEs leaders who prefer to receive in kind grants instead of knowledge.

Resistance to change: Mentoring and coaching cooperatives/SMEs in leadership and management capabilities was supposed to impact and bring change to the cooperatives/SMEs business. Unfortunately some cooperative leaders did not want to change from their usual and traditional ways of doing things.

Frustrating background: The leaders of some cooperatives which were not operating in prior to the program, highlighted that they had been encouraged to form cooperatives by some partners with expectations to receive infrastructure and equipment such as milk coolers, generators, milk cans and milk testing materials which they never delivered. This meant that they did not have a common objective or market constraint they wanted to fix/solve.

Frequency and consistency in the operation of MCCs: Some cooperatives failed to manage their MCCs, this resulted into them contracting private service providers/ individuals to manage these MCCs for them. Unfortunately, these too end up failing to manage the business due to lack of owners and follow up hence closing the MCCs in the middle of operation.

Business Incubation: It was observed that most of the cooperatives were at start up stage. This meant that business coaching therefore needed to be introduced at the beginning of the project and that more time to mentor cooperatives/SMEs into self-reliable business ventures would be of great importance. Especially, when it is worldly known that change is not smoothly embraced.

e. Recommendations

Based on various challenges faced during RDCP II program implementation among others stiff competition from informal markets such as milk bars and kiosks; local vendors; lack of ownership of the MCC businesses, this report recommends to dairy sector partners to:
• Provide or facilitate dairy cooperatives to acquire ICT related hard ware and software to enable them access to information and time management.
• Advocate and support excelling cooperatives to own the subsidized MCC premises and equipment. This will enable them access to financial services for business expansion and investment;
• Enforce the implementation of the ministerial instructions regarding milk collection, transport, processing, and selling; act on informal milk market in order to sustain formal milk business operators including dairy cooperatives/SMEs;
• Continuously mobilize farmers to maximize support provided by different development programs and donors including trainings and technical assistances in order to let the beneficiaries reduce poverty and facilitate donors achieve their targets;
• Engage cooperatives which were not reached during the RDCPII interventions linking them to potential donors;
• Link RDCP II supported cooperatives/SMEs with other development partners to assist them in the implementation of developed strategic plans for at least 2 years;
• For the future projects, start the mentorship for business development and management activities at the starting of the project, putting into perspective that it would be better to give capital assets after ensuring the leadership and management capabilities of beneficiary partners;
• Explore the possibility of supporting cooperatives to conduct quarterly internal (through the cooperative audit committee) and annual external audits for improved business operations and growth of dairy cooperatives;
• Examine the possibility to send written feedback to partners regarding non-successful grant applications submitted to the program;
• Help the dairy actors to make operational the cooperatives apex bodies such as unions: this could help solve market constraints experienced by some cooperatives;
• Develop a special plan/strategy to help closed MCCs to re-open.
CASE STUDIES ON FACILITATING SYSTEMIC CHANGE

A SYNTHESIS OF CASES FROM GHANA, SENEGAL, ZAMBIA, AND RWANDA

LEO REPORT NO. 49

OCTOBER 2016
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ACRONYMS & ABBREVIATIONS

ABS Agro Business Services (See under “Ghana”)
ABS African Breeders Services (See under “Rwanda”)
ADVANCE Agricultural Development and Value Chain Enhancement project
AGDP Agricultural Gross Domestic Product
ANCAR National Agency for Rural and Agricultural Advisory Services
                     (Agence National Conseil Agricole et Rural)
BRB Bonzali Rural Bank
CAD Community agrodealers
CIRIZ Interprofessional Rice Committee in Senegal
                     (Comité Interprofessionnel du Riz au Sénégal)
CNAAS National Agricultural Insurance Company for Senegal
                     (Compagnie nationale d’assurance agricole du Sénégal)
CNCAS National Fund for Agricultural Development of Senegal
                     (Caisse Nationale de Crédit Agricole du Sénégal)
COMESA Common Market for Eastern and Southern Africa
DCA Development Credit Authority
DFID United Kingdom Department for International Development
DRDR Regional Directorate of Agriculture (Direction Régionales de Développement Rural)
ECOWAS/CEDAGO Economic Community of West African States/ Communauté économique des États de l’Afrique de
                     l’Ouest
EDPRS Economic Development and Poverty Reduction Strategy
FI Financial institutions
FPA Fédération des Perimètres Autogères
GAP Good Agricultural Practices
GGC Ghana Grains Council
GHC Ghanaian Cedi
GNI Gross National Income
GoR Government of Rwanda
GoS Government of Senegal
Ha Hectare
HACCP Hazard Analysis Critical Control Point
ISRA National Institute for Agricultural Research of Senegal
                     (Institut Sénégalais de Recherches Agricoles)
JTI Japanese Tobacco International
Kcal Kilo calories
LOL Land O’Lakes
MDG Millennium Development Goal
MSA MarketShare Associates
MT Metric tons
NGO Non-governmental organization
OB Outgrower business
OG Outgrower
PC Producer company
PCE Economic Growth Project (Projet Croissance Economique)
PFL Premium Foods Ltd.
PPP Public-Private Partnerships
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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| PRACAS  | Accelerated Program for Agriculture in Senegal  
          (Programme de relance et d’accélération de la cadence de l’agriculture au Sénégal)  |
| PROFIT+ | Production, Finance, and Improved Technology Plus |
| RALIS   | Rwanda Agriculture and Livestock Inspection Services |
| RDCP    | Rwanda Dairy Competitiveness Program |
| RND     | Rwanda National Diary |
| SAED    | National Society of Land Management of the Senegal Delta and River Valley  
          (Société nationale d'Aménagement des Terres du Delta et de la Vallée du Fleuve Sénégal)  |
| SAT     | Sinapi Aba Trust |
| SH      | Smallholder farmers |
| SWT     | Strength of weak ties |
| USAID   | United States Agency for International Development |
ACKNOWLEDGEMENTS

The authors wish to thank the LEO COR at USAID, Kristin O’Planick, for her support of, and patience for, this study. Key feedback was also received from a variety of USAID staff in the Bureau for Food Security, with the valuable assistance of Susan Pologruto and championing of Meredith Soule. This study is part of a series of studies on systemic change, a topic which provides a significant leap forward in our understanding of how market systems anticipate, respond, and adapt to change. We further thank Anna Garloch, the Program Manager of the LEO project for her support and multiple edits.

We acknowledge with gratitude the cooperation of the staff and management of the four projects included in these case studies. Despite multiple iterations of questions and clarifications, all four Feed the Future implementation teams remained patient and helpful. Even greater appreciation goes to the multiple value chain actors and service providers, for their cooperation was entirely voluntary and they are not compensated for the many hours they spend speaking to consultants. Through multiple clarifications, there is always a possibility of errors. These are entirely the responsibility of the author.

Finally, we wish to acknowledge the contributions of Sally Oh, and William Vu, of the LEO project. They ensured that the researchers got where they needed to go when they needed to be there and made a rather rough document appear as clean as the one we hope you will enjoy reading.
EXECUTIVE SUMMARY

Feed the Future (FTF) is facilitating changes in core agricultural systems that contributes to more sustainable and scalable development objectives. This report summarizes the findings from research into four FTF projects, selected as illustrations of observable systemic change. The four projects are:

- **FTF Senegal Naatal Mbay**, which has introduced various alterations to the prevailing model for contract farming of paddy rice, including a price discovery process that reduced uncertainty that in turn unleashed widespread investment by financial institutions and processors into the more beneficial contract farming system, as well as an increase and improvement in the services to value chain actors, particularly agricultural machinery leasing.

- **FTF Zambia Production, Finance, and Improved Technology (PROFIT) Plus**, which is in the early stages of introducing changes in the structure of the rural input supply system through new aggregation models and agents, improving smallholder access to input and extension services. Interestingly, this has taken place in the context of two years of heavy drought, shifting behaviors from those that are revenue maximizing to those that are risk mitigating and resilience maximizing.

- **FTF Rwanda Dairy Competitiveness Program (RDCP) II**, which has introduced quality grades and standards into the dairy industry both through support for more formal policy-level changes as well as through firm-led behaviors and models that incentivize and reward for quality. Like Zambia, these changes are early in the systemic change process, but there are strong indications of imitation by other lead processors, independent replication, and that these behaviors and practices are beginning to become institutionalized and a ‘new normal’.

- **FTF Ghana Agricultural Development and Value Chain Enhancement (ADVANCE) II**, which has supported the emergence of a relatively new actor in commodity value chains, the outgrower business; this is changing the network structure of input and output systems in the target areas, increasing smallholder access to quality inputs, financing, and output markets.

The cases describe projects in four unique enabling business environments, with each systemic change in various stages of maturity. These cases also span a number of value chains: Zambia Profit + and Ghana ADVANCE II focus on maize; Senegal Naatal Mbay focuses on paddy rice, and Rwanda RDCP II focuses on dairy, with a particular focus on the urban market.

**What is Systemic Change?**

Conceptualizing and defining systemic change is an evolving, fertile space in development. As discussed in Section I.B, there is no agreement within the market systems development field about how to neatly define systemic change. There is, however, a common emphasis on changes in the underlying structural elements of a system. These may include institutions, policies, behavioral norms, networks, and perceptions. In commissioning these case studies, USAID targeted projects they believed had facilitated changes at the structural level, and the researchers then utilized qualitative methods (e.g. focus groups, key informant interviews, document review) to assess those changes - supplemented with available project monitoring data when possible - organized around two categories of indicators: buy-in and imitation. These categories, presented below, draw from the 2014 literature review on *Evaluating Systems and Systemic Change for Inclusive Market Development*, produced by LEO:

1. **Buy-in indicators**, which measure the degree to which market actors have taken ownership over the new business models, technologies, practices and behavior changes that were introduced and/or supported by the intervention. Some examples of buy-in indicators include the following:
   - Adaptation or innovation to the original, program-sponsored model(s)
   - Continued, independent investment after program sponsorship ends

---

1 “Buy-in” refers to much more than a mental assent or philosophical agreement with project-promoted models, technologies or behaviors. It signifies evidence of ownership through significant investment of financial capital, other resources, time, and reputation.
• Repeat behavior
• Satisfaction with program-facilitated changes

2. Imitation indicators, which measure the scale or breadth of program-supported behavior change within a system. There are two prominent examples of imitation indicators:
   • Crowding-in by other businesses that imitate program-sponsored business models originally adopted and demonstrated by businesses that cooperate with the implementer
   • Copying, mentioned less often than crowding-in, refers to imitation at the target beneficiary level by market actors (firms, farms, households or individuals) that imitate the new practices originally adopted and demonstrated by the target beneficiaries of the intervention.

Each case study explores the identified systemic change through these two lenses – buy-in and imitation. These two key domains of indicators have recently been expanded upon as LEO and others have further articulated elements of systemic change. This includes a greater focus on network and institutional structure, emergent patterns, and sensing changes at both the individual agent (e.g. single farmer, single firm, etc) and collective levels. Importantly, no project operated entirely outside the realm of subsidies – with some relying more or less on them, to support different elements, and at different stages of the process. This is an area that deserves more attention in future studies, and as noted elsewhere in the report, supports ex-post assessments to better validate the sustainability of changes after projects end.

Why Focus on Systemic Change?

The concept of systemic change is gaining increasing attention in donor-funded market development projects - and understandably so. Market development projects often involve investments of scarce donor resources in actors who are not part of the intended beneficiary group in order to make systems in which large numbers of the poor participate work better, and work better in ways which allow the poor to benefit. It is a legitimate and compelling question to ask: how can we be sure that investing in getting actors within a system to do things, or organize themselves differently than they have until now, in order to achieve inclusive growth actually achieves these expectations? How can we be sure that inclusive growth will continue after the program is over? Simply put, donors are interested in systemic change because of their interest in enhancing the scalability and sustainability of development outcomes. In recent years, across USAID, systemic change has gained increasing attention: in 2014 the Agency released Local Systems: A Framework for Supporting Sustained Development, which explored the logic behind linking systemic change to enhanced development outcomes and outlined ten principles for engaging in local systems.

The urgency of the scalability and sustainability goals in some ways has put the determination of whether systemic change has occurred, ahead of the question, what is systemic change and how does one make sure that it happens. This report is an initial effort to respond to both questions by looking forward at four cases and backwards at a body of literature to support a theory of change.

In the growing literature on innovation and systemic change there are two distinct paths. The first begins with the introduction of a new way of doing or organizing things - an innovation - and asks how and with whom should this innovation be introduced and how and when can we determine that the introduced innovation becomes systemic, i.e. when forces adopting change outweigh forces opposing it. All the case studies fall into this category.

---

The second, called systems thinking, looks at how the process of change becomes systemic, i.e. how are new ideas, norms, and processes, drawn in by members of a network to disrupt a status quo in order to achieve greater growth and more inclusive growth. In systemic thought, issues including feedback loops, customer and SME churn (i.e. attrition) rates, flow rates (information and finance), alignment of these factors across levels (micro, meso, macro), etc. all come in.

Systems thinking, however important is not a focus of this report. This report focuses on the first set of questions - how an innovation in rules, norms, and or processes is introduced, what factors affect the rate of adoption of the innovation, and how can one determine when the innovation has acquired its own momentum or the point where forces within a system in favor of an innovation have become stronger than the forces supporting the status quo.

Each project case study (see Sections III A-D) focuses on a particular intervention that project management and the respective USAID mission believed represented the best illustration of systemic change among multiple interventions and multiple projects. Together they illustrate elements of the theory of change elaborated later in this report.

Each project introduced an innovation that disrupted a status quo in a set of processes, norms and or relationships – such as in Senegal, where the innovation involved revamping the prevailing model of contract farming in paddy rice. Each worked through actors within a system or network. These included actors within their respective value chains but also included a range of firms that provide services to, or markets for, those value chain actors. Each involved the introduction of an ‘innovation’ across rather than within a group, bridging groups across different functions in the value chain. Each described factors that either accelerated or slowed down the transfer of the innovation from one group to another – such as in Zambia, where the presence of a drought influenced the take-up of localized agro-dealer agents and community agro-dealer-run companies. In RDCP II in Rwanda, the ‘innovation’ was a policy, and reminds us of how quickly the status quo can change when policy changes or policy constraints are lifted. In Ghana, ADVANCE II had such an active level of copying and crowding in by actors who were not directly supported by the project that it suggests that the particular innovation - a change in the nature of the relationship between smallholders and middlemen - had likely reached the point where the forces supporting change had outweighed the advocates of the status quo.

The presence of all of the elements that enable an innovation to become systemic (such as disrupting the status quo in a set of processes, norms, relationships; working through local actors; introducing an innovation that bridges groups, etc) does not ensure that the change has become systemic. The authors of the four case studies, therefore, also looked for evidence that each of the four interventions demonstrated one or more steps in the process of change becoming systemic, as evidenced by the level of ‘buy-in’ by project stakeholders. These steps, while difficult to quantify, represent the sequence from introduction of an innovation to evidence of broad use and adaptation of the innovation - evidence that it had become systemic.

**Table 1.**

<table>
<thead>
<tr>
<th>Evidence of Buy-in</th>
<th>Naatal Mbay</th>
<th>ADVANCE II</th>
<th>PROFIT +</th>
<th>RCDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Continued use</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Adaptation of the model</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Further Investments</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Replication</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

As elaborated more fully in Section III, all four cases illustrate evidence of customer satisfaction and continued use by its intended clients (which is context specific, but includes farmers, processors, SMEs, etc). Naatal Mbay in Senegal demonstrated all the steps except for evidence of adaptation of the model. This is not surprising because in this case, the innovation was

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4 Throughout this document, “project” is used in the generic sense to refer to donor-funded activities, rather than the USAID-specific definition of this word.
buy-in by multiple actors into a common price discovery process; adaptation would mean non-acceptance of the innovation. ADVANCE II showed strong evidence of all steps in the process including broad replication of at least parts of the upgraded relationship between aggregators as service providers and smallholder farmers. RCDP II did not evidence adaptation either and for the same reason. The innovation - the introduction of dairy standards - could only be adopted. Adaptation to the standards would have meant rejection of them; however, businesses up and down the value chain did have to adapt their business models and practices in order to respond to these emerging quality norms.

In Zambia, PROFIT + is a unique case that illustrates several of the key stages towards systemic change, with wide adaptation of the model. It also illustrates the role of the external environment in the rate of adoption of an innovation. In the PROFIT+ case, two seasons of severe drought led participating stakeholders to make use of the innovation, in this case the placement of community level agro-dealers (CADs), but not as the project had initially intended. Instead of sourcing high cost, high yielding seed, fertilizer and crop protection inputs for their maize plots consistent with the vision of the project, smallholders used the CADs to source vegetable seeds and inputs for small livestock rearing. Initial analysis suggested that farmers able to access a range of inputs from retailers in their own village were demonstrating greater resilience to the drought conditions by diversifying their activities and avoiding the financial risk associated with high yielding maize seed, favoring recycling of their old seed instead.
I. BACKGROUND

Feed the Future (FTF) has made significant progress in providing technologies, market opportunities, and nutritional approaches to large numbers of rural people in FTF focus countries. However, FTF has a greater ambition than developing good service delivery models. USAID’s interventions are often designed to facilitate the creation of new market opportunities, farmer-market linkages, or channels for seed and fertilizer delivery, that—if successful—are “self-replicating” with no additional implied financial burden on either donor or host government. These “self-replicating” changes occur largely by identifying and facilitating new opportunities in which for-profit actors—whether traditional traders, or seed suppliers, or nucleus farm owners—are facilitated in taking advantage of new market opportunities that increase their own profits by opening up new opportunities for poor rural people. The motivation for the case studies, therefore, is to dig deeper than simple FTF results reporting, and identify, describe, and analyze strong case studies of FTF value chain programming significantly contributing to systemic change.

A. Objectives of the Study

The objective of this study was to support USAID’s Bureau for Food Security (BFS) to (i) identify countries or regions where USAID has been instrumental in promoting systemic change; (ii) document in case studies the importance and if possible the impact of that systemic change; (iii) document in the same case studies factors and processes that led to systemic change; (iv) based on these case studies, suggest implications for future programming, including possible metrics for measuring systemic change; and (v) prepare short (one page or less) “success story” versions of each case study that both identifies the systemic change and its impact and—by telling the story of one or more poor rural people who have benefitted—puts a human face on articulating the “systemic change” approach of FTF.

The metrics element of the fourth objective was subsequently addressed more thoroughly in two companion LEO publications: Guidelines for Monitoring, Evaluation, and Learning in Market Systems Development and Disrupting System Dynamics: A Framework for Understanding Systemic Change. As such, it was not an explicit focus of these case studies.

B. Methodology

The four projects profiled in this report were identified by USAID and recommended to LEO to include in this study. Following this, the research team then collected and reviewed relevant project documents (e.g. annual performance reports, work plans, results reports, etc), had discussions with project management, technical staff, and associated USAID contacts, and then prepared for field research, which generally took place between May and August 2016, lasting 1-2 weeks in country.

Field research for each of the four cases involved interviews with the key actors to identify indications of buy-in and imitation, as well as focus group discussions with key beneficiary groups to ascertain change in resilience (approximated through diversification of crops) and welfare from adopting innovations and forming new relationships. Post-field work, these case studies and the overarching synthesis were then drafted. A webinar was hosted on September 8, 2016 to preview key findings and solicit feedback from the general practitioner community.

Identifying and Measuring Systemic Change

As discussed in “Evaluating Systems and Systemic Change for Inclusive Market Development” (Dunn and Fowler, 2014) published by USAID through the LEO project, there is no agreement about how to define systemic change. Definitions include:

5 Both reports are available at www.microlinks.org/leo.
“Shifts in patterns (similarities and differences) of system relationships, boundaries, focus, timing, events and behaviors over time and space.” (Parsons and Hargreaves, 2009)

“Transformations in the structure or dynamics of a system that leads to impacts on large numbers of people, either in their material conditions or in their behavior.” (Osorio-Cortes and Jenal, 2013)

“Change in the underlying causes of market system performance – typically in the rules and supporting functions – that can bring about more effective, sustainable and inclusive functioning of the market system.” (DFID and SDC, 2008)

“Systems are groups of agents that interact with each other, producing emergent patterns of collective behavior. They are dynamic – constantly changing – as agents are constantly acting, producing emergent patterns that in turn influence individual behaviors in a never-ending feedback loop. Because systems are constantly changing, “systemic change” refers to the diversion of a system down a new evolutionary path, not the introduction of movement where there was none previously (there is always movement). We can observe indications that systems are changing at two levels: behavior changes and characteristics of individual agents (e.g. people, businesses, other market actors); and collective shifts in interactions between individual agents. Systems are constantly changing in both positive and negative ways. For the purposes of market systems development, positive systemic changes result in more sustainable, inclusive benefits to agents in the system.” (MarketShare Associates, 2016).

These and other definitions of systemic change emphasize the need to change the underlying structural elements of a system. These may include institutions, policies, behavioral norms, and perceptions. The Donor Committee for Enterprise Development (DCED, 2014) further identifies three characteristics of systemic change: scale (“Systemic changes influence and benefit a large number of people who were not directly involved in the original intervention”), sustainability (“Systemic changes continue past the end of the programme, without further external assistance”) and resilience (“Market players can adapt models and institutions to continue delivering pro-poor growth as the market and external environment changes”).

In addition, this report posits that a social or economic system in which systemic change has taken place should be fundamentally different as a result of the change, i.e. transformative. While systemic change can be positive, neutral, or negative, at least for some of the actors in the system, development practitioners aim for these observed changes to contribute to positive development outcomes, manifesting in the increased resilience and or welfare of individuals and communities. Finally, systemic change is inherently disruptive. In order for change to become systemic, it must ‘disrupt’ a status quo whether in the relationships, rules, processes, technologies, network, norms and or behaviors of actors within a system to the point where the forces favoring a change exceed those seeking to maintain it. These two particular characteristics are explored further in the next section.

In conducting these case studies and profiling examples of systemic change, these various unifying elements of systemic change were incorporated. In capturing indications of change, as presented above, this research focused on those presented in Fowler and Dunn, 2014: buy-in, and imitation.

**II. SPOTLIGHT ON INNOVATION: A THEORY OF CHANGE FOR SYSTEMIC CHANGE**

Building on the findings from the four case studies, as well of the broader body of literature on the topic of systemic change, this paper posits the following theory as it relates to how systemic changes occur:

*Innovations introduced within a system become self-replicating and capable of disrupting a status quo without further external force, ergo systemic, through the transfer of an innovation between groups characterized by weak ties between them. Innovations are spread across ‘bridges’ from actors with prior knowledge of a new process, practice, technology or behavior, however recently acquired, to actors who would benefit from adopting it.*
rate of adoption of innovations is determined by characteristics of the individuals forming the bridge, social norms and customs, and environmental (physical, climate, and business enabling) factors. Members of a group or network may replicate and adapt innovations without external support once said innovation is adopted by 16-20%7 of their members.

In reviewing the literature on systemic change, innovation diffusion and the review of the four case studies included in this paper, the authors formulated a theory of change that should guide the design and implementation of any projects leveraging the power of private sector actors to disseminate innovations on a sustainable and systemic basis.

A social or economic system in which systemic change has taken place should be fundamentally different as a result of the change. While change can be positive or negative, innovations in rules, norms networks, or processes in order to achieve donor identified objectives, should result the greater resilience and or welfare of individuals and communities affected by this change. Thus as stated above, in order for change to become systemic, it often will ‘disrupt’ a status quo. In many cases, change becomes systemic when the factors supporting a new evolutionary path overcome the factors supporting the status quo. While never neutral, because the end game must be significantly different from the status quo ante, it can be good or bad for some participants in a system. Importantly, systemic change can occur with or without an external intervention.

Much of the literature around systemic change in market development begins its analysis phase after the introduction of an innovation. Yet, as a complement, a comprehensive theory of change must begin sooner in the change process and identify where the end is of any need for continued subsidy or support to accelerate and render systemic a desired change.

While systemic change can be positive or negative, depending on the power within a system to protect or overturn an inefficient status quo, innovation, at least in this context, refers to change that results in higher economic and social benefits and is therefore a positive force. Part of the systemic change challenge is that innovation begins with an agent from within or outside a system, with the motivation to disrupt a status quo in norms/rules, networks, product, information or service flows, and ends with a large enough mass of actors adopting an innovation to ensure that forces favoring the new condition have surpassed forces invested in maintaining the status quo. A compelling theory of change must begin with the conditions that cause an agent or agents to disrupt the status quo, a method for the identification of those individuals and their motivation, the mechanism by which innovations are spread, and ultimately, a determination of the tipping point beyond which the forces of change have surpassed those favoring the status quo. It is at this last point that subsidy or support is no longer required, at least for a particular innovation.

This TOC therefore, needs to answer several questions. It must be able to explain most if not all cases of introduced innovation becoming systemic for objectives from resilience to economic growth and across multiple environments. It must address how in the process of becoming systemic, it acquires momentum and becomes self-replicating. At the very least the TOC8 must answer the following questions:

1. How do we identify system actors motivated to disrupt the status quo by innovating within a system?
2. How is the innovation spread beyond the innovator to adopters?
3. What are the factors that affect the rate at which innovation occurs and the rate at which said innovation is taken up by other actors?

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7 This hypothesis is based on assumptions from innovation diffusion theory (Rogers, 1962), which posits that once the innovators, the early adopters, and the early majority of a cohort, change their behavior, the remainder of the set of the early and late majority will observe and adopt the new behavior of their own volition.

8 A distinction should be made between a theory for how change occurs, which the synthesis of these studies is attempting to do, and a theory of how a change process is integrated into networks. The latter is much more dynamic but outside the scope of this report.
4. How do we measure progress from the introduction of an innovation to the point at which the introduced change becomes systemic? What are the observable steps in the adoption and replication process, and;

5. How long will it take and what percentage of a population do we have to reach before an innovation has become systemic and we can move on to the next thing?2

Elements of this process have been identified and integrated in previous LEO materials, notably the concepts of leverage and momentum, comfort and learning zones and the diffusion theory bell curve3. Our TOC will draw from a literature review on both systemic change and on the introduction and diffusion of innovation. The remainder of this section provides a theoretical foundation for each of the above questions.

1. How do we identify system actors motivated to disrupt the status quo by innovating within a system?

Market facilitation approaches often emphasize tactics that enable buyers and sellers to learn to cooperate more effectively10. But who among the potential large set of vertically linked firms is likely to introduce or be receptive to introduced innovation? Mark Grannovetter in his seminal work the Strength of Weak Ties11 and the Strength of Weak Ties: A Network Theory Revisited12 describes the innovator in a system as "the innovativeness of [actors] is shackled by vested intellectual interests (or perspectives) then new ideas must emanate from the margins of the network."

Otherwise stated, membership in groups (such as an association of traders, processors, input companies or farmers) tends to stifle innovation, maintaining an internal status quo. This is one reason that donor-funded entities so often introduce innovation, as they are external to any networks within the market system. But external introduction of innovation is a one-off activity. The implication for a development partner is that innovation must be introduced through an actor who is somehow marginal to the group in which they participate. An actor, whether a miller, an input supplier, or a wholesaler, becomes marginal to a group or network when she/he faces incentives to overcome a status quo situation. She/he might be trying to capture market share from other members of her/his group, be a member of a different ethnic group than others, have a different educational level or other factors that predispose her/him to overcome a status quo condition. With some exceptions, the actor in a group with the greatest market share will be less inclined to innovate; their investment in the status quo has worked well for them so far.

2. How are innovations spread beyond the innovator to adopters?

Once the challenge of selecting a firm or firms with the incentives to introduce an innovation, the systemic change program must identify to whom a particular technology should be introduced. Many programs continue to try and train as close to 100% of a targeted population as possible for social equity reasons. This approach tends to be costly, and less effective than those that target assistance to individuals most likely to adopt a particular technology and disseminate that technology within her or his group. Here the notion of bridges as described by Grannovetter is important13. Bridges are weak ties between members of two unlike groups, one who has access to information and or technologies of value to the other and the incentives to disseminate; the second, who is more disposed than other members of her or his group to test, and if successful, adopt the new technology (see figure 1). In the context of the four cases in this paper the holder of innovation could be a processor, an input or veterinary services provider, a lead firm, or nucleus farmer or outgrower business. In some instances, an individual can serve as a bridge between two groups. The outgrower businesses (OB) in the ADVANCE II project are an illustration of this.

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10 For more on the facilitation approach, see www.microlinks.org/sood-practice-center/value-chain-wiki/facilitation. LEO has also produced a number of program-focused learning tools that build capacity in staff to apply the facilitation approach and specific intervention tactics. See www.micro-links.org/library/market-systems-development-cartoon-based-learning-tools.
13 Idem
To effectively use limited resources, the firm introducing change must identify whom in a receiving group is most inclined to adopt and if successful, disseminate within her/his own group. Here diffusion theory is helpful. Diffusion theory posits that within any group or network, members of the group respond to, and adopt innovations differently. Members can be classified as innovators, early adopters, early and late majorities and laggards. Surprisingly the distribution of a population around these types is remarkably consistent across types of networks, culture, age, etc. Innovation diffusion theory\textsuperscript{14} states that approximately 2.5% of any population are predisposed to innovate (e.g. try new technologies, before they have observed the results). Innovation diffusion theory suggests that a program can be more effective when it identifies the innovators with from within a network, introduces a new, or bolsters an existing, innovation, and supports innovators in disseminating (e.g. ‘diffusing’) this innovation to other members of her/his network. The community agro-dealers (CAD) in the Zambia PROFIT+ project illustrate this, but so does any bridge between a private actor who has successfully identified the innovators with in any group to which she/he wishes to introduce a technology. Innovators within a group are not difficult to identify because most of the members of a group or network already know who they are. Market system development programs aiming to facilitate systemic change should take care to ensure that members of the group identify the innovators and that they function as one side of the technology transfer bridge; this can both save resources and accelerate the diffusion to the larger group.

3. What are the factors that affect the rate at which innovation occurs and the rate at which said innovation is taken up by other actors?

Each of the four cases in this study illustrate key elements of systemic change. Each however varies by the level and rate of copying and crowding in by actors not directly supported by the particular project. We assume that the rate of adoption of innovations, and importantly for systemic change, the rate of imitation and crowding in by other actors, will vary from case to case. But why? And are there ways to change, i.e. accelerate change within a system?

Rogers (1995) developed a model for the adoption of innovation within a system that illustrates the variables in this process (see figure 2). These include individuals, social systems and perceptions about a particular innovation. All four projects in this study intervene at the individual level using strategic subsidies, cost sharing grants, as well as heightened recognition and activities to elevate her/his status from adoption, to positively affect the individual’s (innovator) uptake of innovation. Likewise, programs use demonstrations to increase an individual’s perception of an innovation; demonstration plots and field days are a common mechanism to achieve this. An additional factor, not included in Roger's framework but important in a developing economic context and illustrated in the four cases in this study are environmental factors. Included in environmental factors are the physical, political, economic, and climate.

Each of the four cases provides strong evidence of systemic change each was affected by, or importantly, had an effect upon, the environment. The Rwanda dairy case is an illustration of how the introduction of standards resulted in an industry policy change that in turn affected the adoption of standards across the whole industry. The Zambia case illustrates how in the face of persistent drought the rate of innovation adoption is slowed, even while strengthening the resilience of current adopters; in the absence of drought conditions, Zambia might be expected to demonstrate a higher level of adoption, imitation and crowding in. Ghana and Senegal experience relatively normal rainfall patterns; both countries suffer from an absence of a robust private sector seed market and low levels of high quality seed use\textsuperscript{15}. Yet the rate of imitation and crowding in by multiple private sector actors in Ghana seems significantly higher than in Senegal. Since imitation concerns actors not directly targeted by the project, this difference cannot be attributed to differences in management or implementation. Imitation behavior by actors not directly supported by the project are exogenous to differences in management. The causes of this difference are beyond the scope of these studies to determine; one hypothesis is that the difference is due to the business enabling environment. A quick comparison of the World Bank’s Doing Business indicators (see table 2) shows much lower ranks for the Rwanda and Zambia, but also shows a 20-point difference in Ghana’s favor over Senegal; lower scores reflect more ease in doing business.

Innovation diffusion theory is useful at identifying where a project can intervene to accelerate the adoption of innovation as well as understanding factors outside of the project’s control that will affect the rate of adoption and dissemination of a particular innovation. Weaknesses of the model, however, are in its failure to describe what happens when innovations are not taken up and how to mitigate this. Figure 3 below lays out empirically observable steps in the innovation acceptance and diffusion process.

\begin{table}[h]
\centering
\begin{tabular}{|l|c|}
\hline
\textbf{Country} & \textbf{Ease of Doing Business Rank} \\
\hline
Rwanda & 62 \\
Zambia & 97 \\
Ghana & 114 \\
Senegal & 153 \\
\hline
\end{tabular}
\caption{Ease of Doing Business}
\end{table}

\textsuperscript{15} The Senegal Naatal Mbay project is implementing a seed multiplication activity but it is too early to assess the effectiveness of this intervention at lifting the seed availability constraint for large numbers of farmers.
4. How do we measure progress from the introduction of an innovation to the point at which the introduced change becomes systemic? What are the observable steps in the adoption and replication process?

Figure 3 lays out a five step process to assess progress towards buy-in, which is one key indication of systemic change. These steps can be built into a program’s internal M&E system, permitting users to monitor progress towards buy-in as it is taking place. Progress towards and beyond each of the five steps can be monitored using qualitative data collection techniques. If weak ties bridges identified above reject an innovation or there is no evidence that the network or group is investing in the innovation, project staff can dig deeper to understand why and to modify implementation strategy based on what they find when they dig.

5. How long will it take and what percentage of a population do we have to reach before an innovation has become systemic and we can move on to the next thing?

Figure 4 below and basic calculus would suggest that the ‘tipping point’ occurs where the slope of the blue curve changes from concave to convex to its origin - or when the early majority begins to replicate the behaviors of the early adopters. If this is indeed the case, the targeted results of many market systems development programs in terms of outreach are excessive – in other words, projects only need to aspire to outreach targets that approximate the ‘tipping point’, not canvas the entire population. There are also numerous factors that break ties between one subpopulation and another; this phenomena, if established would warrant interventions in which the tipping point was achieved within two or more subpopulations, with the expectation that the status quo was overcome and the desired change would continue to spread. Empirical, post-project research is needed before this theoretical tipping point can be confirmed in the field.
Rogers\textsuperscript{16} diffusion of innovations graph illustrates Malcolm Gladwell's tipping point notion. Once innovators and all the early adopters have tried, adapted and replicated a new innovation for their own benefit, other members of their group or network will follow suit, so long as the resources required to adopt a given innovation are still available. This is what Malcolm Gladwell refers to as the 'tipping point.’ Beyond this point, if members of the early majority have the same access to the bundle of services that the innovators and early adopters had, they should, in principle, go out and invest in the same innovation. This of course assumes that actors who are part of the early majority can access that bundle of goods and or services under the same terms and conditions. This point of inflection in the adjoining figure occurs after when approximately all early adopters (i.e., 16-18% of a population) have adopted and are replicating a particular innovation.

From a development resource management perspective, beyond this point, funds invested to ensure wide adoption of a particular change within a particular environment may not be necessary. This needs to be tested empirically of course. An exception to this hypothesis is if the ties between subgroups of a population lack bridges (see above). This can occur among groups in conflict or severe isolation from one another.

This appears to be supported by the uptake of improved seed by farmers. Figure 5 illustrates uptake of improved seed by farmers in a number of Sub-Saharan countries. In this graph, use of improved seed by country shows a significant cluster at or below 20% and use of private proprietary seed far lower. Three countries, however, Senegal, Kenya, and South Africa, have uptake of improved seed at or above 50%. There are many variables in play in this graph but in West African markets, use of improved seed barely reaches 5%, and seed markets flounder; in most of the COMESA countries, hybrid seed use has surpassed 20% and these markets are growing, mostly without external subsidy.

\textbf{Figure 5: Improved Seed Uptake in Sub Saharan Africa}

From this theoretical foundation and an evaluation of the four cases we can hypothesize a Theory of Change for Systemic Change as:

\emph{Innovations introduced within a system become self-replicating and capable of disrupting a status quo without further external force, ergo systemic, through the transfer of an innovation between groups characterized by weak ties between them. Innovations are spread across ‘bridges’ from actors \cite{Ibid}}
with prior knowledge of a new process, practice, technology or behavior, however recently acquired, to actors who would benefit from adopting it. The rate of adoption of innovations is determined by characteristics of the individuals forming the bridge, social norms and customs, and environmental (physical, climate, and business enabling) factors. Members of a group or network may replicate and adapt innovations without external support once said innovation is adopted by 16-20%\(^\text{17}\) of their members.

\(^{17}\) This 16%-20% figure requires additional empirical testing.
III. COUNTRY CASE STUDIES

A. SENEGAL: SYSTEMIC CHANGE CASE STUDY ON NAATAL MBAY

SUMMARY

Naatal Mbay is a large-scale, market systems development project targeting the rice, maize, and millet value chains in the Senegal River Valley and the South Forest Zone. This case study highlights two key areas in which the project is facilitating changes at a systemic level: revamping the prevailing contract farming system in paddy rice by introducing a more inclusive, competitive model, and introducing agricultural equipment leasing into a new geographic area, tailored for a new category of clients (millers and processors).

About the project: Naatal Mbay is the successor to the Project Croissance Economique (PCE), which was launched in April 2009 and ended in May 2015. PCE focused on the rice, maize and millet value chains, targeting the Senegal River Valley for rice produced under irrigation, and the South Forest Zone surrounding the Gambia for maize, millet and rain fed rice. Naatal Mbay’s focus is to scale-up successful technologies and approaches developed under PCE. The project is managed by Engility Corporation and runs through February 2019, with a budget of $24 million. Naatal Mbay continues to focus on the rice, maize and millet value chains in the Senegal River Valley (SRV) and the South Forest Zone with the objective of reaching more than 50% of a target population estimated at 330,000 households.

Key findings include:

- There are signs the contract farming model as a whole is becoming increasingly adopted. The 3 processors interviewed for the study are now supporting over 3,000 smallholder farmers annually, compared to approximately 400 that they used to support before. Additionally, 20 processors and small-scale millers are participating in the system, allowing for in-kind reimbursement, with over 55,000 tons of paddy worth $12 million estimated by the project in the 2016 dry cropping season.

- Moreover, the amount of credit available in the system has similarly increased substantially, and there has been crowding-in by other financial institutions to finance rice contract farming at a variety of levels. Building from one partner - CNCAS - which financed the millers and farmers, three other microcredit institutions are now in the market, with a fourth in discussions. CNCAS estimated that the total credit volume that it is allocating for rice cultivation has approximately doubled, from $6 million prior to the project to $12 million currently. Locafrique and BNDE have also entered the market, lending to millers to purchase paddy rice. Locafrique has already made loans of $1 million and intends to triple that amount in 2016. BNDE also has programs of this magnitude.

- None of the market actors involved in the machinery leasing model have discontinued their participation. Rather, most actors have actually expanded their operations. To be profitable, processors need enough quality rice for their newly acquired rice mills to operate for at least eight months. Farmers are reliant on credit, and so are keen to demonstrate their creditworthiness. Millers all plan to support more farmers in order to pay back the cost of their equipment to Locafrique. This has given the millers a vested interest in making the system work.

- Locafrique represents the most significant case of potential adaptation of the initial model introduced by Naatal Mbay. They have adapted their product offering to leasing larger agricultural equipment like rice millers, and now plan to convert into a bank that will offer working capital financing to actors in the rice sector. Locafrique has also sourced new lines of credit at more favorable rates to be able to reduce the interest rate that it is charging its clients in the SRV.
Beneficiary clients report significant satisfaction with the business model – one indication of buy-in. The equipment leasing provider, Locafrique, is satisfied with the system and recognizes that Naatal Mbay played a significant role in its decision to begin offering these services. Similarly, the millers and processors are satisfied with the terms on which they got their processing units. They feel certain that they will be able to repay their loans. CNCAS, a semi-public bank, is satisfied with the system since they are being paid on time by their borrowers.

There has been ongoing investment by all actors involved in equipment leasing, with little direct involvement by Naatal Mbay. Locafrique has continued to invest in its business expansion throughout the partnership with Naatal Mbay, including through the opening of a permanent office in Saint Louis to manage its leasing operations. This has occurred without ongoing subsidy by Naatal Mbay.

As opposed to the equipment leasing initiatives, the ongoing role of subsidies by Naatal Mbay for extension in the contract farming model raises concerns. Ideally subsidy would be reduced, weaning the subsidized provider and allowing for other actors to enter.

CONTEXT

Senegal covers an area of nearly 200,000 km² and has a tropical semi-arid climate. According to IFAD, despite good economic performance and sustained growth over recent years, the standard of living of the median Senegalese remains low. Low agricultural productivity, the failure of the economy to generate employment growth in other sectors, and inadequate resources allocated to social services all contribute to systemic poverty. An estimated 46.7 percent of the population in 2010 lived below the poverty line of 2400 kCal per person per day in food consumption. This proportion is much higher in the countryside, where three quarters of the poor reside. With a gross national income (GNI) per capita of $1040, a life expectancy of only 66.7 years (64.6 male, 68.6 female) and an overall literacy rate of 49.7 percent of the adult population (61.8 percent male, 38.7 percent female), Senegal has a 0.466 Human Development Index score for 2015 and ranks 170th of 180 countries.

PROJECT STRATEGY

This section looks at two distinct components of Naatal Mbay’s strategy for fostering systemic change, as well as the findings about the level of systemic changes observed. These two components are contract farming and equipment leasing. While it is too early to determine how systemic and enduring the change with the three initiatives is, the project has analyzed each area and is taking steps to support innovations becoming systemic.

SYSTEMIC CHANGE AREA 1: CONTRACT FARMING

Project Strategy

Introducing a new model for contract farming is Naatal Mbay’s most prominent intervention, and arguably has generated the most impact from among all of its interventions. Hence including it in the assessment of systemic change was critical. The contract farming intervention was launched to significantly reduce the risks, difficulties, conflicts, and uncertainty of procuring rice on the open market and consequently to increase farmers’ incomes.

The contract farming model promoted by Naatal Mbay has the following characteristics:

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19 Gross national income (GNI) is defined as the sum of value added by all producers who are residents in a nation, plus any product taxes (minus subsidies) not included in output, plus income received from abroad such as employee compensation and property income. [http://www.unicef.org/infoby-country/senegal_statistics.html](http://www.unicef.org/infoby-country/senegal_statistics.html)
21 [www.indexmundi.com/senegal/literacy.html](http://www.indexmundi.com/senegal/literacy.html) 2009.
22 The Human Development Index (HDI) is a composite statistic of life expectancy, education, and income per capita indicators, which are used to rank countries into four tiers of human development. [http://countryeconomy.com/hdi/senegal](http://countryeconomy.com/hdi/senegal)
• Contracts are signed between farmers, a processor and a bank (either together or separately) to govern the distribution of credit. Raw material norms and standards and testing technologies are included in the contract annexes.
• An annual meeting is held immediately before harvesting during which the selling price of the paddy rice is agreed by farmer representatives, governmental bodies, buyers, millers, equipment dealers and insurance companies. The negotiated price serves as a basis for the agreements between farmers and service (and goods) providers.
• Banks and millers both lend to farmers and receive either paddy or cash in payment. Although loans are provided individually, they are guaranteed by the farmer association as social collateral.
• All the actors in the chain (lenders, processors, service providers) accept to be paid by farmers in paddy rice based on the aforementioned price. Non-miller service providers who are paid in paddy rice sell the rice to millers to convert their payment to cash. Millers also take loans in paddy from the banks based on the agreed-upon paddy selling price, and repay in cash after processing the paddy and selling the rice.
• Farmers are only required to repay their lenders with a quantity of paddy or milled rice sufficient to clear their debt (i.e. fractional selling). They are free to market any surplus inside or outside of the contract farming scheme.
• Rice accepted as payment by the bank is managed by an independent warehouse manager, who ensures that all rice meets required quality standards.
• All borrowers (farmers and millers) must purchase crop insurance, which is provided by a government-subsidized entity.
• Extension agents employed by processors and Naatal Mbay’s partners (either apex farmers associations or farmer associations) train lead farmers from within the farmers groups on good agricultural practices (e.g., production, processing, storage). The lead farmers are then expected to train their fellow group members. The expectation is that the training content will reach every farmer in the target groups.
• Database managers employed by processors and Naatal Mbay’s partners (either apex farmers associations or farmer associations) collect and maintain information on the size of each farmer’s plot, their physical location (via geo-referencing), farmers’ production capacity, and their input needs for each season.
• Apex farmers’ associations use the database information to order inputs for their members and coordinate delivery.
• Buyers access the database information to better coordinate the distribution of inputs and crop purchases.
• Processors and the CNCAS bank access the database to assess farmers’ production capacity and calculate the size of loan that they are willing to provide.

This model is a modification of the traditional *filière* that is widespread in francophone countries, in which farmers are provided inputs, which the contracting entity (typically tied to the state) deducts from the cost of those inputs (sometimes highly inflated) when it buys the final product. The following table compares the model promoted by Naatal Mbay with a typical *filière* system.

| Table 3 |
|-----------------|----------------------------------|----------------------------------|
| **Aspect**      | **Filière system**               | **Naatal Mbay model**            |
| Buyer           | There is a single buyer – typically a state entity | Multiple buyers compete to purchase the rice |
| Repayment currency | Payment made with crop mainly | Payment can be made with crop or cash |
| Side-selling    | Farmers must sell their entire crop to the single buyer | Farmers do not have to sell their entire harvest to the buyer – only enough to clear their crop loan |
| Repayment value | Price is typically set based on the market value of the crop during the harvest period | A uniform price is agreed immediately before harvest |
| Quality assurance | Poorly understood by most actors, not widely disseminated | Well understood by all actors; widely disseminated through flyers |
| Bargaining power/market governance | Monopsonistic; farmers have no bargaining power Only large companies maintain records on production | Market based; producers can sell to any of multiple buyers competing for product Redundancy is purposely built into the system: all actors (including farmers associations) maintain |
The following results chain presents the anticipated change process from Naatal Mbay’s contract farming model. The anticipated intervention results assume that a robust contract farming system will contribute to increasing participating rice farmers’ yields, product quality and profitability and that the participating value chain actors will continue to expand upon this model without external subsidy beyond the life of this project. For that to happen, system actors must be able to deliver extension services, inputs, and financing. Reasonably strong farmers associations and geo-referencing allow for accurate estimates of members’ production potential and input requirements. With this information, lenders have information on farmers’ production potential, and buyers know exactly where farmers are located.

As these changes occur, several systemic changes are expected. As market actors’ margins improve, they should increase their buy-in to the contract farming model. More processors, service providers and farmers associations should replicate the contract farming model, and consequently more rice farmers should begin participating.

To achieve the changes outlined in the above results chain, Naatal Mbay’s strategy has been to partner with a multitude of actors in the rice value chain, including apex organizations representing farmers associations, the Government of Senegal’s regional department in charge of agriculture, banks, insurance companies and managers of irrigated land and extension services (SAED and ANCAR). Naatal Mbay has undertaken the following activities:

- Attracting the interest of the banks and other financial service providers to provide funds to the value chain actors to finance their working capital requirements
- Directly subsidizing 90 percent of the salaries of extension agents (typically three) and database managers (one) for both the processors who are purchasing the rice and for the farmer associations that are managing the coordination of supply
- Encouraging and financing the participation of all stakeholders in the annual price setting meetings
- Inviting the insurance company, CNAAS, to provide insurance to farmers and other actors requesting a loan

In Naatal Mbay, CNCAS participate in the price setting negotiations but the grain is managed by a third party.

Several critical assumptions underpin Naatal Mbay’s contract farming intervention:

- All the actors accept the defined price for the paddy prior to starting production
- All actors agree on the quality of the rice to be sold/monetized and how quality will be measured
- Banks and service providers agree to adapt their business models by accepting payment in kind
- There are no major shocks in international rice markets which would affect the price in the national market

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23 Profitability also depends on other factors not depicted in the results chain, including that the terms and conditions of the contract farming model to not skew benefits and power relations in favor of the processor.
Figure 6. Contract Farming Results Chain
EVIDENCE OF SYSTEMIC CHANGE

Imitation

One major area of imitation confirmed during this research relates to financing of the contract farming system. Initially Naatal Mbay worked exclusively with CNCAS to finance the millers and farmers. Subsequently other microcredit institutions joined in, imitating CNCAS in financing rice contract farming. This includes: Credit Mutuel du Senegal, Microcred, and FIDES. Ecobank is also holding discussions with Naatal Mbay about providing finance and leasing services. Recently, Locafrique and BNDE have entered the market, lending to millers to purchase paddy rice. Locafrique has already made loans of $1 million and intends to triple that amount in 2016. BNDE also has programs of this magnitude. This level of imitation is worthy of note because financial institutions are better known for mitigating risk than for innovating, and it is an indication of the industry’s perception of the profitability of this new model for contract farming.

Another area where imitation has begun occurring is amongst processors, who are beginning to adopt the in-kind reimbursement system introduced by Naatal Mbay. In the beginning, Naatal Mbay worked most intensively with three processors and directly introduced the model to each of them. Now, a number of other processors have also started to use the in-kind reimbursement system. The research team was unable, given time constraints, to speak with all of the processors and millers; the project estimates that more than 20 processors and small-scale millers are now participating in the system and that in the 2016 dry cropping season will amount to 55,000 tons of paddy worth $12 million. The extent to which these actors adopted these behaviors directly because of the project’s intervention versus imitating the behavior of others could not be verified.

In some areas, the research team did not find evidence of imitation by non-project partners of project-supported behavior. In some cases, this is because the function cannot easily be replicated given its design. For example, the Government of Senegal currently subsidizes 50 percent of the cost of CNAAS’s insurance policies, which would deter other entrants needing to operate on a purely commercial basis. As the shareholders of CNAAS are the major private insurance companies there is the potential that they could enter themselves as the market evolves, but it will not happen at present. Moreover, other associations have not independently adopted the hiring of database managers and extension officers without Naatal Mbay’s funding, with the exception of the SFA milling company, which is now paying a stipend for extension services.

Buy-In

A challenge with assessing buy-in attributable to Naatal Mbay was that contract farming is not new to the Senegal River Valley; actors had already been practicing contract farming prior to the beginning of the PCE project. Naatal Mbay’s innovations help the contract farming system function better. Therefore the assessment of market actors’ buy-in focuses specifically on the new innovations that Naatal Mbay introduced (e.g., acceptance by banks and other market actors to be paid in paddy rice rather than cash, acceptance by all market actors of a uniform price, linkage of farmer loan reimbursement and miller lines of credit through a grain consignment system, introduction of quality standards and testing protocols as part of the contracting process) rather than their adherence to the contract farming system as a whole. Several elements of buy-in are explored below:

Satisfaction

All actors expressed satisfaction with the contract farming model. No significant complaints were registered. One point of evidence for this is that more and more farmers are approaching the outgrower businesses to join the contract farming model. CNCAS is also satisfied with the system as its loans to farmers and other actors are being repaid, business is growing and the Senegal River Valley now generates the most business for their company. Another indication of satisfaction is that although farmers only need to sell enough rice to their lender to discharge the value of their loan, many are selling their excess through the same system rather than using the informal markets.

However, satisfaction proved a somewhat challenging indicator to measure, given the direct funding being provided by Naatal Mbay to many of the stakeholders who were interviewed. Consequently, all interviewed stakeholders expressed satisfaction with the support they received but also cautioned that they were expecting support to continue.
Continued Use

One indication that continued use post-project support is likely is changes in the capacity of the market actors. It was observed that many farmers associations are now sufficiently confident to contact and negotiate with other market actors as needed. More generally, there are signs that the contract farming model as a whole is becoming increasingly adopted. The three processors interviewed for the study are now supporting over 3,000 smallholder farmers annually, compared to approximately 400 that they used to support before. Moreover, the amount of credit available in the system has similarly increased substantially. CNCAS estimated that the total credit volume that it is allocating for rice cultivation has approximately doubled, from $6 million prior to the project to $12 million currently.

A leading signal that continued use is likely is that the benefits accruing to market actors are strong. One of the benefits created by the innovations to the contract farming model is that farmers are able to quickly pay off their loan with a single crop delivery. With a fixed price and a guaranteed buyer, they avoid spending significant time negotiating and selling small amounts. This frees up their borrowing room to do double cropping or other investments. Similarly, with millers now selling a better quality product, they have been better able to compete in the market. This has strengthened their profitability and thus improved farmers’ confidence that they will be paid.

The actors that were interviewed indicated they were continuing to use the contract farming system and the specific features introduced by Naatal Mbay. In particular, farmers associations, buyers and processors have all continued to employ extension officers and database managers. However, this is a relatively weak indication of buy-in, given that Naatal Mbay has continued to provide a very high subsidy of 90% of the total salary cost. Because project support has not yet ended, the likelihood of continuing use of these specialists without subsidy is not fully clear. An examination of capacity suggests that the buyers and processors, as well as some of the larger apex farmers associations, are more likely to continue to do so. They have the financial capacity to afford the salaries of these positions, whereas the smaller farmers associations will struggle to do so (the total cost of the four positions, approximately $500 per month, is far beyond some of the associations’ yearly earnings). Naatal Mbay is aware of the risk that this poses to the ongoing functioning of the model and is trying to correct for this. They are planning to pursue several strategies to ensure information continues to be generated at farmer level. One is to reduce the subsidy level. Another is to leverage the resources and capacity of the apex associations to which farmer associations belong. To that end, they have developed an agreement with the Fédération des périmètres autogérés du Sénégal (FPA) and seven other parties to develop a system for farmer production forecasting, which they are now piloting with the potential to expand to all of the FPA’s member farmer unions. This system could possibly help to alleviate the resource challenges faced by the farmers associations upon project exit.

Adaptation

Already SAED is now facilitating the annual process of establishing a price floor, where Naatal Mbay introduced this process. Moreover, recently the fixed price model has now become standard practice in the industry; even the major processors who were not active partners of PCE use the negotiated price. A similar process occurred with insurance: the banks and Locafrique now automatically require that prospective borrowers or lessees obtain insurance. Importantly, banks have started processing loans to finance two plantings with a single application, rather than just one. This enables farmers to avoid delays in undertaking their second planting while waiting for credit, and demonstrates banks’ increased confidence in pre-authorizing greater quantities of capital. No independent adaptation by value chain actors has been observed in the provision of extension services and this is a concern for longer term systemic change.

Further Investments

Firms have not made any of their own investments specifically related to Naatal Mbay’s inputs on database management and extension support. However, they are making other commercial investments that support their continued engagement in the contract farming system. These include processors and buyers leasing rice processing units and expanding the credit that they

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24 The total cost per group is 225,000 CFA (75,000 for a database manager + 50,000 for an extension officer x 3) or approximately $500.
are offering farmers to support the production of paddy rice. Market actors have assumed the cost of their participation in the annual price setting meeting. Whereas Naatal Mbay originally paid transport costs and per diems to actors to participate, it no longer does so. Moreover, CNCAS has greatly expanded its investment in lending to actors in the rice sector.

Replication
The one instance of replication that was observed was by a financial institution. CNCAS, the semi-public bank, is piloting several aspects of the contract farming model in Senegal’s peanut-growing basin, including being repaid in kind for loans, having a third party manage the stocks, and providing processors with stock. However, the three millers or buyers that are project partners have not replicated beyond their traditional business areas, as that area alone can offer sufficient supply.

In terms of replication of the model by external actors, some momentum has begun. Naatal Mbay has been working with the Senegalese Ministry of Commerce and the World Bank to set up a Warehouse Receipts System (WRS) in Senegal. Both actors have decided to use the rice trading model as a point of entry for WRS, and are undertaking initial activities. If this continues to fruition, it would enable a fully documented loan receipt system that would be applicable to many other staple crops beyond rice.

Other Aspects
There is a suggestion that the contract farming system has created benefits for other players in the market system, which may increase the pressure for the system to endure. For example, the in-kind repayment system and fixed price have improved service providers’ assurance that they will be paid and lowered their transaction costs for serving smallholder farmers. For example, contract harvesters can now be paid in kind for their services at the contracted price and then sell the rice on to millers. Because they already know the price they can sell the rice at, they are more confident in providing the services to smallholders. Moreover, millers’ requirements that rice they purchase meet the given standards also influences service providers who are being paid in-kind to provide a quality services.

Other functions did not seem to be fully institutionalized. For example, SAED is supervising the extension officers being paid for by Naatal Mbay that work for the farmers associations. This is a function that presumably should be handled by the associations if this role is to endure without activity financing.

Additionally, a PCE publication noted that “[m]eanwhile, farmer networks that have benefitted from multiple cycles of contracting support and who have learned to study and respond to market trends have become increasingly shrewd and empowered negotiators”. (Contract Farming For Cereal Value Chains Smallholder Market Integration Through Contract Sales Agreements, April 2015, page 8). This observation was not confirmed through the field research, however.

SYSTEMIC CHANGE AREA 2: EQUIPMENT LEASING
The second area in which the research team investigated signs of systemic change was equipment leasing. Relative to contract farming, this intervention was more straightforward, with fewer actors and project activities. This intervention was launched to resolve farmers’ challenges of quickly preparing their land for planting, harvesting before quality began deteriorating, and being able to grade their land.

The land preparation service model promoted by Naatal Mbay has the following characteristics:

- An equipment leasing company (Locafrique) imports land mechanization equipment (i.e., tractors, combine harvesters) and graders (for irrigated land expansion and maintenance) and leases or sells it to millers and service providers
- The lease terms are variable depending on the type of equipment
- Purchasers or lessees of the equipment are required to purchase insurance from CNAAS, a publically-subsidized company
- Millers and service providers provide land preparation, combining and/or grading services to farmers and get reimbursed in cash or in kind (with rice)
• USAID’s Development Credit Authority (DCA) provides a guarantee for lessees of Locafrique’s agreement equipment
• Banks such as CNCAS provide loans to farmers, millers and processors to fund their operational costs required to operate the equipment (e.g., fuel, staff)

The results chain on the following page presents the impacts and change process anticipated from the land mechanization model. The intervention is based on the belief that better access by farmers to farm machinery services will allow them to greatly improve their operations. Land preparation services will enable them to expand their area cultivated, while combining equipment will allow them to double their crop. For these beneficial effects to happen, a viable equipment rental business model will need to exist, with financing available for service providers to acquire or lease the equipment. As these changes occur, several systemic changes are expected. The actors in the machinery results chain increasingly buy-in to their roles and expand their operations. New equipment lessors and service providers imitate existing ones and enter into the market.

To pursue this, Naatal Mbay has undertaken the following activities:
• Entering into a partnership with Locafrique to expand their leasing activities beyond the traditional areas in which they operated
• Linking Locafrique to potential customers (millers, processors and service providers), and facilitating negotiations
• Attracting an insurance company to offer insurance to lessees
• Facilitating the link between Locafrique and USAID to make greater use of the DCA guarantee
• Supporting the institutional development of millers and processors by providing management training, bookkeeping training, database management, etc. to help professionalize management of their leasing businesses

25 A DCA provides a portfolio guarantee to a financial institution. Locafrique benefited from a $5 million facility to secure its leasing finance.
Figure 7. Equipment Leasing Results Chain

EVIDENCE OF SYSTEMIC CHANGE

Imitation
The primary example of imitation that has been observed is in the equipment leasing market. BNDE is a newly created bank that has followed Locafrique’s lead in financing agricultural equipment to millers. Though it is not offering leasing services itself, BNDE has financed the down payment that one of the millers has put down to lease equipment through Locafrique.

Buy-In
Satisfaction
The significant players in the intervention all expressed their satisfaction with the model. The equipment provider, Locafrique, is satisfied with the system and recognizes that Naatal Mbay played a significant role in its decision to begin offering these services. It is expanding its business in the Senegal River Valley. Similarly, the millers and processors are satisfied with the terms on which they got their processing units. They feel certain that they will be able to repay their loans. CNCAS is satisfied with the system since they are being paid on time by their borrowers.

Continued Use
None of the market actors involved in the machinery leasing model have discontinued their participation. Rather, most actors have actually expanded their operations. To be profitable, processors need enough quality rice for their newly acquired rice mills to operate for at least eight months. Farmers are reliant on credit, and so are keen to demonstrate their creditworthiness. Millers all plan to support more farmers in order to pay back the cost of their equipment to Locafrique. This has given the millers a vested interest in making the system work.

Adaptation
Locafrique represents the most significant case of potential adaptation of the initial model introduced by Naatal Mbay. Beyond shifting their business model to agricultural equipment leasing with the encouragement of Naatal Mbay – they previously dealt
mainly in motor vehicles – Locafrique has steadily expanded their focus. They have adapted their product offering to leasing larger agricultural equipment like rice millers, and now plan to convert into a bank that will offer working capital financing to actors in the rice sector. Locafrique has also sourced new lines of credit at more favorable rates to be able to reduce the interest rate that it is charging its clients in the SRV.

Further Investments
There has been ongoing investment by all actors involved in equipment leasing, with little direct involvement by Naatal Mbay. Locafrique has continued to invest in its business expansion throughout the partnership with Naatal Mbay, including through the opening of a permanent office in Saint Louis to manage its leasing operations. This has occurred without ongoing subsidy by Naatal Mbay. The processors have leased very large-scale milling units and are expanding their businesses. This expansion has contributed to the professionalization of the processors’ operations. Access to equipment services has enabled farmers to make complementary investments in land preparation and, by speeding harvesting with combines, to begin double-cropping.

Replication
Locafrique has expressed an intention to lease equipment to more service providers beyond the SRV, but has not yet done so.

CONCLUSIONS
The key findings and conclusions which emerged from this work include the following:

- Some aspects of buy-in are leading, such as satisfaction with the business model, while others are lagging and can be best assessed following the withdrawal of project support (e.g., continued use).
- Certain aspects of buy-in are difficult to measure when a project is continuing to provide ongoing funding at the time at the research, and are therefore better assessed following the withdrawal of direct financial support. This pertained particularly to the extension officers and database managers that are funded under the contract farming intervention, especially given that the level of financial support – 90% – has not been lowered over time to indicate if this has promoted shifts in project partners’ decisions.
- A range of external factors played an instrumental role in supporting the dynamism of the rice sector in Senegal after a long period of stagnation. Among these is the more active role that the government is now playing in influencing the actions of market players. The government has applied pressure on rice importers to reduce imports during the local production season and instead increase domestic purchases. This has been instrumental to the involvement of the rice importers in the process, who might have otherwise undermined the model by undercutting local prices with cheaper imports. Another factor is growing demand for aromatic varieties in the Senegalese market, which supports growing investment by market actors.
- The ongoing role of subsidies in some elements may constrain the ability of the project to foster systemic change in some areas. Ideally subsidy would be reduced, weaning the subsidized provider and allowing for other actors to enter. No one can enter competing with the subsidy, unless the actual market is much larger than the subsidy can reach.
- There are a range of structural factors and risks that may limit the ongoing growth of the project-supported models, as noted by Richard Kohl (2016). These include:
  1. SAED is still not able to provide ongoing extension support nor incentivize farmers to maintain secondary and tertiary systems
  2. Unclear how much more land can be made available and where
  3. As machinery, liquidity, seeds are increasingly available, may be approaching limits of yields
  4. Access to capital is a significant issue – a very small percentage of formal credit in Senegal is invested in agriculture
  5. Continued weather and pest problems threaten double planting
  6. Lack of guarantees, servicing and maintenance for machinery
  7. Impossible for GOS to get anywhere close to self-sufficiency, while costs of intervention will increase dramatically as limits are approached
- Like many projects, Naatal Mbay uses a mix of interventions that featured a strong facilitation approach, but also undertakes interventions in which they provide high direct subsidies. This includes their work in the seed sector, in which new infrastructure for the government seed agency was financed, and their almost full financing of extension
and database management staff to support contract farming. Examining only the interventions in which a strong facilitation approach was used, without considering the influence of the direct subsidies (and indeed, whether the facilitation interventions can survive absent the direct subsidies) would provide an incomplete picture.

- Naatal Mbay learned with time that building redundancy into the system was an important characteristic supporting systemic change. So instead of only training the rice mills on quality standards, they also built the capacity of farmers and the banks. This helps to equalize the power in the relationship at selling time, relative to enabling only one actor to be the arbiter of quality. The same lesson applied to the management of information on production levels. Naatal Mbay found that the millers, bank and farmer associations all needed to manage information on production estimates and volumes harvested and reimbursement levels. This builds the capacity of all actors to negotiate effectively and have the information needed to make their own analysis and decisions.
B. ZAMBIA: SYSTEMIC CHANGE CASE STUDY ON PROFIT+

SUMMARY

The FTF/Zambia Production, Finance, and Improved Technology Plus (PROFIT+) project is a market development initiative that targets a range of value chains including maize, soybean, groundnut, and sunflower. This case study highlights how PROFIT+ is introducing changes in the structure of the localized rural input supply system through new actors (community agro-dealers) and aggregation models (CAD-owned ‘producer companies’). While in the early stages - and compounded by the context of two years of heavy drought, which has led to shifts in behaviors from those that are revenue maximizing to those that are risk mitigating and resilience maximizing – these structural changes in the system are beginning to improve smallholder access to input and extension services.

About the project: The objective of PROFIT+ is to increase productivity, expand trade, and increase investments in Zambia, by strengthening market systems in rural areas to facilitate stronger linkages to private sector service providers through public private partnerships (PPP). The project runs from 2012-2017 and is geographically focused in Eastern Province and peri-urban Lusaka. The project began during a period of strong economic growth, but for the last two years Zambia has suffered from a serious drought.

Key findings include:

- The producer company model shows strong potential to become an enduring change in the structure of the rural input supply system, localizing services and increasing access to extension and inputs for large numbers of smallholders; 18 PCs have formed thus far, encompassing 161 CADs which on average serve between 100-400 farmers directly at present26. While the majority are those directly supported by the project in business development and linkages to a bank for credit financing, there is evidence that the model is beginning to spread independently, with Cargill and Syngenta each in the process of creating hundreds of CADs. In addition, there are already several additional groups of CADs signaling a desire to create imitation PCs. The model is still too recent to evaluate conclusively; it should be revisited in two or three years to re-evaluate the ways in which this change in actors and structures for input supply led to sustained and scaled development outcomes.

- With regards to satisfaction, one indication of buy-in, farmers interviewed reported a net positive impact of the producer company on their lives. Technologies, in particular conservation tillage practices, have resulted in time saved from no longer having to travel to town to purchase inputs; increased yields; and improved food security. Since the research sample was not representative of the full beneficiary population, further research would be needed to determine how widespread these impacts are as additional PCs begin and expand operations in the region.

- As the systemic change Theory of Change introduced in Section II suggests, climactic shocks will reduce the rate of adoption of innovations. An interesting phenomenon in the Zambia case is that while broad adoption and replication of innovations has slowed, the ties formed among actors participating in the program have contributed to increased resilience.

26 In this context, ‘serve’ refers to farmers which CADs reach as customers. Each CAD’s commercial reach is driven by their location, their own nascent resources and capacity, farmers’ financial capacity and adoption rates, and crops grown. Those in areas where villages are densely populated in close proximity to CADs, are able to serve 400+ farmers. Where distances between villages are bigger, the outreach is smaller. As the CADs grow and progressively expand into crop trading, their outreach becomes wider as farmers are more willing to travel to sell their crop. The CADs that have been creating and strengthening agribusiness groups in the communities for some time (lead farmer training groups from the earlier project phase, credit saving and trading groups, etc.) also seem to have larger outreach. Another element is years spent in business – CADs that have been working with PROFIT+ for three years have a much wider outreach than those that were brought on board in Year 4 of the project. This explains the range in farmers engaged per CAD.
During periods of shocks, risk mitigation may be as, or more important, than increased income. One practice widely adopted within the past few years is ripping associated with conservation tillage. Ripping is one of the few technologies promoted to farmers that does not require increased cash costs and risk exposure for farmers yet through its associated protection of soil moisture, can mitigate yield loss during times of drought.

- Given smallholder vulnerability to shocks, promoting changes in practice that improve resiliency of current yields, even without significant potential for yield increases, in the face of increased climatic shock will become increasingly important to focus on and promote in the future. Climatic shocks will increase and smallholders will have to find a balance between resiliency maximizing and profit maximizing strategies.

**CONTEXT**

PROFIT+ began in 2012, during a period of strong economic growth, both for the economy at large and the agricultural sector. GDP growth has averaged 6.45% over the past ten years, with ag and the agricultural subsector growing 7% in that same period. Relative to other countries in the region, smallholders in Zambia are more heavily commercialized. In 2015, 60% of Zambian farmers were using hybrid maize seed, compared with 7% in Mozambique. The agricultural private sector, both agro-input suppliers and commodity traders, were established and competitive. End-market demand for maize is large and growing, as the total population of net maize consumers is growing faster than net maize producers. From 2000-2010 Zambia’s urban population grew at 4.2% per year, while the rural population grew at only 1.5% per year. Since 2000, Zambia’s urban population grew from 3.4 million to 5.2 million people, all of whom are net consumers of maize. There was growing appetite on the part of input suppliers to reach smallholder customers in Eastern Province, but limited resources to reach such highly dispersed and opaque customer bases.

In this context, PROFIT+ engaged with an agricultural sector relatively more advanced than in neighboring countries. PROFIT+ was faced with a smallholder beneficiary population already aware of improved inputs, but with limited access, and a private sector eager to increase supply to these communities but with limited knowledge of where sufficient pockets of demand existed, or reliable local intermediaries to aggregate demand to a level that was profitable to supply. Thus the project’s objective was to facilitate the emergence of a new value chain actor that could function as a bridge between existing (but dispersed) smallholder input demand, and companies eager to meet that demand.

PROFIT+ has developed a two-tiered village-based firm model to sustainably increase smallholder access to inputs and extension on good agricultural practice. The model is an adaptation of a microenterprise/village-based agent model, bringing together 3-12 microenterprises to form an umbrella Producer Company (PC) firm to coordinate input supply orders and food commodity sales to traders, millers, and processors. While a version of the community agro-dealer (CAD) model was introduced under the previous PROFIT project in Southern Province, the CAD model was new to Eastern Province, and the PC model new to the whole country when introduced in late 2015 by PROFIT+.

Compounding the project’s challenge has been a series of drought years in the rainfed production areas across Zambia, including Eastern Province. The 2014/15 maize season saw a significant drop in rainfall, negatively affecting yields, which dropped from a 2013/14 average of 2.36 tons/ha to 1.75 tons/ha in 2014/15. While final yield figures for 2016 are not yet available, anecdotal evidence shows that rains came late and ended early, likely resulting in another depressed production season.

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30 Zambian National Farmers Union Statistics.
Within this combined context of long-run smallholder growth, confronted by short-run climatic volatility, this research focused on three questions:

a. To what extent has the producer company (PC) model developed and implemented under PROFIT+ become a systemic change of the input and output marketing system?

b. What effect has the expansion of CADs as input and extension retailers, and commodity offtakers, had on smallholder adoption of improved technology and practices?

c. What effect has the increased incidence of drought had on smallholder adoption of improved practices?

The PROFIT+ project strategy is outlined below, including its farmer and firm-level theories of change; this is followed by an assessment of the extent to which the PC model has led to systemic change, as well as its prospects for doing so in the future. Finally, this case study reviews the farmer-level effects of producer company transactions and relations, and what this reveals about the extent to which these affect farmer adoption of improved production practices in a context of recent droughts.

**PROJECT STRATEGY**

The PROFIT+ project’s approach to input supply expansion rested on four premises, constituting an inverted farmer adoption theory of change:

a. Smallholder farmers (SHs) currently under-utilize improved inputs and production practices, including high quality seed, fertilizer and agrochemicals, as well as appropriate tillage, crop management, harvest and post-harvest practices.

b. SH underutilization is driven by lack of knowledge and lack of access, which limits stimuli to trigger change and improvement.

c. This lack of access is driven by three factors:
   i. Infrastructure-driven costs for input suppliers and retailers to serve SH communities.
   ii. Opaque and fractured demand, compounded by limited bridges into SH social networks and low transactional volumes, requiring commensurately more sales and marketing costs per unit sold.
   iii. Low managerial and financial capacity within SH social networks, which means higher turnover in rural retail enterprises and limited growth capacity.

Thus, PROFIT+ investigated constraints to smallholder access to high quality inputs and extension services. Large scale input suppliers were generally interested in smallholder customers, but transaction costs proved too high without a local retail point that could serve to actively market and drive sales, aggregating smallholder demand to sufficient tonnages to justify distribution to the village level. However, it was difficult for these companies to identify individuals at the village level who were sufficiently trustworthy, as well as agronomically and financially capable, to fulfill this aggregation and sales role.

PROFIT+ deployed a four phase strategy to trigger a sustainable expansion of input supply farther into rural catchments:

a. Training: Building on the network of lead farmers developed in the first two seasons of the project, PROFIT+ identified those lead farmers with the greatest potential capacity, approximately half of their total network of nearly 700 lead farmers, and invited them to enroll in a training program to become ‘community agrodealers’ (CADs) in which they would begin to function as a bridge between input companies willing to invest in this new structure and smallholder groups. This network of CADs received training in core business skills development, including inventory management, marketing and sales, regulatory certification, and financial literacy. In addition, all CADs have ongoing relationships with the government extension officers in their areas, and were originally trained by them in agronomic best practices in the first two seasons of the project, when the CADs were still just demonstration site hosts.

b. Structuring partnerships with input suppliers: The project’s assessment of costs to serve these CADs showed that, without some form of risk buy-down, it would be cost prohibitive for input suppliers to manage large networks of CADs individually. PROFIT+ then developed partnerships with several input suppliers to take on management of these CAD networks in two ways, one a lighter touch, the other more intense. Some suppliers engaged the CADs as full franchises, branding and rehabilitating their storefronts, providing them with stock on consignment, and facilitating wholesale pricing from other input suppliers. Other suppliers simply provided an initial consignment stock, with the initial consignment partially subsidized by PROFIT+ to reduce risk.
c. **Encouraging emergence of CAD-owned firms (“Producer Companies”):** In their second season, these CADs were presented with a potential, voluntary model that they were encouraged to follow: form clusters with other CADs, and establish a new wholesale intermediary firm, with each CAD as a shareholder. This model is intentionally not an association, but a separate corporate entity, with each CAD holding an equity stake. These clustered firms, which the project called producer companies (PCs) would reduce input supplier costs to serve, and allow CADs to share management challenges and leverage their size for economies of scale in input purchasing and output aggregation and trade. In the process of organizing themselves into production companies, CADs continued to function as network bridge for larger input suppliers but were also able to accelerate the dissemination of information as well as integrate vertically providing input, extension and output marketing services.

d. **Support business development of PCs:** These PCs were then supported in developing business plans around models of their own choosing. Most PCs are operating as wholesale intermediaries between input suppliers and their constituent CADs. All of them are acting as commodity buyers, some for in-house processing into value added products, and others as traders, selling on through the national agricultural commodity exchange (ZAMACE) or directly to larger buyers such as Cargill.

Thus PCs are supposed to provide a conduit for innovation (improved inputs and practices) into the village level SH networks. They are meant to overcome the constraints to access through pooling managerial and financial capacity, as well as their individual customer catchments to achieve economies of scale in purchasing inputs and supplying offtakers.

The producer companies interviewed engaged in a range of activities, including:

a. **Wholesale input procurement:** Some PCs are comprised of constituent CAD businesses, all currently engaged in agro-input retailing. The PCs are operating as an umbrella intermediary between the CADs and their input suppliers, generating wholesale price discounts, and providing ‘one stop’ delivery points for input suppliers for all constituent CADs.

b. **Embedded extension and in-field services:** Some PCs are working through CADs to recruit and provide teams to spray, weed, prepare land, and perform other relevant in-season services.

c. **Output procurement, warehousing, and trading:** Many of the PCs are engaging in output trading, utilizing the CAD empty input warehouses as aggregation points at the end of the maize season. These PCs are selling on through ZAMACE (the commodity exchange), through border arbitrage (at the Malawi and DRC borders), and holding for price speculation later in the year.

d. **Formal and informal outgrower schemes:** Several PCs have initiated small outgrower schemes for groundnut, soy, and maize, providing input on credit to be repaid with a percentage of the crop yield.

e. **Value added processing:** Several PCs are exploring value addition processing (tomatoes), high nutrient protein supplements (soy and groundnut paste with micronutrient additives), and cooking oil production.

**EVIDENCE OF SYSTEMIC CHANGE**

While the project’s implementation approach evolved over time, the producer company model was the first phase that was anticipated to be fully self-sustaining by the end of the project. In this research, two aspects of the model were evaluated: first, the extent to which the PC model shows evidence of systemic change in the input supply system, evaluated through the current and potential extent of firm buy-in and peer imitation; and second, the extent to which those changes are triggering SH adoption of improved inputs and practices, and why (or why not).

**Imitation**

As all producer companies are just at the end of their first operating season, there has been limited time for imitation to occur. That said, there was mixed evidence of the potential for the PC model to be imitated by other potential rural entrepreneur groups. The three PCs interviewed reported that there are at least three additional PCs, comprised of other CADs from PROFIT+’s network, voluntarily forming without PROFIT+ financial or managerial support. While this at minimum proves that other CADs perceive the PC model as worthy of imitation, it does not provide evidence that the innovation would necessarily expand beyond the social network of CADs created by PROFIT+. 
This prospect for horizontal spread from current PC CADs to comparable nascent entrepreneurs in the same or neighboring villages is limited in part by the nature of the model itself: competitive networks of peer firms tend to avoid sharing business innovations as ‘trade secrets’, and the core functions of the model’s success occur in relatively remote areas in short transactions between farmers and the firms. In other words, while many input and commodity traders are socially connected within districts and towns, these traders rarely have opportunities to observe each other’s behaviors (company structure, strategy, buying practices, etc.) in the field, but instead depend on farmers and word of mouth to piece together their competitive landscape. The core changes at the firm level the project seeks are fundamentally about internal company dynamics (shareholding structure around equity stakes) that build on pre-existing businesses with relevant sector-related experience.

The greatest potential for imitation may be through external encouragement by input supplier firms. The input supplier network of firms that PROFIT+ has worked with and linked to CADs has voiced unanimous interest in assisting PCs to succeed, because they provide a single stop for supply to an exponentially larger network of end-market customers than a single CAD. While PROFIT+ is only this season (late 2016) engaging in comparable work with offtakers, the underlying market logic is the same, with its success is driven by the ability to reach large volumes of commodity through a single transaction point (the PC). If the current cadre of PCs proves profitable for input suppliers and offtakers, it will be interesting to see the extent to which they attempt to support CAD and PC formation with other potential entrepreneurs.

Buy-In
Evidence of buy-in is explored through the three categories introduced in Section II: satisfaction, continued use, and adaptation.

Satisfaction
All three PCs reported high levels of enthusiasm, though only one PC had completed a full business cycle (the other two were still in the middle of their buying season). The one PC interviewed with the completed outgrower scheme season reported a repayment rate of 100%. After discussing the nature of the model and speaking with outgrower farmer participants, it seems likely that this high repayment rate was driven by three factors:

- **Proximity**: The PC was able to leverage their geographic dispersion as individual CADs to recruit farmers within no more than 2 kilometers of an individual CAD. This proximity facilitated repeated visits, fostering social cohesion and enabling CAD’s to ‘check in’ more often to see if other buyers were approaching outgrower participants to sidesell.
- **Pre-existing social capital**: The majority of outgrower scheme participants had been members of the CADs’ training farmer groups previously, and/or knew the CAD socially in some other way. This cohesion was reported by all outgrower scheme participants as a core reason they were uninterested in transacting with anyone else.
- **Repayment only required to cover input costs**: The PCs required repayment only in the amounts of the pre-financed inputs, and offered market price for the remaining product. This allows the farmer to determine whether they will hold back the remainder of the crop for home consumption, choose another market, or some mix of the two. The outgrower scheme participants interviewed reported that they are holding back some portion of their crop for home consumption, but any surplus they sold or will sell to the PC.

These three factors and their initial success hold promise for other PCs beginning to engage in outgrower schemes this coming season. The core reasons for the scheme’s success should accrue similar advantages to other PCs engaging in trading: social cohesion, geographic proximity, and farmer freedom to choose the market for some significant percentage of the crop.

Continued Use
Since the companies are only finishing their first year of operation, we were unable to empirically assess any continuation. That said, all three companies stated that they are planning to continue or expand their operations moving forward. The one company that had successfully completed an outgrower scheme round recouped their initial investment and earned profit, which they are reinvesting in further operations. The interview with the one producer company furthest along with its operations did

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31 Producer Company #1 Interview Notes.
confirm, however, that the CADs felt they were better able to share duties within the PC, playing to each other’s strengths, and were able to leverage better consignment and unit cost terms with suppliers because they were ordering higher volumes. This seems to validate that the PC model can solve for managerial and financial capacity problems faced by autonomous CADs.

**Adaptation**

The producer company model, within the cadre of existing CADs, shows high prospects for voluntary adaptability. The CAD training course, PROFIT+ implemented, focused on building fundamental skills in business analysis as well as business operations, enabling CADs to evaluate potential business ventures independently. Out of this training, CADs interested in forming into PCs have taken the model in a wide range of directions. One PC interviewed is focusing on producing high nutrient protein supplements for child nutrition and selling to the government program. One PC is focusing on the outgrower model for maize and groundnuts, mentioned above. The third PC is focused on developing a tomato supply chain for processing and maize trading.

This adaptability is a critical factor for success moving forward in an uncertain macro- and micro-economic context. As farmers shift commodities and production practices in response to climatic variability and market shocks, PCs will need the capacity to anticipate and drive shifts in their own goods, services, and procurements from farmers. Additionally, PROFIT+ is starting to see agro-dealers that used to be in town reach out into the communities, because there are viable business partners now in CADs.

**Replication**

There is evidence of the CAD model particularly replicating, as its proof of concept is demonstrated. Cargill, for example, is creating 360 CADs, and Syngenta is adding 100, using P+s CAD training program and adapting it internally.

**Effects on Smallholder Adoption of Improved Technologies and Practices**

In conducting the case study, 15 interviews were held with farmers in the CADs’ village social networks. The interviews were semi-structured around a common set of questions, and assessed the extent to which the PCs functioned as a social bridge into their network to spur innovation and adoption of improved inputs and practices. One challenge faced in this part of the research was the fact that CADs were the primary point of interaction farmers had with PCs, thus it was impossible to separate the CAD function from the PC in spurring innovation. That said, for PROFIT+, there does not have to be a functional difference between the two: the PC is critical for the duration and success of its constituent CADs, and constituent CADs in turn drive farmer-level innovation. A second challenge was the presence of other donor programs providing additional ‘bridges’ for innovation adoption. Consistently, farmers listed CADs as their primary source for extension advice and the inputs that the CADs stocked; however in addition, interviewed farmers indicated other organizations and programs as sources of extension information.

Results from adoption are highlighted below:

*Conservation Tillage Adoption:* Over 90% of interviewed farmers reported adopting conservation tillage, including deep-line ripping and planting basins, from their CADs. Additionally, over 80% of interviewed farmers reported that their neighbors were adopting or had adopted one or both of these practices from them, based on conversational interactions with neighbors and seeing these practices replicated in neighbors’ fields. Farmer reasons for adopting conservation tillage demonstrated very comprehensive understanding of changing rainfall patterns and the need to adapt production practices as a result. One farmer stated that she is using conservation tillage because “the climate is changing, rains are not coming like they used to...ripping and basins have improved yields.” Another stated that “[the] weather pattern is unpredictable now, so [I] adopted this new set of technologies because they conserve moisture.”

*Seed Access:* Nearly half of interviewed farmers stated that CAD proximity has increased their access to improved seeds locally, instead of having to travel to town to procure. Of the remaining farmers who did not list seed access increase as a result of

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32 It should be noted that other more empirically robust studies denote much lower CA adoption rates across Zambia.
CADs, these farmers were growing recycled seed mostly because they claimed not to have sufficient money to purchase improved seed, not because they were unaware of its benefits.

*Crop Diversification:* PROFIT+ has seen in its project areas a significant shift to diversification – this has been influenced in part by climate change, which reduced maize yields, and in part by the role that CADs and PCs have played in actively opening up market opportunities for other crops such as soy, tomatoes, sunflowers, groundnuts, and onions. As one of the outgrower scheme participants noted that she participated in the scheme for soy and groundnuts to “diversify [her] crops: I realize that the weather pattern has changed, so I should grow more than just maize.”

*Reach to poorer farmers:* Whereas most larger outgrower schemes with less local knowledge will tend to engage only farmers with larger asset bases and a track record of commercial engagement, CADs were able to leverage their knowledge of local farmer practices to select the best farmers, regardless of asset base, for participation in the scheme. This local knowledge enabled the schemes to reach relatively poorer farmers because of their relationship and reputations as good growers.

**Drought Effect on Adoption**

In particular, the droughts during the 2014/15 and 2015/16 maize seasons provide a snapshot of the risk management strategies of target smallholders, and how these strategies spur or depress adoption of different practices. The droughts were cited (in the form of ‘erratic rainfall’ in recent seasons, or some version thereof) by many farmers as the reason they adopted minimum tillage, a practice explicitly focused on soil moisture retention. At the same time, this same increase in climatic volatility increased the perceived (and actual) risk of purchasing commercial inputs like seed and fertilizer, depressing demand. This depressed demand was a function of two inter-related factors: a lack of funds, which most farmers cited, needed to purchase the improved inputs at planting because of lower yields from years before, and an increased wariness of investing more cash, and thus increasing risk exposure, into agricultural activities. This suggests two things:

- First, that adoption of cash intensive technologies is highly sensitive to changes in farmer perception of environmental stability. In scenarios where smallholders perceive high volatility (e.g. increased risk of drought in future seasons), even farmers with a firm grasp of the benefits of improved inputs will not adopt them because of increased risks.
- Second, the CADs were still successful in promoting resiliency-enhancing behaviors, specifically conservation tillage, because this was a cash-neutral risk management technique for smallholders facing increased frequency of drought.

**CONCLUSIONS**

1. The producer company models show strong potential to become an enduring change in the rural input supply system. The nature of the model demonstrates high potential for duration and diffusion (see #2 below), and there are already several additional groups of CADs signaling a desire to create imitation PCs. While the model is still too recent to evaluate conclusively, it should be revisited in two or three years to re-evaluate.

2. Farmers interviewed reported a net positive impact of the producer company on their lives. Technologies, in particular conservation tillage practices, have resulted in time saved from no longer having to travel to town to purchase inputs; increased yields, and improved food security. Since the research sample was not representative of the full beneficiary population, further research would be needed to determine how widespread these impacts are as additional PCs begin and expand operations in the region.

3. The model’s flexibility to adapt is key to increase prospects for sustainability and imitation. A key theme that emerged from the producer company interviews is that the capacity to adapt the company model to virtually any product or service line increased their interest and increased the perception that the venture was less risky. The model can be adapted moving forward if market conditions shifted and they needed to diversify or drop certain products or services. Additionally, this flexibility should increase the potential for imitation, as other current or potential firms evaluate the model’s relevance for other product and service lines, even outside of agriculture. Future projects seeking to drive imitation should develop models that are not tied to a limited number of value chain-specific products, but instead include mechanisms to encourage firm leadership to continuously evaluate the market for new opportunities, or to pivot away from existing opportunities when market dynamics move against them. This skillset and firm capacity,
more than a specific product line (such as seed or fertilizer), seems to have the greatest potential to sustainably transform the local retail sector to better supply smallholders’ needs.

4. Horizontal diversification is a core part of success. The interviews with farmers and PC CADs painted a picture of the local market system in which retail demand amongst farmers for any given product was always tenuous, but that, across all potential goods and services, there was a consistent gap between supply and demand. In this context, firms need to diversify product offerings as much as possible to capture as much of this demand as possible, smooth revenue across calendar months, and develop a healthy balance between high volume/low margin products (such as seed) and low volume/high margin products (such as vaccines and chemicals). Additionally, as PCs diversify the product lines of their retail CAD shops, the village-based customers increasingly benefit in two ways: first, through time savings from ‘one stop’ shopping, and second, as PCs take on more value addition services (such as milling and processing), they are reducing ‘distance tax’ that farmers pay for those value-added goods locally. For example, approximately 22% of maize growers are net maize consumers in Zambia, buying more in refined maize meal than they sell at the end of their season. The farther from the consumer that this milling occurs, the greater the transportation and intermediary costs, which are often passed on to the consumer. If the PC model proves able to localize these value addition services, even net buyers of maize meal will pay less, as their maize is not traveling as far or passing through as many hands before it is processed and sold back to them. These kinds of local economy ‘multipliers’ are still theoretical, but could have pro-cyclical effects, generating ever growing and diversified local firms and employment.

5. Risk mitigation is as important or more than income increase for farmers. One consistent finding across the farmer interviews was their desire to prioritize risk mitigation over potential yield increases. Most farmers interviewed demonstrated sophisticated understanding of the potential for increased frequency of extreme weather, including drought and floods, raising the risk potential of increased investments in agricultural inputs. It seemed (though no respondent explicitly stated), that one reason ripping and basin making were consistently and widely adopted within the past few years is that it is one of the few technologies promoted to farmers that does not require increased cash costs and risk exposure for farmers. In this context, it is increasingly important for projects to evaluate potential practices and technologies for promotion not only for their potential to raise incomes and yields in optimal climatic conditions, but also for their effect on the farm and households’ risk exposure. Promoting changes in practice that improve resiliency of current yields, even without significant potential for yield increases, in the face of increased climatic shock will become increasingly important to focus on and promote in the future.

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C. RWANDA: SYSTEMIC CHANGE CASE STUDY ON RDCP II

SUMMARY

The Feed the Future Rwanda Dairy Competitiveness Program II (RDCP II) is working to strengthen Rwanda’s entire dairy value chain. The program is also playing a leading role in improving Rwanda’s food safety standards for dairy, while raising consumer awareness about the importance of drinking quality milk. This case study highlights an early stage example of systemic change in the dairy industry, as RDCP II’s efforts to introduce milk quality grades and standards into the industry, along with new aggregation and output models, is starting to alter the norms and practices of key actors (processors, outlet stores), building incentives for these behaviors up and down the supply chain.

About the project: RDCP II is a $15 million, 5-year activity implemented by Land O’Lakes International Development and its partner African Breeder Services/Total Cattle Management (ABS/TCM). The project is designed to reduce poverty through expanded marketing of quality milk, and is a successor project to RDCP I. RDCP I worked in three districts in Eastern Rwanda and the capital city of Kigali. RDCP II primarily worked at the farm level to improve milk quality among PEPFAR-supported farmers, but also engaged to a limited extent with the dairy board on their operations. In contrast, RDCP II covers 17 districts across all of Rwanda’s provinces. It has a greatly expanded focus on productivity, milk quality, consumption, policy change, facilitating private investments, accessing financial services and accessing business development services. Whereas RDCP I took a more direct delivery approach, RDCP II was more market-oriented and facilitation-based. This case study focuses on RDCP II, in particular its work to change industry norms, through informal and formal rules, around milk quality.

Key findings include:

- There is strong evidence that both an underlying business model facilitated by the project (leveraging milk collection centers for aggregation and ‘milk zone’ franchised businesses as output centers for quality milk sales), as well as industry-level adherence to defined quality standards, are becoming institutionalized, independent of RDCP II, amongst influential firms that control major portions of the dairy market.
- Consumers recognize and reward higher quality milk, and while this is currently limited to Kigali-based sales, the benefits of quality improvements flow across the system, including through to many rural businesses (e.g. farms, milk collection centers, etc).
- Imitation by non-project partners is beginning to take place. This is an excellent signal that quality standards are playing a role in influencing market actor behavior, and that key value chain actors (processors in this case) are becoming de-facto enforcers of the standards rather than relying solely on the government agency to do that vetting for them.
- Quality standards are being adopted by new entrants.
- In terms of replication, RDCP II’s pilot with lead processor Inyange started with just a single milk zone, but the company has since replicated the model with dozens of milk zones independent of project support. After its initial imitation, Crystal Fresh, another lead processor, is replicating the milk zone model, expanding its milk retail outlets.

CONTEXT

Rwanda is a landlocked country in the Great Lakes region of central Africa covering roughly 26,000 square kilometers of land and 1,400 square kilometers of water. Rwanda’s population is estimated at 11.8 million people (of which 52% are women) in

34 A milk zone is a single retail kiosk dispensing pasteurized milk.
2016. The current population growth rate is estimated at 3.5 percent per year while the population density is the highest in Africa, at 407 people per square kilometer, and more than 500 people per square kilometer of arable land.

Despite its small geographic footprint, more than 90% of the population depends on agriculture for their livelihood, and the agricultural sector contributes 34% of the national GDP. Strong economic growth over the past decade has been accompanied by substantial improvements in living standards, evidenced by a two-thirds drop in child mortality and the realization of near-universal primary school enrolment – Rwanda had met most of its MDGs by the end of 2015. Rwanda’s long-term development strategy is to transform from a low-income agriculture-based economy to a knowledge-based, service-oriented middle-income economy by 2020. Today, 39% of the population lives below the poverty line.

The Rwanda dairy industry offers a potential pathway out of poverty for the large numbers of households keeping livestock and providing services and value addition throughout the supply chain. The current "farm gate" value of milk is approximately Rwf 79.7 billion (US$1.3 billion). The dairy industry contributes 15% to agricultural gross domestic product and 6% to GDP.

However, the industry is not living up to its potential. Rwanda’s dairy consumption and production levels are both low relative to world and regional averages. Milk consumption in Rwanda is 40-59 liters per person per year, compared with 111 liters per person per year in Kenya. Rwanda produces around 706,000 metric tons of milk annually (2015 data, estimates), which translates into an average daily yield per cow of just 3.2 liters, far below potential yields and those in more competitive countries on the continent, such as South Africa. This low average yield is driven by several factors, including that pure breeds constitute just 6% of the 1.3 million dairy cattle in the country. Moreover, the quality of raw milk has traditionally been very low, and there has been limited processing capacity.

However, there are signs that the industry is evolving in a positive direction. Rwanda’s dairy industry has increased milk production, processing and trade in the last few years. Production of milk has continuously increased through the national one-cow-per-family flagship program which was introduced in 2006 and has since seen over 200,000 cows distributed to vulnerable families. In 2013, with the support of the RDCCP II, Rwanda developed the national dairy strategy that seeks to increase milk production, processing and marketing. Nevertheless, challenges remain including domestic production of processed and unprocessed milk.

PROJECT STRATEGY

This section presents RCDP II’s strategy for fostering systemic change with respect to the widespread adoption and enforcement of quality standards in the dairy sector, and findings about what indications of systemic changes were uncovered. Quality standards that are understood, applied and enforced are a powerful force for supporting positive behavior in any market system. The challenge is to align the behavior of the many stakeholders that collectively maintain or prevent effective standards, including enforcement behavior by government agencies, investment in necessary equipment, adherence to rules by the private sector, and obtaining the knowledge and adherence to rules by farmers so they can meet the standards.

35 www.worldometers.info/world-population/rwanda-population/
39 http://www.mdgmonitor.org/mdg-progress-rwanda-africa/
40 www.statistics.gov.rw
43 Kenya 2009.
44 https://cgspace.cgiar.org/bitstream/handle/10568/2410/Dairy%20Value%20Chain%20Rwanda%20Report.pdf?sequence=1
46 Rwanda National Dairy Strategy. As of 2014/15, 40% are local breeds, 54% are crossbreeds and 6% are pure breeds.
In order for changes in the wider dairy industry (such as improved quality standards) to have an impact on small scale farmers, there needs to be effective and scalable models for connecting farmers to end markets. RDCP II’s focus has been on developing model contracts between the different key actors: farmers, cooperatives, transporters, milk collection centers (MCCs), and processors. The two early adopters of these contracts are the Inyange Industries and Blessed Dairies milk processors, who signed contracts with cooperatives of milk producers to boost their volumes of production.

Another business model that RDCP II has introduced sees milk producer cooperatives sign contracts the Milks Sellers’ Association (an associations of transporters) to transport milk from farms to MCCs, often using bicycles. This overcomes farmers’ previous challenge with getting their milk to the milk collection center before bacteria levels rise too high. RDCP II facilitated the creation of associations to link existing transporters together, so they could offer their service in bulk to a cooperative’s member farmers. This way a single transporter can carry the milk from three to five farmers in a given area at the same time, reducing transport costs for producers and helping their milk reach the MCC on a more reliable timeframe. It also increases the utilization of the transporter’s capacity, providing a win-win business model. Further, the transporter is equipped to test the quality of milk and assumes responsibility thereafter, reducing risks of loss to the producer.

On the consumer side, RDCP II has piloted with Inyange Industries, a large processor. Inyange has branded milk retail outlets/kiosks (termed ‘milk zones’) where pasteurized milk and milk products are sold directly to consumers in a standardized manner. These milk zones are operated by entrepreneurs who enter franchise agreements with Inyange to use the brand. Milk zones are sometimes completely new businesses, and sometimes already existing milk retailers that have decided to align with the milk zone brand. Inyange takes responsibility for testing milk quality at each milk zone, which compete directly with informally marketed dairy products sold at kiosks that do not follow comparable quality standards.

In summary, RDCP II’s vision for a dairy sector that produces high quality milk and milk products is as follows:

- Processors enter into agreements with members of milk cooperatives to guarantee their supply of milk. Milk that is purchased by the processors must meet various conditions, including that it is supplied within two hours of milking.
- Cooperatives enter into agreement with transporters (groups of individuals who own bicycles) to organize farmers to supply milk on a schedule.
- Milk prices are negotiated and agreed upon for a certain period (e.g., 8 months).
- Rural MCCs receive the milk collected from farmers and test its quality before selling it onward to clients/processors.
- Local governments have clear guidance – via a ministerial order – on the expected quality standards governing milk production, transportation and retail and ensure its enforcement.
- The Rwanda Agriculture and Livestock Inspection Services (RALIS) inspects MCCs and provides guidance towards award of quality certification to the centers that meet the requirements. RALIS enforces the standards and will order changes to or even the closure of centers and processors who do not meet the ministerial order requirements.

This model is presented in the following results chain, which outlines selected impacts and the change process that RDCP II anticipates from its interventions in the dairy sector. The intervention assumes that the adoption of improved standards at the processor and cooperative level, combined with innovative business models for supporting and aggregating high quality milk from farmers, will enable small scale dairy farmers to more fully participate in the market. The wider market relies on government actors following through on their commitments to enforce the new standards through audits and actually shutting down businesses that fail to make the grade. This will require an investment of resources, time and ultimately political capital (to withstand any backlash from businesses that get shut down), which is a crucial assumption underpinning the entire theory of change.

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47 The most common contamination sources have been identified and an acceptable threshold has been established for each.
Figure 8. RDCPII Results Chain
To achieve the changes outlined in the above results chain, RDCP II’s strategy has been to partner with a multitude of actors in the milk value chain, including processors, cooperatives, the Government of Rwanda, financial institutions and input service providers. RDCP II has undertaken the following activities:

- Working in close collaboration with the RALIS and the Rwanda Standards Board to develop a national pilot training, testing and certification program to enable milk cooperatives to achieve existing dairy quality standards.\(^{48}\)
- Designing and implementing a communication plan to share information about the standards, with government buy-in. This included providing farmers and other actors with flyers and materials that displayed the basics of the standards on how to handle, transport, and process the milk. Milk transporters were organized and trained on how to handle and transport the milk.
- Attracting the interest of Inyange and other milk processors, the banks and other financial service providers to provide services and support to the dairy value chain actors.
- Facilitating discussions between cooperatives of milk producers and potential buyers.
- Supporting the development of early adopters of various new business models by coaching/training them and providing them with funds and equipment.
- Training MCCs and providing them with equipment to test the quality of the milk received from farmers.
- Coaching and mentoring staff at key MCCs and dairy processors to understand quality standards and make investments to be able to pass inspections.
- Facilitating the development and dissemination of Ministerial orders to actors in the milk sector on proper milk handling during the production, collection, transportation, and retail of fresh milk and dairy products.
- Generating buy-in from the government and private sector actors on implementation of and adherence to quality standards.

Several critical assumptions underpin RDCP II’s interventions:

- All actors agree on the quality requirements for milk to be sold and how that quality will be measured. This includes trust that quality will be measured fairly and consistently.
- Economic benefits (e.g., higher margins, more consumers) result from providing good quality product and sanctions arise from poor quality.
- Banks and service providers agree to adapt their business models by providing customized services to milk producers, milk cooperatives, milk zone owners and other actors in the value chain.
- Strong support from the government to enforce quality measures as outlined in Ministerial orders at the national level and benchmarked against COMESA standards.
- Sufficient value is being created for the different actors to maintain their interest in adhering to the standards.

**EVIDENCE OF SYSTEMIC CHANGE**

**Imitation**

A key indication of imitation was the decision of a non-partner processor, Crystal Fresh Milk, to imitate major aspects of the model. Crystal Fresh Milk has entered into a contract agreement with farmer cooperatives to buy their milk and process it. The company has also established its own ‘milk zone’ (kiosk) outlets following in the steps of Inyange Industries. Crystal Fresh has started to train groups of farmers who supply them milk to follow the standards. They reported their motivation for doing so as wanting to have a secured source of supply. Crystal Fresh has trained its group of milk transporters to verify the quality of the milk before collection and get it to the MCC within a couple of hours. This is an imitation of activities initially undertaken by the project (training and set-up of transporter associations) which we can now see being imitated and taken up by the private sector. Its milk outlets are now apparently following the standards despite not having any direct support from RDCP II. They are now seeking additional support to expand their business, and have been offered financing to purchase the equipment needed to process and package milk.

\(^{48}\) National and COMESA standards already existed at the start of RDCP II, but had not been widely adopted.
Another example of imitation was the decision of milk zone owners, who were not part of the initial group of owners supported through the program and those who set up their business after the project support ceased, to meet the new quality standards. They found that this was required to work under the Inyange franchise, as the company is refusing to work with owners who do not do so. This is an excellent signal that quality standards are playing a role in influencing market actor behavior, and that key value chain actors (processors in this case) are becoming de-facto enforcers of the standards rather than relying solely on the government agency to do that vetting for them.

Buy-In

As per the model introduced above in Section II, each aspect of buy-in is presented and analyzed here.

**Satisfaction:** At this early stage, all actors are satisfied with the implementation of the standards and the agreement they have had with other actors in the chain. However, it is still early in the audit process, and any businesses that do not do well may ultimately prove dissatisfied with the model. No visible resistance was expressed by any of the actors who were interviewed. The government expressed strong satisfaction with how the standards have been adopted to date. It has given six months to all businesses to comply with the standards. After the six-month period, audits will be led by the RALIS and businesses which do not meet the standards in the way they collect, process, transport or store milk and dairy products will be closed.

Farmers were satisfied that they were able to sign agreements with milk transporters to get their milk to the MCC less than two hours after milking. They are also satisfied with the agreements they signed with MCCs as they are certain to sell their milk at a set price without risk of the milk spoiling before they could find another buyer.

Milk transporters are satisfied with the training they received and the agreement they had with farm cooperatives and MCCs through the pre-existing Milk Sellers’ Association, which is a member cluster of the Rwanda National Dairy Platform, through which they have pledged to support the implementation of dairy standards. They are also better able to predict their revenues as they know the quantity of milk that will be sold and the percentage they can get out of it if they follow the rules. Finally, MCCs are happy as they are more likely to have quality raw milk delivered every day and they can better predict their revenues.

**Continued use:** Actors that were interviewed claimed to be continuing to use the standards and the model as taught from the project. Although the trainings with farmers, transporters and processors took place a couple of years ago, the researchers had the opportunity to see good practices sustained in the field.

Farmers now follow good hygiene standards when milking their cows. The rationale for this is that tests at the MCC show that the milk received is meeting the required quality standards. However, this assumes that testing is done properly and results are not tampered with, something that was questioned in the Mid-Term Evaluation when certain MCC’s reported 0% rejection rates.\(^\text{49}\) The actual rate of compliance with the new system will be monitored as the government begins its audits.

Milk zones have followed suit. During the fieldwork for this research the standards continue to be displayed on a notice board in all milk collection centers and cooperatives that were visited. Inyange is monitoring its milk zones for compliance with the standards. This is a very interesting practice as it signals self-regulation in advance of external auditing by RALIS, who will be auditing the milk zones to see if they comply with the standards. The government has started to audit milk processing and selling units and deliver certificates of conformity. It has also continued to emphasize the importance of the standards to market actors by issuing a note directing all actors to use them.

The milk collection center in Ngondore is being revamped to meet the standards, and Blessed Dairies has also since upgraded all of its milk kiosks to meet the standards. Milk transporters have consistently been using the standards to collect and

\(^{49}\) RDCP-II Mid-Term Evaluation Report.
transport the milk. The quantity that is being rejected for non-compliance by MCCs from transporters has been steadily dropping and is almost nil. The system will likely continue to be used since all the actors are happy with it and are continuing to use it despite no longer receiving any significant support from the project. They are now paying for all their operating costs.

An important factor supporting the continued use is that the new system brings significant financial benefits for the processors. By outsourcing the collection system to transporters, it reduces their logistical costs while maintaining the reliability of the supply chain. The standards have allowed some of the dairies to clearly prosper. Blessed Dairies’ investment in Hazard Analysis Critical Control Point (HACCP) certification – paid for by the company itself – has contributed to an over 400% increase in sales (to 100,000 liters of milk per day) through its milk collection centers. Blessed Dairies has also expanded its client base to include quality-conscious companies like RwandAir, the nation’s largest airline carrier, and has started to sell its products in neighboring countries. Part of the business’s success in getting the certification and expanding its volumes has been investment in dairy processing technologies as well as working with equipment manufacturers and RDCP II staff to secure cooling tanks, pasteurizers and machines for yogurt production.

**Adaptation:** Many aspects of the model are working as they were originally introduced. Milk producers who have been supported are using the model as it was engineered by the project: they are members of a cooperative that sign an agreement with the milk transporters and with a MCC. Milk is then delivered from the farm to the MCC by the transporters. One observed example of adaptation of the model – which does not directly relate to the milk quality standards that the project supported – was that Inyange began allowing customers to bring their own containers to purchase milk. Inyange used to sell milk in customized packages, which had a higher cost per liter. Now they have adapted to customer demand and in all milk zones are using large coolers (1000 or more liters) so customers can bring their own containers to the milk zone, and get milk at a reduced cost (as much as 40% lower). This adaptation demonstrates that the firm is learning about customer preferences through the milk zone retail model, and adjusting its products to better fit demand.

**Further investments:** In order to improve milk quality, almost all the actors involved in the chain have had to make further investments. Some were initially supported by the project, such as Blessed Dairies, which received one large tank from RDCP II to collect the milk from the MCCs, but has since bought four more tanks and other equipment to increase its capacity to process the milk. Blessed Diaries has also invested in its processing facilities and is now processing milk into butter, cream and cheese. Inyange is working with investors to purchase a larger processing unit and the equipment to transform the excess milk into powder. MCCs are also making further investments. A milk collection center in Ngondore is being upgraded by the farmers themselves to meet the standards, a sign of farmer buy-in and the willingness of cooperatives to invest. Milk collection centers that were visited during the case study were purchasing testing material to test the quality of the milk on the local market.

The government is preparing to conduct a nationwide, annual audit of the milk collection centers to ensure they follow the standards, which will require significant resources, none of which will be provided by the project.

**Replication:** A primary example of replication is by Inyange, RDCP II’s primary partner processor. RDCP II’s pilot with Inyange started with just a single milk zone, but the company has since replicated the model with dozens of milk zones independent of project support. After its initial imitation, Crystal Fresh has continued to replicate the milk zone model, expanding its milk retail outlets.

**Other Indications of Systemic Change**

There are signs that the model has been institutionalized. The government is supporting the implementation of quality standards and milk processors are now following them. This is a powerful force for sustainability as it creates a new competitive norm for new entrants into the dairy sector. New milk zones are following the standards too because, according to some interviewees, people would prefer to buy their milk from places that look as nice and clean as the ones supported by Inyange and Crystal Dairies. The RALIS and district-level veterinarians are also now enforcing the implementation of the standards and encouraging local businesses to follow them.
Additionally, the project facilitated greater participation of women in the value chain. Traditionally, women did not own or milk cows in Rwanda, both of which have begun to change. RDCP II included both men and women in their meetings and trainings, which created some tensions initially but eventually became accepted.

Growth in production and prevalence of contracts between cooperatives and collection centers has enabled farmers’ cooperatives to secure contracts to sell their milk across the country. Processors are now selling some of their excess production in neighboring countries such as DRC and Uganda, expanding regional markets for Rwandan milk. At the same time, the development of the milk collection centers and milk zones on the retail side has also boosted consumption and increased the size of the domestic market. Financial institutions have started to respond to the growth of the sector by developing tailored financial products, such as the loan product that Opportunity Bank has developed for Crystal Dairies. This has begun to restore trust among bankers who previously were skeptical of the creditworthiness of dairy sector actors given the non-performance of loans from the Rwandan Development Bank to MCCs.50

CONCLUSIONS

Key conclusions which have emerged from this work include the following:

- **RDCP II demonstrates the error of assuming that policy enforcement need always be initiated by government action.** In this case, it was critical to first demonstrate that value chain actors could enforce quality standards, and that there was significant support within the industry for quality standards. In other words, RDCP II’s work with the private sector helped to shape a norm that quality standards were important and good for business, which made it feasible for the government to act. This was undoubtedly facilitated by RDCP II’s strategy of creating positive benefits to providing quality milk – introducing a business model reaching a quality-conscious market segment – before emphasizing punitive action for non-compliance. Getting buy-in from the top two processors in the country was instrumental to pushing other actors to adopt the standards and incentivizing imitation by other businesses.

- **Nevertheless, government enforcement of quality standards is critical for institutionalizing and reinforcing this norm across the industry, particularly in the informal sector that could potentially use price to undercut the quality-conscious market segment.** The as-of-yet incomplete institutionalization of the milk quality enforcement mechanism is the biggest potential threat to the maintenance of the quality upgrading that RDCP II has supported. Given the limited time between when the ministerial order was enforced and the date of the case study, it is still unclear whether the government will fully embrace its role as an enforcer of standards, particularly if it meets significant resistance from the informal sector or others.

- **Also, the conditions in Rwanda were conducive to the enforcement of standards and the belief that this was a realistic outcome.** Rwanda’s government has a history of enforcing standards in other industries and a reputation for competency, which gives it credibility with industry players.

- **This case study also demonstrates how the conditions favoring systemic change can vary even within a country.** Kigali has a large number of middle and upper class, time-pressed consumers who were able to pay for quality milk once they valued it (and of course once the overall dairy system had evolved to enable this through extensive changes in quality management at the farm, collection points, and transporters). It was therefore logical that quality pasteurized milk was initially provided for sale in Kigali. While the upgrades to the MCCs have meant that the milk they supply in rural areas is also of higher quality than before, to date rural consumers do not have access to the high quality milk that can be obtained from the milk zones. However, a number of the other products introduced to the market in the previous five years – yoghurts and cheese in particular – do make their way outside of Kigali to district centers and peri-urban (some even rural) markets.

50 Mid-term Evaluation.
Lastly, the connectedness of RDCP II to other development programs was important to its success. The project leveraged the momentum provided by the one-cow-per-family program to boost milk production and utilized the capacity of the Rwanda Standards Board to train and mentor RALIS for the pilot national certification program.
D. GHANA: SYSTEMIC CHANGE STUDY ON ADVANCE II

SUMMARY

Feed the Future Ghana ADVANCE II is increasing the competitiveness of the maize, rice and soya value chains in northern Ghana. ADVANCE II achieves this through boosting agricultural productivity, improving value chain actors’ access to markets and finance, and strengthening local capacities. The project has been promoting and fostering the growth of outgrower businesses, changing the structure of aggregation systems for input and output markets in northern Ghana, improving terms of trade for smallholder producers and opening up a business model through which financing and other agricultural services can more effectively and profitably flow through the system.

About the Project: ADVANCE II is a five-year project implemented by a consortium led by ACDI/VOCA, with Technoserve, PAB Consult and ACDEP as the partners. The project is expected to reach over 113,000 smallholder farmers by end of 2018. Outgrower businesses (OBs), which ADVANCE II is promoting, are a relatively recent niche in the grains industry in Ghana. They function as a bridge between larger input, service and off-taker institutions and smallholder farmers.

Key Findings include:

- ADVANCE II effectively illustrates the critical elements of systemic adoption and adaptation as market actors continue to innovate in response to changes in the market and their own learning experience. A robust set of activities initiated by ADVANCE II is being replicated by system actors with no support from ADVANCE II or other projects. The level of innovation, imitation, copying, buy-in is extensive, and supported by a relatively stable and competitive enabling environment. The growing number of OBs that do not work with any project and those who are expanding without project resources indicates that OBs are a systemic change in cereal markets in Northern Ghana.

- The field work found significant evidence of buy-in of innovations in smallholder practices, OB services, modification to input and service provider business models and in communications between offtakers and their suppliers. In each instance, there was clear evidence of satisfaction, at least with part of the innovation. Continued use is more difficult to detect given the short time that ADVANCE II has been operating but there are enough instances of satisfaction that users of the new innovation are expanding their use of the innovation through new investments and new actors are copying whole or in part. In addition, an ADVANCE II survey showed revenues increasing by 13 percent from 2014 to 2015, indicating continued use is profitable.

- There is much copying among each of the system actors, demonstrating replication. As of October 2016, ADVANCE alone was working directly with 368 OBs (more than double that in 2014), who collectively aggregate product for over 100,000 farmers and provide input credit to nearly 43,000 of them. OBs are also expanding and beginning to mentor other weak, new, or aspiring OBs. Recently, OBs in Upper West, Upper East and Northern regions decided to form one OB network in each region to undertake advocacy activities and exchange experiences.

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51 These figures only reflect farmers engaged in the ADVANCE project; OBs also work with other farmers, although the project does not track this in its data monitoring systems.
There is anecdotal evidence that adoption of the OB model in Northern Ghana may have reached a tipping point beyond which the innovation process is likely to continue to expand on its own. There is a considerable level of copying each other’s innovations, adapting them to their own use, replicating these and crowding in by new actors in the system.

**CONTEXT**

Ghana has, at least in relative terms, has created a robust enabling environment for the systemic transformation of its agricultural sector. At the same time, there remain a number of constraints that augment smallholder risks particularly in the context of climate change, such as high interest rates that prevent borrowers from increasing their investment.

Commercial seed markets are weak, yet there is considerable movement and innovation in models and approaches to build bridges between private input companies and output buyers and smallholders. Yet, like many of its neighbors, Ghana continues to struggle to find a balance between developing a robust and private sector seed market for its own and imported varieties while meeting its plant protection obligations. As a result, maize yields, especially in the north of Ghana, remain a fraction of what smallholders could and should achieve if a private and well-regulated seed market was allowed to emerge. Further, there is not a market system that can rapidly multiply and commercialize drought tolerant varieties.

**PROJECT STRATEGY**

ADVANCE II has focused on the OB model (see Figure) as a bridge between input companies and output market buyers for farmers’ product. The OB is an adaptation from ADVANCE II’s predecessor project, recognizing the importance of a more commercially focused and resource endowed linkage between actors on the input and output side of smallholders and the smallholders themselves. OBs bridge smallholder farmers to service providers lacking mechanisms or services adapted to reach large numbers of service providers and buyers lacking mechanisms to ensure the volumes and quality demanded by their buyers. They also function as service providers, offering tractor services, short term input financing, post-harvest shelling and rudimentary extension services backstopped by the Ministry of Food and Agriculture’s extension specialists. OBs have existed for some time in Ghana, but were mostly focused on aggregation of produce as well as tractor services provision (if any). ADVANCE II grew this model substantially, and encouraged additional services ‘scaffolded’ on, such as input credit and extension. So, by working with ADVANCE II (and its predecessor project ADVANCE I), OB Aswaba Farms provides a wider range of services to his outgrowers.

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52 The seed situation is changing in Ghana, albeit slowly. PANAAR and Pioneer hybrids have been tested and certified, though not yet gazetted. Hybrid seed of certified varieties are being imported but there is no domestic production of these seeds at this time.
Smallholder farmers directly or indirectly supported by ADVANCE II are organized into groups. Under the model, OB’s receive assistance in the delivery and management of services to groups of smallholders, farmer groups are used by nucleus farmers and OBs for economic and efficient delivery of input and extension services, in the aggregation of farmers’ product to fulfill contracts, and to assist in the enforcement of contracts.

For example, Mohamad is an outgrower businessman based out of Asawaba Farms, and currently works with 820 outgrowers, 40% of whom are female, based throughout the Tolon and East Gonja districts. As he expanded his OB, he has added additional services, from providing crop protection inputs and fertilizer to now including extension, ploughing and harrowing, as well as pre-financed inputs for 200 of his best outgrowers. Mohammed and other OBs generally sell to the larger millers in the region – overall, major processors and traders who work through OBs include Agro-Business Services (ABS), Premium Foods, and Akate Farmers. Some of these, such as Akate Farms, also provide financing to OBs. John Deere supplies tractors and farm equipment to outgrower businesses who either purchase directly or arrange financing through banks such as the Sinapi Aba Trust.  Mohammed believes he will continue to provide services to his outgrowers even without ADVANCE II or other donor funded projects. He now sets aside funds for the depreciation and maintenance on his equipment, and indicated that recently all the OBs in his association have promised to do the same thing. He credits ADVANCE II for much of his success.

EVIDENCE OF SYSTEMIC CHANGE

Through interviews and focus groups with market system actors in the maize trade, from smallholder farmers downstream to off-takers and service providers, this study observed widespread imitation, adaptation of imitated models, investment in expanding innovations, and replication by actors not affiliated with any program public or private. Through the strength of weak ties (SWT), bridges have been formed between input companies and off-takers to groups of smallholders. Through these bridges, OBs are introducing innovation into groups and associations of smallholders, and within these groups of smallholders, innovations are being adopted at differing rates depending upon whether a particular farmer is her/himself an innovator, an early adopter, a member of the early or late majority, or a laggard. Each of the critical elements of systemic change can be found in the behavior of various value chain actors including imitation, satisfaction, buy-in, continued use, and further adaptation of innovations introduced into the value systems in which the project is operating. It is clear that ADVANCE II is operating as a catalyst and an accelerant in this robust system, introducing innovations at a much faster rate than the market would on its own. At the same time, the question must be asked of activities heavily subsidized by ADVANCE II, such as its equipment cost sharing grants, whether said grants are stimulating demand through demonstration, demand which will continue to expand after the project, or whether demand at full cost actually exists.

Imitation

There was substantial evidence of copying occurring by actors interviewed and reporting of copying by other actors not included in this assessment. This is facilitated through both formal and informal networks. For example, many OBs have recently formed an association in their region with support from ADVANCE II. As of October 2016, ADVANCE II alone was working directly with 368 OBs (more than double that in 2014), who collectively aggregate product for over 100,000 farmers and provide input credit to nearly 43,000 of them. OBs are also mentoring other weak, new, or aspiring OBs: in FY16, 25 OBs were mentoring 125 individuals, up from 10 OBs mentoring 78 individuals in FY15. This is a behavior the ADVANCE II project actively encourages, building on the fact that many OBs are community leaders, which traditionally have a cultural role in mentoring others.

There appears to be broad convergence about the potential of the outgrower business as an effective bridge between offtakers, input companies, and financial institutions and the large number of smallholders to whom they offer an increasingly robust bundle of services, from whom they aggregate a volume of product that clears their repayment obligation for services rendered. With access to good agricultural practices (GAP) and tractor services, smallholder farmers appear able to double their

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53 These figures only reflect farmers engaged in the ADVANCE II project; OBs also work with other farmers, although the project does not track this in its data monitoring systems.
yields. This seems a sufficiently strong incentive for multiple market system actors to copy or innovate in order to offer improved services to smallholders or to the OB that functions as a ‘bridge’ to them. The doubling of smallholder yields is occurring for the most part without widespread access to hybrid or otherwise highly productive maize seed.

ADVANCE II is also starting to see some copying and crowding in amongst financial institutions that are part of the OB model. For example, Sinapi Aba Trust (SAT), a licensed bank, is financing OBs and informs smallholders of credit opportunities and tractor services available from the OB. Payment for services is undertaken by the OB on behalf of its smallholders to SAT. At harvest, OBs receive repayment in kind from their smallholders which is then sold to offset smallholder liabilities at SAT. The Trust has provided credit to about 7,000 ADVANCE II-assisted farmers since 2013. The financial institution believes its support to producers is transforming its own operations in rural communities. SAT benefits from the relationship with ADVANCE II through expansion of its loan portfolio. It also derives income from servicing farmers to enable sustainable operations. In 2015 three other banks started attending meetings with ADVANCE II to develop similar strategies – UT Bank, NIB, and Fidelity Bank.

Buy-In

Satisfaction

Many of the OBs, product buyers, and outgrower farmers reported a high level of satisfaction. Additionally, an ADVANCE II survey showed revenues increasing by 13 percent from 2014 to 2015, indicating continued use is profitable. As a result of the access to markets and financing the OB provides, many farmers are seeing a significant increase in yields and a reduction in post-harvest losses. Non-participating farmers fell into two categories. The first were adopting elements of GAP from their neighbors or farmers in nearby villages; this was surprisingly common but produced less than optimal results. The remaining set of non-affiliated farmers reported that they did not have access to inputs or information as to how they could improve their performance.

Adaptation

This study found some examples of adaptation taking place. For example, Wumpini Agro Chemicals is an input supplier that serves northern Ghana. Wumpini changed its principal business model from wholesaling inputs to small community level retail agrodealers to direct marketing to smallholders through their associations and OBs. Based on lessons learned from women’s farmer groups that buy from them, Wumpini initiated solidarity group input supply depots in targeted communities. While this has been frustrating to a number of village level retail agro-dealers, Wumpini believes them to be obsolete and less service oriented that its current links to farmers through the input supply depots. Wumpini believes many agro-input companies are copying its business model and that their partnership with ADVANCE II has been beneficial.

Replication

During the field interviews, this study observed that some smallholder groups were copying successful practices even though they were not working with an outgrower business. Further follow up verified that some clusters of smallholders adopting GAP and or postharvest innovations had not heard of ADVANCE. One of these had heard of ADVANCE but not worked with the project. This smallholder cluster worked with an OB which received support from ADVANCE, but was continuing to expand its activities on its own. This suggests adoption and replication by the OB on its own, as well as by the cluster of smallholders not associated with ADVANCE.

Further Investment

OBs in Upper West, Upper East and Northern regions decided to form one OB network in each region to undertake advocacy activities and exchange experiences. The formation was supported by the project, but the set up was at their initiative and

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54 The reason for lower performance by farmers who copied those supported by ADVANCE might be the lack of follow-up to ensure that the copying farmers had full knowledge of the improved practices. This, however, could not be tested.
were the first OB networks in Ghana. In addition, the Bonzali Rural Bank, which provides banking services to rural communities in eight districts of the Northern Region, is financing OBs to acquire tractors to provide land preparation services to smallholders. Other banks are now realizing the viability of the sector and copying its business strategy.

**CONCLUSIONS**

ADVANCE II effectively illustrates the critical elements of systemic change, including widespread evidence of adoption and adaption of a structural innovation, i.e. the growth of OBs as intermediaries in a market system, as well as the use of improved agricultural practices diffused, at least partially through the OBs. Much of the widespread imitation, adaptation, and replication by different value chain actors can be directly attributed to ADVANCE I and II interventions, or indirectly by actors copying what they learn from ADVANCE partners. At the same time, there is so much crowding in by multiple actors and learning from multiple other actors that some attribution cannot be determined.

The OB-smallholder model has grown rapidly and appears to continue to grow on its own. While it was outside the scope of this assessment, the ADVANCE OB model may have reached a tipping point where it will continue to expand and evolve without additional resources, though unlikely to expand at the same rate. The level of buy-in and imitation by multiple value chain actors is almost dizzying. The high level of women’s participation in these schemes is a positive surprise. Women have a deserved reputation for being more likely to honor financial obligations so some OBs have initiated their operations with women’s groups.

In interviews with farmer groups, female members reported reduced dependency on their husbands on account of increased incomes from implementing the new farm practices. The new wealth in the community is evidenced by conversion from thatch to aluminum roofing sheets on their houses. Off farm, group members now have more resources and time to engage in other activities such as trading, dressmaking (especially by females) and other microenterprises including photo-copying, mobile device charging, and managing cash transfers on mobile devices. A number are upgrading from bicycles to motorbikes.

How well does the ADVANCE II case support the theory of change posited earlier in this paper in Section II? ADVANCE relies heavily on elements of weak ties posited by Grannovetter. Principal among them is the use of OBs as bridges between smallholders and the private actors supplying them with inputs and aggregating their surplus. In some cases, members of smallholder groups introduced new groups to their OB, illustrating weak tie bridges between one group and another. In other cases bridges between one group and another resulted in the adoption of innovation by the second group without a link to an OB.

Early on the ADVANCE II team recognized that it could not train all the members of any group and it needed to identify innovators and early adopters within those groups who, once trained, would use their own farm as a demonstration for their neighbors. The level of adoption of new practices clustered around 67%. This approximately follows the literature on diffusion theory which posits that 1/3 of a sample will fall into the late adoption category and 16% as laggards are more averse to change. 55 Important from a resource allocation perspective, 67% adoption significantly exceeds the tipping point at which the early and late majority of actors will adopt the introduced technology on their own. This seems to be borne out by the broad and deep evidence of imitation, crowding in, and replication.

Finally, the abundance of systemic change behavior begs the question, why? What is different about Ghana? Although this is beyond the scope of this assessment, the authors posit two hypotheses. The first is an enabling environment in which it is relatively easier to do business in Ghana than in neighboring countries (see Table 2). The second is that Ghana has relatively weak producer organizations. Cooperatives are very weak and the average size of farmer organizations is around 20 members.

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55 USAID’s FTF indicators have a broad definition of new technology adoption. Using this broader definition, over 99% of ADVANCE clients have adopted at least one new practice over the life of project to date.
Grannovetter might posit that the strong ties linking members of a community tend to stifle innovation at the expense of promoting collective compliance with group norms. Perhaps the relative weakness of collective groups, and the fact that these groups are linked through weak ties to outgrower businesses, is an advantage.
IV. BENEFICIARY SPOTLIGHTS

Profiles of key project beneficiaries are provided in the following pages, for each of the cases explored above. These are designed to spotlight individuals who have benefitted from the broader systemic change processes outlined in the full case studies in Section III.
SENEGAL NAATAL MBAY: SPOTLIGHT ON MBODJ & BROS

This snapshot profiles a beneficiary as part of the Feed the Future Senegal Naatal Mbay project. Naatal Mbay is a large-scale, market systems development project targeting the rice, maize, and millet value chains in the Senegal River Valley and the South Forest Zone. Naatal Mbay is facilitating changes at a systemic level in two key areas: revamping the prevailing contract farming system in paddy rice by introducing a more inclusive, competitive model, and introducing agricultural equipment leasing into a new geographic area, tailored for a new category of clients (millers and processors). This snapshot is part of a broader report which captures case studies of how FTF is facilitating systemic change in four priority countries: Senegal, Ghana, Rwanda, and Zambia. Access the full report at: www.microlinks.org/library/case-studies-facilitating-systemic-change-feed-future.

Ibrahima Diop is a happy farmer. He has produced seven tons of rice in the past season, five tons of which he has sold through the enterprise Mbodj & Bros at 125 CFA per kg. With the money from the sale, Ibrahima was able to repay the loans he had taken out to grow rice, have extra cash for investment and meet his family’s needs. His cash-on-hand income rose 40% from the previous year. Ibrahima achieved these goals thanks to a system of contract farming set up by the EIG and other local businessmen. For three years, Mbodj & Bros have been operating a system of contract farming for rice cultivation facilitated by the Naatal Mbay project (and its predecessor, PCE), described in detail in the full case study referenced above. Farmers and other stakeholders within the system meet at the beginning of the season and agree on a fixed price per kg of paddy rice. Based on this price, each farmer assesses his/her input and agricultural service needs. These needs are then studied by the outgrower businesses (OB) who offer loans to farmers to cover all or part of the costs. The loan is repaid in-kind in paddy rice after the harvest. Around 800 farmers like Ibrahima have benefited from the system. (As covered in the case study, the 3 processors interviewed for the study are now supporting over 3,000 smallholder farmers annually, compared to approximately 400 that they used to support before. Additionally, 20 processors and small-scale millers are participating in the system, allowing for in-kind reimbursement, with over 55,000 tons of paddy worth $12 million estimated by the project in the 2016 dry cropping season).

According to Alioune Mbodj of Mbodj & Bros, there is great demand by farmers for the contract farming model promoted by Naatal Mbay due to its flexibility and potential benefits to be reaped by

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1 In the case of climate shocks and widespread crop failure, the majority of farmers also benefit from the presence of a national crop insurance program.
farmers and their groups. Two years ago, Mbdj & Bros began to lease a large rice-processing unit from Locafrique, an equipment leasing company, using the rice paddies of Ibrahima and other farmers to ensure its profitability. In order to improve their productivity, the group entered into contract farming with them by providing soil preparation, inputs and advisory services during the production season, thereby a high quality of rice to be processed and then sold on the local market.

The partnership between Mbdj & Bros and Ibrahima is not a new one; a major change in their relationship was prompted by the Naatal Mbay project and the Locafrique group. Given that farmers in the area can produce more and better rice than the group but were limited by poor access to high quality inputs and agricultural advisory, the project brought together stakeholders in the rice sector such as Ibrahima and his friends. These discussions highlighted one of the problems faced by farmers, which was the lack of access to credit due to uncertainty of their produce sales.

This uncertainty was due to the variable quality of their produce that made it impossible to make income projections and thus access credit. As a result, Naatal Mbay sought to simplify and raise awareness about the stages of production and rice quality standards. The adoption of these stages and standards led to an increase in the quality of local produce and boosted demand for it.

Seeing the market develop, Mbdj & Bros group decided to work to acquire a rice-processing unit and increase their production capabilities. Locafrique, which started out as a vehicle leasing company, saw a great opportunity and decided to branch out into the new market of agricultural equipment. Following inquiry, it convinced Mbdj & Bros and four other large outgrower businesses from the area to lease the units. Locafrique now works in the area to see its rice processing units as well as other items of agricultural equipment, according to local needs. Furthermore, Locafrique has set up simple repayment terms which have helped to grow sales of its products. In addition to the inputs he gets from Mbdj & Bros, Ibrahima is also able to avail of Mbdj & Bros’ agricultural advice services from staff that were recruited and trained during the project. Ibrahima's production saw a huge increase, with yields growing from three to five tons per hectare, as well as a reduction in post-harvest losses thanks to better management practices.

At the same time, thanks to the support of the project, the Mbdj & Bros group was able to professionalize considerably which contributed to them developing a partnership between Ibrahima and his friends. The group built new premises, set up a transparent accounting system and a comprehensive, up-to-date database of all the farmers in the area with which it had contracted. In turn, Ibrahima and his friends benefit from the increase in their incomes and believe that the system will help to positively transform their lives and their families. Mbdj & Bros aim to repay the cost of their processing unit and continue to offer their services to all farmers who want them. Locafrique aims to sell equipment in the area and plans to expand its activities into agricultural banking, offering financial products and services to rural stakeholders.

Ibrahima and the benefits he is getting from the contract farming relationship with Mbdj & Bros is but one example of the impact seen from Naatal Mbay’s efforts to facilitate systemic change in the rice system through changes in contract farming models and equipment leasing. For more on these broader changes, read the full report, Case Studies on Facilitating Systemic Change in Feed the Future.

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2 At the time of this study, the project was training technicians directly, and initially subsidized their salaries, but this subsidy was ending, and the project is planning to end subsidies. Additional follow up work would be valuable to determine the impact of this on sustainability.
ZAMBIA PROFIT PLUS: SPOTLIGHT ON JASADON PRODUCER COMPANY

This snapshot profiles a beneficiary as part of the Feed the Future Zambia Production, Finance, and Improved Technology Plus (PROFIT+) project, a market development initiative that targets a range of value chains including maize, soybean, groundnut, and sunflower. PROFIT+ is introducing changes in the structure of the localized rural input supply system through new actors (community agro-dealers) and aggregation models (CAD-owned ‘producer companies’). While in the early stages - and compounded by the context of two years of heavy drought, which has led to shifts in behaviors from those that are revenue maximizing to those that are risk mitigating and resilience maximizing – these structural changes in the system are beginning to improve smallholder access to input and extension services. This profile is part of a broader report which captures case studies of how FTF is facilitating systemic change in four priority countries: Senegal, Ghana, Rwanda, and Zambia. Access the full report at: www.microlinks.org/library/case-studies-facilitating-systemic-change-feed-future.

Over the past three years, several community agro-dealers (CAD) in the Chipata area began selling inputs to their neighbors after participating in trainings with PROFIT+ in how to build and run a retail agroinput shop. While they found these shops successful, there were still several challenges they faced. They were still faced with liquidity problems—lending rates were too high, and banks were wary of lending them enough to make a significant difference in their operations. Without enough money, they could only offer a limited range of products to farmers in limited quantities. Their margins were slim, partially because they were only able to buy small amounts of stock, but also because for small quantities they could not get bulk discounts from suppliers, and had to pay transport costs to their shops.

These CADs knew they had to grow their businesses to remain viable, but individually could not manage or finance enough expansion. Working with PROFIT+ technical advisors, they came together to form an umbrella Producer Company (PC). As opposed to an association, this company is a separate entity from each of their retail shops, and they each invested capital and owned shares of the firm. PROFIT+ worked with them to develop a business plan and strategy. The sustainability of the CADs lies in the heart of the PC itself, and trainings are meant to build CAD capacity to a point that they can sustain and grow their new enterprises, providing a durable market point for inputs and offtake for smallholders in their area.
The Jasadon PC is focused on growing in two markets. First, they have leveraged their greater market share to secure wholesale discounts from input suppliers, reducing costs to their customers and establishing inventory credit lines with input suppliers, often with sellback guarantees. As a one-stop entry point to a network of five retail shops, input suppliers recognize that the producer company reduces their last mile costs. Jasadon can receive orders at their main warehouse, and distribute internally themselves to their retail points. Between their five retail shops, they have already sold to nearly 1,400 farmers this season, and are targeting to increase this number to 2,000 next season. In addition, different PCs and input suppliers have different arrangements in terms of how inventory credit schemes function, where return/refund policies on unsold stock are clearly outlined in their retailer agreements. Most suppliers offer buyback arrangements for any rainfed-crop related inventory unsold after the major planting season ends.

Second, they have begun and are expanding a rotational outgrower and spot trading firm, picking up commodity from their network of smallholder input clients on credit or for cash, and trading it through the Zambian Agricultural Commodity Exchange (ZAMACE). As of June, they had purchased 12.5MT of soy, and 30MT of maize, but are targeting total purchase of nearly 100MT of maize this season, and smaller tonnages of groundnut and sunflower. Pooling resources, they have constructed a group warehouse where they can collect and aggregate tonnages purchased from their individual retail areas, and bulk to truck-fill tonnages to send to ZAMACE. Their outgrower scheme has worked initially with only 72 farmers, but next year they hope to grow larger if they can finance the seed. Towards this end, next season they are hoping to expand the goods they can offer to farmers, providing soy and groundnut seed multiplication to help build the local supply base and ensure farmers do not run out of high quality seed in future years, like they did this year for soya.

**Between the Jasadon PC’s five retail shops, they have already sold to nearly 1,400 farmers this season, and are targeting to increase this number to 2,000 next season.**

Through expanding their input goods and services, and a guaranteed local market for key commodities, the producer company is saving customers time, increasing their yields and helping build the diversity and resiliency of local market systems in Chipata. For more on these broader changes, read the full report, *Case Studies on Facilitating Systemic Change in Feed the Future.*
RWANDA RDCP II: SPOTLIGHT ON BLESSED DAIRIES

This snapshot profiles a beneficiary as part of the Feed the Future Rwanda Dairy Competitiveness Program II (RDCP II). RDCP II is working to strengthen Rwanda’s entire dairy value chain. The program is also playing a leading role in improving Rwanda’s food safety standards for dairy, while raising consumer awareness about the importance of drinking quality milk. This case study highlights an early stage example of systemic change in the dairy industry, as RDCP II’s efforts to introduce milk quality grades and standards into the industry, along with new aggregation and output models, is starting to alter the norms and practices of key actors (processors, outlet stores), building incentives for these behaviors up and down the supply chain. It is part of a broader report which captures case studies of how FTF is facilitating systemic change in four priority countries: Senegal, Ghana, Rwanda, and Zambia. Access the full report at: www.microlinks.org/library/case-studies-facilitating-systemic-change-feed-future.

At first glance, Milton Ngirente looks like an ordinary businessman. However, he is far from that. Milton started out by purchasing milk locally and transporting it for sale in Kigali. He initially worked with an informal network of 25 producers. After several months of seeing Milton’s determination, a group of milk producers decided to work together to provide milk to Milton. Several other producers joined the new group, which quickly grew from a membership of 200 to 350. In return, Milton offered the producers guaranteed sales of their product at a competitive price higher than the local rural market rate. Milton also managed to build a secure supply chain and a network of contacts in order to meet the market demand for milk. This network of small producers quickly grew to 500 members with the increasing demand for milk. This prompted Milton to begin processing milk targeted at a growing urban consumer demand for value added milk products. Thus in 2012, Blessed Dairies Limited was established with a focus on yogurt, cheese, butter and fresh pasteurized milk to the urban market. RDCP II began working with Milton during this period. The project supported Milton to expand his business by first providing him with a cooling tank to transport large quantities of milk and a pasteurizer to increase his processing capacity. Milton was one of the main operators in the sector to benefit from such support due to his dedication.

Inyange, the largest milk processing and sales company, became aware of Milton’s business and offered to directly purchase a large quantity of fresh, unpasteurized milk from him. This was achieved following Milton’s successful collaboration with RDCP II to pilot the ‘seal of quality’ program – an initiative of RDCP II prime implementer Land O’Lakes to work with milk producers and suppliers to improve the quality of milk through regular testing at aggregation and collection centers.
Milton then decided to begin processing surplus milk. He aimed to sell yogurt, cheese, butter and milk to Inyange and urban market consumers. RDCP II began working with Milton during this period. The project supported Milton to expand his business by first providing him with a cooling tank to transport large quantities of milk. Milton was one of the main operators in the sector to benefit from such a work tool.

RDCP II also helped Milton to structure his business, better manage his stock and comply with hygiene and quality standards. RDCP II worked with Milton and other milk traders to implement quality standards for the collection, transportation, processing and distribution of the milk. In collaboration with the Rwanda Agriculture and Livestock Inspection and Certification Agency (RALIS), which is responsible for certifying agricultural products, quality and hygiene. Dairy quality protocols were finalized and enacted by the Ministry. All actors within the value chain were asked to follow these measures; if not, they were to face sanctions placed by authorities. Milton religiously implemented RDCP II’s innovations, which helped him become the first Rwandan dairy processor to secure Hazard Analysis and Critical Control Point (HACCP) certification in 2014. His business attracted the attention of investors and buyers, which increased demand for his milk.

Milton decided to self-finance three other insulated milk delivery tanks to increase his collection and distribution capabilities. In 2014 and 2015, Milton invested US$150,000 in the purchase of modern processing equipment, including six cooling tanks, a batch pasteurizer, a second mobile insulated tank and an automatic filling and sealing machine for yogurt production. He currently provides Inyange with over 35 thousand liters of milk per day and also sells milk on the market through his distribution network.

Following Milton’s achievement, the Rwandan airline RwandAir has decided to purchase, through their distributor, Blessed Dairies’ milk products for their inflight services. Blessed Dairies is now supplying 600 yogurt cups, 30 kilograms of fresh cream and 7 kilograms of mozzarella cheese to RwandAir each week.

Milton currently provides Inyange with over 35 thousand liters of milk per day and also sells milk on the market through his distribution network.

Milton currently works with over 8,000 milk producers and over 200 small transporters who collect the milk each morning from small rural farms and deliver them to the drop-off points in every district. Quality and hygiene standards measures are monitored across the entire supply chain, from the farm to the consumer, and any breach automatically leads to rejection of the entire batch. In collaboration with RDCP II, the milk transporters have been trained and equipped with testing kits thereby working as promoters of milk quality practices significantly reducing milk rejections in the entire coverage. Milton communicates with his suppliers through a network of MCCs and milk transporters who are in daily contact with the milk producers. The transporters have been instrumental in communicating and ensuring quality of milk produced. His network of suppliers is also linked to both private and public extension service providers, with a pre-selected list of providers at each location. Additionally, beyond milk hygiene, the processor and cooperatives have an extension outreach strategy that supports access to breeding and feeding technologies to further improve production per cow by linking with private service providers.

These quality standards are now adhered to by the majority of actors in the milk sector, which has developed Rwandan milk and milk product sales within both internal markets and neighboring countries. In 2015, milk was recognized for the first time as significantly contributing to the country’s agricultural Gross National Product. Producers who benefited from One-Cow-Per-Family, a government dairy re-stocking program, were able to sell milk at a higher price, which improved their livelihoods and increased the contribution of the livestock sector to the development of Rwanda. Milton and Blessed Dairies’ story are but one example of the broader change in the dairy system that RDCP II has facilitated. For more on these broader changes, read the full report, Case Studies on Facilitating Systemic Change in Feed the Future.
GHANA ADVANCE II: SPOTLIGHT ON OUTGROWER HARUNA ALHASSAN

This snapshot profiles a beneficiary as part of the Feed the Future Ghana Agricultural Development and Value Chain Enhancement (ADVANCE) II project. ADVANCE II is increasing the competitiveness of the maize, rice and soya value chains in northern Ghana. ADVANCE II achieves this through boosting agricultural productivity, improving value chain actors’ access to markets and finance, and strengthening local capacities. The project has been promoting and fostering the growth of outgrower businesses, and through this, changing the structure of aggregation systems for input and output markets, improving terms of trade for smallholder producers and opening up a business model through which financing and other agricultural services can more effectively and profitably flow through the system. This personal snapshot is part of a broader report which captures case studies of how FTF is facilitating systemic change in four priority countries: Senegal, Ghana, Rwanda, and Zambia. Access the full report at: www.microlinks.org/library/case-studies-facilitating-systemic-change-feed-future.

Haruna Alhassan is a 38-year-old farmer who began producing crops at an early age of 12 with his father. Though he was unable to attend school due to his family’s acute poverty and the need to contribute to their sustenance, he was able to attend evening classes with the non-formal education unit organized nightly in his community, Kurogu Vuhiayil in the Tolon District in northern Ghana.

On the lookout for any opportunity to improve his circumstance, he learned of a farmer group at Kale in his district receiving assistance from Asawaba Farms, an outgrower business (OB) owned by Mohammed Zion, who provided assistance to farmers for repayment in kind at the end of the production season. He travelled to Tamale to meet with Mohammed to discuss how he could benefit. Mohammed was happy to oblige his request and the result was formation of the Suglomali Nyori Farmer Group meaning “Patience is Wealth.” Now after nine years of hard work and steady relations with Asawaba Farms, Haruna and his farmer group are reaping the benefits of their dedication and readiness to learn new practices introduced by their outgrower business to improve their yields and incomes. The group has grown to 200 members including 91 women. It has a four-member executive with Haruna as chairman and his ardent childhood friends Brimah Baba as secretary, Baba Asana as

1 The relationship between outgrower businesses and outgrowers has existed for some time in Ghana, but it was mostly focused on aggregation of produce as well as tractor services provision (if any). ADVANCE II grew this model substantially, and encouraged additional services ‘scaffolded’ on, such as input credit and extension. So, by working with ADVANCE II (and its predecessor project ADVANCE I), OB Aswaba Farms provides a wider range of services to his outgrowers.
treasurer and Baba Abdulai as organizer. The group pays monthly dues of GHS 4 (approximately 1 USD) collected quarterly at weekly meetings and have an unwritten constitution which has so far not created any misunderstandings in their behavior. They have, however, resolved to write down their constitution with assistance of their OB to show their growing willingness to improve themselves.

There are several major ways in which Haruna and his group have changed their maize farming practices, as a result of the access to the OB Aswaba Farms, which has provided training for his outgrowers, financing, and a market outlet for their harvest. This includes the use of tractor services where previously there was none. They have learnt how to apply crop protection inputs on their fields and crops with knapsack sprayers. They have learned to bury weeds for production of green manure instead of burning, and concentrate on practicing good agricultural practices to increase yields instead of focusing on farming large acreages. The farmers have also moved from broadcasting seed (throwing handfuls of seed into the soil) to more targeted, seeding-into-a-hole practices using drills and dibble tools - which, although requiring more labor (and thus more costly up-front), results in less fertilizer use in the end. Also, they now understand how to acquire new skills from participating in field demonstrations and have learned the use of rippers for conservation farming.

Previously, they engaged in mixed cropping but now concentrate on a maize as commercial farmers. They are earning more income from increased yields of two to six bags per acre from their fields. Across ADVANCE II’s portfolio of farmer beneficiaries, adoption of improved farming practices has been consistently high, driven in large part by the outgrower business model: in FY2015, 98.8% (or 52,577) of ADVANCE’s beneficiary farmers adopted one or more of the targeted improved farming practices, and in FY2014, the adoption rate was equally high, at over 96% (or 36,452 farmers). This contributed to average yield increases of roughly 163% for maize in particular, up from the baseline of 1.38 MT/ha during the 2013 agriculture season to 3.63 MT/ha in 2015, and corresponding average gross margin increases from $283/ha to $1,108/ha.

They were eager to change their practices once they realized that their incomes were improving from increased yields and that female members no longer depended on their husbands on account of increased incomes from farm operations. Further, they are able to pay school fees without effort. Due to increased incomes, there is more cordial relations with wives because they now contribute to family needs without depending on men.

Not all members of the community are group members. The community has 350 people, out of which 200 are group members. Many of the remaining 150 were former group members who defaulted in their repayments to Aswaba Farms and were suspended. Also community members outside the group actively copy farm activities of group members. Some are not trustworthy to repay credit but they still engage in group practices. Although they do not benefit from tractor services leading to late farming, they still get appreciable yields from copying new practices.

“We are now commercial farmers who sell our produce to make money. We no longer produce crops to only feed ourselves,” said Haruna Alhassan.

Their new wealth is evidenced by increased nutrition and conversion from thatch to aluminum roofing sheets on their houses. Off farm, they now have more resources and time to engage in other activities such as cattle rearing, trading, dressmaking, and photography. Also, many are upgrading from bicycles to motorbikes.
The prosperity and life’s success are also showing on Haruna. He has two wives who are active group members and five children, the eldest of who is 12 years old. They all regularly attend the community primary school without fail as school fees is no longer a problem, as was the case in Haruna’s youth when he was denied a formal education. His house is now one of the many in the community showing a new roof line of aluminum sheets from the old thatch. His new Combian motorbike purchased after the 2015 production season is parked in front of his compound. To crown his growing social and political standing, he was elected assemblyman for the community at the District Assembly elections held in Ghana in late 2015.

Haruna’s story is but one example of the broader change in the cereals system of northern Ghana that ADVANCE II has facilitated. For more on the broader changes, read the ADVANCE II case study in the full report, *Case Studies on Facilitating Systemic Change in Feed the Future*.
A. BIBLIOGRAPHY


Rwanda Dairy Competitiveness Program II: Efficiency gains in dairy production systems decrease GHG emission intensity

A series analyzing low emissions agricultural practices in USAID development projects

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Key messages

- The Rwanda Dairy Competitiveness Program II (RDCP) was estimated to have resulted in a strong decrease in the GHG emissions intensity of milk production, defined as the GHG emissions per unit (liter) of milk produced. Extensive cattle production systems reduced their GHG emission intensity by an estimated -4.11 tCO₂e per 1000 l of milk (-60%), while intensive production systems reduced their intensity by an estimated -1.7 tCO₂e/1000 l (-47%). The decrease in GHG emission intensity is evidence that RDCP made the value chain more efficient and sustainable in climate change mitigation terms.

- RDCP’s productivity-oriented interventions increased livestock herd size and cow weight. As a consequence, total annual GHG emissions in the project area increased by an estimated 18,980 tCO₂e due to increased herd size and 34,904 tCO₂e due to increased cow weight, when compared to business-as-usual practices. This represents a 12 percent increase in GHG emissions.

- The increase in milk output was proportionally much larger than the associated increase in GHG emissions. This increase in the efficiency of dairy production systems was the basis for a transformation to more sustainable production patterns in intensive and extensive dairy systems.

About the Rwanda Dairy Competitiveness Program II

RDCP II was a 5-year project funded by the Feed the Future (FTF) initiative. Land O’Lakes has implemented the project in 17 districts across all five provinces of Rwanda. This project aimed to reduce poverty through expanded production and marketing of quality milk that generates income and employment, and improves nutrition of rural households. The activity’s development hypothesis was that improving raw milk quality and efficiency of production, together with marketing all along the dairy value chain, would pay high returns to public and private investment.

Begun in 2012, RDCP II increased the competitiveness of Rwandan dairy products in regional markets in order to increase rural household incomes associated with dairy-related enterprises. Land O’Lakes upgraded the entire dairy value chain by stimulating investment and helping to improve management practices at key points, from the smallholder producer to milk cooling centers, milk transporters, and milk processors.

RDCP II aimed to improve the livestock production systems of an estimated 50,000–63,000 dairy-producing smallholder farmers and 150,000–200,000 cows. Beneficiaries were roughly differentiated among extensive production systems of the east and northwestern parts of the country that rely on grazing as their sole feeding source, and semi-intensive systems in the northeast and south, as well as those near urban centers, mainly Kigali. The latter group rely partially on cut-and-carry practices of...
feed provision, which consist of harvesting grasses and fodder crops including in off-farm locations.

Average herd sizes were estimated to have seven cows in the extensive system with an average of two lactating at a time, while the semi-intensive households keep an average of only 2.6 cows, of which 1.7 cows are lactating on average. RDCP II was estimated by project staff to have led to a slight increase in numbers in semi-intensive systems to an average of 3 cows per household as more feed resources gradually became available; animal numbers in the extensive system were estimated to remain constant. The underlying data for the activity’s GHG analysis were therefore based on activity monitoring data prior to project completion as well as the expectations by the project staff of what RDCP II would have achieved when completed.

Low emission development

In the 2009 United Nations Framework Convention on Climate Change (UNFCCC) discussions, countries agreed to the Copenhagen Accord, which included recognition that “a low-emission development strategy is indispensable to sustainable development” (UNFCCC 2009). Low emission development (LED) has continued to occupy a prominent place in UNFCCC agreements. In the 2015 Paris Agreement, countries established pledges to reduce emission of GHGs that drive climate change, and many countries identified the agricultural sector as a source of intended reductions (Richards et al. 2015).

In general, LED uses information and analysis to develop strategic approaches to promote economic growth while reducing long-term GHG emission trajectories. For the agricultural sector to participate meaningfully in LED, decision makers must understand the opportunities for achieving mitigation co-benefits relevant at the scale of nations, the barriers to achieving widespread adoption of these approaches, and the methods for estimating emission reductions from interventions. When designed to yield mitigation co-benefits, agricultural development can help countries reach their development goals while contributing to the mitigation targets to which they are committed as part of the Paris Agreement, and ultimately to the global targets set forth in the Agreement.

In 2015, the United States Agency for International Development (USAID) Office of Global Climate Change engaged the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) to examine LED options in USAID’s agriculture and food security portfolio. CCAFS conducted this analysis in collaboration with the University of Vermont’s Gund Institute for Ecological Economics and the Food and Agriculture Organization of the United Nations (FAO). The CCAFS research team partnered with USAID’s Bureau of Food Security to review projects in the FTF program. FTF works with host country governments, businesses, smallholder farmers, research institutions, and civil society organizations in 19 focus countries to promote global food security and nutrition.

As part of the broader effort to frame a strategic approach to LED in the agricultural sector, several case studies, including this one, quantify the potential climate change mitigation benefits from agricultural projects and describe the effects of low emission practices on yields and emissions. Systematic incorporation of such emission analyses into agricultural economic development initiatives could lead to meaningful reductions in GHG emissions compared to business-as-usual emissions, while continuing to meet economic development and food security objectives.

The team analyzed and estimated the project's impacts on GHG emissions and carbon sequestration using the FAO Ex-Ante Carbon Balance Tool (EX-ACT). EX-ACT is an appraisal system developed by FAO to estimate the impact of agriculture and forestry development projects, programs, and policies on net GHG emissions and carbon sequestration. In all cases, conventional agricultural practices (those employed before project implementation) provided reference points for a GHG emission baseline. The team described results as increases or reductions in net GHG emissions attributable to changes in agricultural practices as a result of the project. Methane, nitrous oxide, and carbon dioxide emissions are expressed in metric tonnes of carbon dioxide equivalent (tCO₂e). (For reference, each tCO₂e is equivalent to the GHG emissions from 2.3 barrels of oil.) If the agricultural practices supported by the project lead to a decrease in net GHG emissions through an increase in GHG removals (e.g. carbon sequestration) and/or a decrease in GHG emissions, the overall project impact is represented as a negative (−) value. Numbers presented in this analysis have not been rounded but this does not mean all digits are significant. Non-significant digits have been retained for transparency in the data set.

This rapid assessment technique is intended for contexts where aggregate data are available on agricultural land use and management practices, but where field measurements of GHG emissions and carbon stock changes are not available. It provides an indication of the magnitude of GHG impacts and compares the strength of GHG impacts among various field activities or cropping systems. The proposed approach does not deliver plot, or season-specific estimates of GHG emissions. This method may guide future estimates of GHG impacts where data are scarce, as is characteristic of environments where organizations engage in agricultural investment planning. Actors interested in verification of changes in GHG impacts resulting from interventions should collect field measurements needed to apply process-based bio-physical models.
Agricultural and environmental context: Rwanda

Rwanda is a low income country with a population of about 10.5 million in 2012 (World Bank, 2016a). The country has experienced stable economic growth in the recent decade, averaging 8% of real GDP growth per annum between 2001 and 2015 (ibid). During the same period GDP per capita more than tripled from US$ 211 in 2001 to US$ 718 in 2014 (NISR 2015). Considerable improvements in poverty reduction have been achieved; the poverty rate has been reduced from 59% in 2001 to 45% in 2011 and 39% in 2014 (NISR 2015, World Bank 2016c). However, poverty and malnutrition remain key issues in the country with 16% of the population living in extreme poverty and 38% of children under age 5 suffering from stunting (NISR 2015).

Agriculture is a central component of the economic development of the country; it employs 70% of the workforce (World Bank 2016b) and generates 35% of the GDP (NISR 2015). As the most densely populated country in Africa, agricultural landholdings are very small, with 60% of agricultural households farming on less than 0.7 hectares (MINAGRI 2008). Small-scale, subsistence-oriented family farming dominates, with 66% of production destined for home consumption (MINAGRI 2012). Traditionally, farms produce a diversified portfolio of crops and livestock products, with approximately 60% of households rearing livestock (ibid.). When excluding land use change and forestry, GHG emissions from livestock, including enteric fermentation, manure management, and manure left on pastures, account for more than 70% of national agricultural emissions (FAOSTAT 2016, Tubiello et al. 2014). Rwanda’s INDC, submitted under the UNFCCC, included climate change mitigation in agriculture as a co-benefit of adaptation actions. Target actions include expansion of agroforestry, sustainable agricultural intensification, avoided cropland degradation, and improvement of livestock feeding (Richards et al. 2016).

The dairy subsector contributes 15% to the agricultural gross domestic product and 6% to the gross domestic product (MINAGRI 2013). Rwanda has 1.33 million head of cattle, of which 28% are improved dairy cows that produce 82% of the total milk output (ibid.). The estimate of the annual milk output is 445,000,000 liters with a value of US$ 115.3 million (ibid).

Within the Rwandan dairy sector, main challenges include feed availability (quality and quantity) and animal management (health and breeding). Productivity is limited by feed supply during the dry season, the availability of quality forages and feeds (hay, silage, crop by-products) and the comparably high costs of feed concentrate (MINAGRI 2013). In addition, some areas have experienced the conversion of grazing pasture to cropland (Clay et al. 2002) and shortages of water (Mutibvu 2012). Dairy producers lack access to animal health and improved breeding services (MINAGRI 2013). The number of privately operating veterinarians is relatively low and mastitis is widespread. Although artificial insemination services are subsidized by the government, low access in rural localities and quality of services remain limiting factors (ibid.).

Agricultural practices that impact GHG emissions and carbon sequestration

The GHG emission analysis of RDCP II focused on improved practices in the dairy cow value chain. GHG emissions responded to the following supported practices: (1) feed quality improvements, (2) breeding improvements, (3) herd size management, and (4) feed quantity and herd weight dynamics.

Feed quality improvements

**Background.** Low-quality and low-digestibility feeds result in relatively high GHG emissions from enteric fermentation per unit of meat or milk, particularly in systems with low productivity (Herrero et al. 2016). Improving feed digestibility and energy content, and better matching...
protein supply to animal requirements, can be achieved through an increased provision of quality forages and alternative feeds including hay, silage, (processed) crop residues, agro-industrial by-products and concentrates (Gerber et al. 2013).

Producing improved feed can have environmental benefits in some contexts, such as when degraded grazing lands are rehabilitated through planting of improved grass and forage crops. Many improved feed production systems have their own resource footprint, and may compete with food crops or the conversion of natural land, or withdraw resources from alternative uses, e.g. the mulching of crop residues.

Feed substitutes can change enteric fermentation processes in the rumen and influence methane production. Feeding corn or legume silages, starch, or soy also decreases methane production compared with exclusively feeding grass silages. According to MacLeod et al. (2015), improving forage quality and strengthening resource transfers between livestock and crop-related activities can increase the economic welfare of smallholder farming systems.

Practice plan. RDCP II supported improved feed management by promoting alternative strategies for forage production and feed processing and storage, as well as supporting the purchase of complementary feed sources. Contrary to a diet based mainly on grazing, roadside cuttings, and unprocessed crop residues (as seasonally available), RDCP II fostered the targeted cultivation of Napier grass (Pennisetum purpureum), velvet bean (mucuna), tick clover (desmodium) and calliandra; sprinkling of dry grasses with sugarcane molasses to increase palatability; urea treatment; use of silage; and hay bailing.

Impact on GHG emissions. RDCP II’s feed digestibility improvements were estimated to reduce GHG emissions per livestock head. In the absence of precise information on current and future feed composition, the FAO team utilized the method of Smith et al. (2007). This method provides estimates for GHG reductions following feed improvement in sub-Saharan Africa without requiring information on further input data on feed composition or feed digestibility. For sub-Saharan Africa, Smith et al. (ibid.) conservatively estimate that a reduction of only 1% in methane emissions from enteric fermentation would result from currently available and commonly applied improved feeding practices. This contrasts strongly with higher mitigation benefits that are estimated using the more mechanistic approach of the Tier 2 emission factors in IPCC (2006) when analyzing cases with strong increases in feed digestibility. In the absence of available data on changes in feed composition and feed digestibility, the conservative approach by Smith et al. (2007) estimates annual GHG mitigation benefits from feed quality improvements of -0.02 tCO₂e/head for cows (Figure 1). The impacts result in a change in GHG emissions of –1,205 tCO₂e/year (Figure 2) when scaled to the full herd size.

Breeding improvements

Background. Improved animal health, including artificial insemination services, allows reductions in the herd overhead (i.e. the unproductive part of the herd) and thus reduces the amount of GHG emissions (Herrero 2016, Gerber et al. 2013). Improved breeding also supports transition to an animal heard with improved productivity and disease tolerance, thus reducing the share of the livestock herd that contributes GHG emissions while not providing milk output.

Practice plan. RDCP II promoted best practices in dairy production, including increase in the availability and use of artificial insemination in the project area. The project expected to reach over 10,000 farmers with improved insemination through targeted extension and veterinary officers.

Impact on emissions. Using Smith et al. (2007), FAO estimated that the breeding improvements result in an annual change in GHG emissions of -0.01 tCO₂e/head for cows (Figure 1). This results in a change in GHG emissions of –482 tCO₂e/yr (Figure 2) when scaled to the full herd size.

Herd size dynamics

Background. Larger livestock herd sizes are associated with higher GHG emission levels. Regulating the livestock herd size at the household level through targeted and timely decision-making on reproduction and sales of animals is an important and integrated precondition for optimizing the availability of sufficient financial and natural resources for feed and health management. Decisions on livestock herd size are part of the herders’ risk management strategies and are closely linked to vulnerability from weather shocks and climate change (Megersa et al. 2014, Angassa et al. 2012, Thornton et al. 2007).

Practice plan. RDCP II stimulated investments to improve management practices at key points along the
dairy value chain, from the smallholder producer to milk cooling centers, transporters, and processors. The project estimated that these interventions support a moderate increase in herd sizes in the intensive dairy cattle operations from 49,800 to 57,482 cattle. This is particularly supported by the increased access and availability of livestock feed from cut-and-carry systems. There is no increase in herd size for the extensively kept dairy cattle, whose herd size remains stable at 141,001 head.

**Impact on emissions.** The increase in herd size is estimated to have resulted in an annual increase in GHG emissions of 2.48 t\(\text{CO}_2\)e per additional cow (Figure 1). The impacts result in a change in GHG emissions of 18,980 t\(\text{CO}_2\)e/yr (Figure 2) when scaled to the full herd size.

**Feed quality and herd weight dynamics**

**Background.** Increasing the availability of feed intake and the stability of feed during the dry season through project actions was estimated to have yielded strong productivity benefits (Lukuyu et al. 2015, Gerber et al. 2013, Shikuku et al. 2016).

Due to the stable feed supply, milk yield was estimated to improve, reducing the common productivity fluctuations based on feed seasonality. Increasing feed intake, thereby increasing animal weight, was estimated to cause an augmentation in GHG emissions per cow stemming from enteric fermentation, manure management and manure deposition.

**Practice plan.** Feed quantity improvements were estimated to increase weight from 250 to 270 kg in the extensive systems and from 290 to 313 kg in the semi-intensive systems.

**Impact on emissions.** Estimates by the project on increased animal weight were utilized as part of the Tier 2 methodology provided in IPCC (2006) in order to estimate increases in GHG emissions from enteric fermentation, manure handling and manure management. The increase in cow weight results in an estimated annual increase in GHG emissions of 0.18 t\(\text{CO}_2\)e/head (Figure 1). The impacts result in a change in GHG emissions of 34,904 t\(\text{CO}_2\)e/yr (Figure 2) when scaled to the full herd size.

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**In focus: Efficiency increases in the dairy value chain result from modernizing down-stream facilities and adapting input markets**

Rwandan dairy producers face a variety of value chain challenges that impact productivity, including access to inputs and services (e.g., quality forage or veterinary services) and availability of post-production infrastructure (quality milk cooling, transportation, processing and marketing facilities). The steadily increasing urban milk demand, and the more price sensitive peri-urban and rural milk demand constitute a stable market. The larger investment costs required for private investment in dairy processing and associated sector services limit market entry to stakeholders with access to capital and the ability to take financial risks.

RDCP II invested in training and coordination of private and public service providers (veterinary services, improved breeding services), upstream businesses (livestock feed), and downstream processors (modern, efficient machinery for cooling, transport, processing) within the dairy value-chain. Specifically, the project addressed the low geographic coverage of post-production services in the dairy sector in Rwanda. The project gave financial support to the expansion of high quality cooling facilities and milk processing and encouraged the establishment of long-term relationships between processors and producers, creating the demand conditions for these capital investments.

The program targeted small-scale producers with improved feeding practices that do not require large upfront investments while providing direct benefits for productivity and farm income. Through value chain modernization, RDCP II created market-based incentives for producers to improve the quality and quantity of milk output and directly benefit from their investments in improved feed and higher milk output.
Summary of projected GHG emission and carbon sequestration co-benefits

Total change in GHG emissions due to interventions by RCDP II was an increase of approximately 12% per year. Figures 1 and 2 summarize GHG emissions per animal and over the entire project.

Improved feed quality and breeding provide estimated annual GHG impacts of -0.02 and -0.01 tCO$_2$e/animal per year respectively. The increased quantity of feed and the higher weight of animals lead to annual increases in GHG emissions of 0.18 tCO$_2$e/head. The increase in the number of dairy cows generates the main increase in GHG emissions, estimated at 2.48 tCO$_2$e per additional head. Figure 2 shows that increasing feed quantity and animal weight, when scaled up to the project level, has the largest impact on GHG emissions, estimated at 34,904 tCO$_2$/yr. By contrast, increasing animal numbers generates an estimated 18,980 tCO$_2$/yr. Feed quality and breeding improvements provide minimal GHG emission benefits when scaled up to the project level. Due to the conservative methodology used, the GHG mitigation benefits from feed quality and breeding improvements may, however, be underestimated.

Figure 1. Impact of agricultural practices: Net GHG emissions on an animal basis (tCO$_2$e/head/yr)

Feed quality improvements: -0.02
Breeding improvements: -0.01
Herd size management: Increased 2.48
Feed quantity improvements: 0.18

Figure 2. Impact of agricultural practices: Net GHG emissions on total animals (tCO$_2$e/yr)

Feed quality improvements: -1,205
Breeding improvements: -482
Herd size management: Increased 18,980
Feed quantity improvements: 34,904
GHG emission intensity

Emission intensity (GHG emissions per unit of output) is a useful indicator of LED in the agricultural sector. Table 1 summarizes emission intensity findings for dairy cows without and with practices supported by RDCP II.

**Milk productivity.** The extensive and semi-intensive dairy production systems were estimated to experience both sizeable productivity increases: extensive dairy cattle at 97% and intensive dairy cattle at 49%. The productivity increases were due to improvements in feeding (especially a more stable feed supply during the lactation period, independent of seasonality), use of improved breeds, and expansion of animal health services. As a result, the activity estimated that the average milk yield increased from 4.47 l/cow to 6.44 l/cow in the semi-intensive system and from 2.17 l/cow to 4.14 l/cow in the extensive system. In addition, the average number of lactating days was estimated to increase from 220 to 227 in the semi-intensive system and from 205 to 212 in the extensive system.

**Post-production loss.** Post-production losses for dairy are reduced by an estimated 25%. Interventions to reduce the loss of milk include the distribution of kits for milk quality testing, and training of milk traders and processors in their use. Milk cooling centers that function as intermediate stops prior to the transport of milk to processing and packaging centers have been improved and extended to new locations. The project also supported improved product quality monitoring during milk bulking and processing, plus transport and quality assurance through the Rwanda Seal of Quality.

The reductions in post-harvest losses of milk when shifting additional producers from informal commercialization to modern processing facilities are often huge. The realization of the estimated post-harvest loss reductions in the future thus depends on the continued operation of the improved physical and social value chain infrastructure.

**Emission intensity.** When considering the issue of GHG emission intensity, milk from extensive dairy production systems experienced a major reduction of an estimated -4.11 tCO₂e/1,000 l (from 6.88 to 2.77 tCO₂e/1,000 l) due to the strong increase in milk production (+97%). This is equivalent to a reduction of 60% of the conventional GHG emission intensity.

On the other hand, the GHG emission intensity of milk from semi-intensive dairy cows was reduced by an estimated 47% due to the more limited increase in milk production. Intensive dairy production systems experienced a smaller, but significant, reduction of GHG intensity from an estimated 3.60 tCO₂e/1,000 l to 1.90 tCO₂e/1,000 l.

RDCP II illustrates how value chain support can both increase overall GHG emissions driven by a dramatic production increase and decrease the emission intensity per ton of milk, making the value chain more efficient and more sustainable.

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**Table 1. RDCP II—GHG emission intensity of dairy systems**

<table>
<thead>
<tr>
<th>Activity agricultural practices</th>
<th>Total GHG emissions per head (tCO₂e/head)</th>
<th>Annual yield (1,000 l/head)</th>
<th>Post-production loss (%)</th>
<th>Remaining annual yield (1,000 l/head)</th>
<th>Emission intensity (tCO₂e/1,000 l product)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Extensive dairy cattle</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(feed quality, feed quantity, breeding improvements, herd size management)</td>
<td>No project</td>
<td>2.14</td>
<td>0.44</td>
<td>30%</td>
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<td>5%</td>
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</tr>
<tr>
<td></td>
<td>Difference (%)</td>
<td>0.17 (8%)</td>
<td>0.44 (97%)</td>
<td>-25% (-83%)</td>
<td>0.52 (168%)</td>
</tr>
<tr>
<td><strong>Semi-intensive dairy cattle</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(feed quality, feed quantity, breeding improvements, herd size management)</td>
<td>No project</td>
<td>2.48</td>
<td>0.98</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>Difference (%)</td>
<td>0.16 (7%)</td>
<td>0.48 (49%)</td>
<td>-25% (-83%)</td>
<td>0.70 (102%)</td>
</tr>
</tbody>
</table>

Notes:
1. Total GHG emissions per head refers to the emissions per head of cattle.
2. Annual yield refers to the volume of product produced per head of cattle each year.
3. Post-production loss is the measurable product loss during processing steps from harvest to consumption per year.
4. Remaining annual yield is calculated by subtracting postharvest loss from annual yield.
5. Emission intensity is calculated by dividing the total GHG emissions per 1,000 liters product by the remaining annual yield.
Low emission program design considerations

The analysis of emissions by agricultural practice illustrates issues that those designing or implementing programs may want to consider in the context of LED and food security for smallholder farmers. These issues include:

- **Livestock forage quality and quantity management.** What value chain interventions are feasible in order to improve fodder management (cultivation, conservation, and processing) and feed rationing (concentrate and complete feeds)? How can feed producers and processors be supported so that high production volumes and low sales prices are achieved? Which forage varieties balance increased production, farmer affordability and adoption potential with reduced GHG emissions?
- **Breeding and veterinary services.** Which strategies are available in order to increase the effectiveness, access, and quality of breeding and veterinary services? Which institutional set-up increases the synergies between public and private service providers of artificial insemination and veterinary services?
- **Herd size dynamics.** Which insurance and financial services are needed in order to enable farmers to reduce the number of unproductive animals without facing higher production risks?
- **Manure management.** How can efficient resource transfer between livestock and cropping systems be ensured, including the targeted provision and application of manure to cropping systems and the reduction of runoff and leakage? What are the barriers to expansion of manure biodigesters for intensive dairy production? How can the efficient operation of biodigesters be ensured against biogas leakage and venting?
- **Post-production loss.** Which practices are most effective to improve producer access to post-production services such as milk cooling, processing and commercialization?

Methods for estimating GHG impacts

A comprehensive description of the methodology used for the analysis presented in this report can be found in Grewer et al. (2016); a summary of the methodology follows. The selection of projects to be analyzed consisted of two phases. First, the research team reviewed interventions in the FTF initiative and additional USAID activities with high potential for agricultural GHG mitigation to determine which activities were to be analyzed for changes in GHG emissions and carbon sequestration. CCAFS characterized agricultural interventions across a broad range of geographies and approaches. These included some that were focused on specific practices and others designed to increase production by supporting value chains. For some activities, such as technical training, the relationship between the intervention and agricultural GHG impacts relied on multiple intermediate steps. It was beyond the scope of the study to quantify GHG emission reductions for these cases, and the research team therefore excluded them. Next, researchers from CCAFS and USAID selected 30 activities with high potential for agricultural GHG mitigation based on expert judgment of anticipated GHG emissions and strength of the intervention. The analysis focused on practices that have been documented to mitigate climate change (Smith et al. 2007) and a range of value chain interventions that influence productivity.

Researchers from FAO, USAID, and CCAFS analyzed a substantial range of project documentation for the GHG analysis. They conducted face-to-face or telephone interviews with implementing partners and followed up in writing with national project management. Implementing partners provided information, monitoring data, and estimates regarding the adoption of improved agricultural practices, annual yields, and postharvest losses. The GHG analysis is based on the provided information as input data.

The team estimated GHG emissions and carbon sequestration associated with agricultural and forestry practices by utilizing EX-ACT, an appraisal system developed by FAO (Bernoux et al. 2010; Bockel et al. 2013; Grewer et al. 2013), and other methodologies. EX-ACT was selected based on its ability to account for a number of GHGs, practices, and environments. Derivation of intensity and practice-based estimates of GHG emissions reflected in this case study required a substantial time investment that was beyond the usual effort and scope of GHG assessments of agricultural investment projects. Additional details on the methodology for deriving intensity and practice-based estimates can be found in Grewer et al. (2016).
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Citation:


CCAFS and Info Notes

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CCAFS is supported by:
Learning from Feed the Future Programs about Gender Integration and Women’s Empowerment

Compiled Case Submissions

April 2016

The case studies in the following pages were solicited from Feed the Future partners through a Call for Cases about Feed the Future Learning on Gender Integration and Women’s Empowerment, released in April 2016.¹ Feed the Future partners submitted twenty cases spanning ten different countries. The cases were ranked and chosen according to the quality of the data, the compelling nature of the story, demonstration of learning, and diversity of representation in terms of geography and type of intervention.

While the majority of information in the Cultivating Women’s Empowerment: Stories from Feed the Future 2011-2015 came from these twenty cases, it was not possible to include everything. In the spirit of learning and transparency, all of the original case submissions are compiled here and are available for download on USAID’s Agrilinks website. They are a complimentary piece to the publication and showcase the broader set of activities happening around gender integration and women’s empowerment in Feed the Future programs.

The cases are organized alphabetically by region and by country.

¹ See the Call for Cases here: https://agrilinks.org/blog/call-cases-feed-future-programs-learning-gender-integration-and-women’s-empowerment.
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Asia
International Maize and Wheat Improvement Center (CIMMYT)

Submission of case for:

USAID: Call for Cases from Feed the Future Programs:
Learning for Gender Integration and Women’s Empowerment

Introduction
This case is based on experiences from the USAID-funded project Cereals Systems Initiative for South Asia in Bangladesh (CSISA-BD). The five-year project (October 2010 – December 2015) aimed to increase household income, food security and livelihoods in poor agricultural regions in Bangladesh by expanding the rate of adoption and dissemination of improved crop and aquaculture varieties and management practices. The project was implemented jointly by CIMMYT, IRRI, and WorldFish.

1. Lesson:
An important lesson from this project is that investing in the capacity of women farmers pays off and can improve agricultural outcomes, for instance, by strengthening seed viability and quality. Similarly, business training and linkage events for women entrepreneurs help women expand existing businesses and embrace new business opportunities, inspires other women and strengthens their confidence and position at household and community level.

2. Activities
The project aimed to raise the awareness, knowledge and skills of farmers on new varieties and agricultural management practices. To reach this aim, CSISA-BD provided e.g. trainings, demonstrations, on field trials, and farmers could participate in farmer field days or cross-farm-visits. From the beginning, the project was committed to reach an equal participation of women and men in these events. A Whole-Family-Training-Approach was applied. Additionally, technologies and interventions were designed that are appropriate for women and specifically target them.

Trainings covered relevant topics like seed production and storage, maize production for income generation and human consumption, best practices for cereal based cropping systems, intercropping and business training.

Special efforts were made to increase women’s business and entrepreneurship capacities. For example, a workshop with women who had already initiated small businesses was held in collaboration with UN Women to identify women’s constraints in establishing and expanding a small business, and, furthermore, to link women-led small businesses with supermarkets, processors, and enterprise associations.
Another approach to increase women’s entrepreneurship skills was the concept of “Info Ladies”. A number of women successfully applied for loans to buy laptops and Internet connections in order to sell web-based agricultural services to farmers. These activities were implemented through local NGOs: Pride from Jessore and Dnet from Dhaka.

3. Data
A baseline survey was conducted in late-2010 and early-2011 including 324 farm households in Dinajpur and Gazipur. The survey covered household demographics as well as agronomic practices, income sources, market linkages, adoption of modern seeds and technologies, as well as women’s participation in household decision making, family businesses and farm management. In early 2015, the endline survey was conducted, in which particular attention was given to the participation and the outcome of training and on-farm trials related to maize and wheat cultivation for home consumption and marketing, including intercropping, grain storage, as well as seed production and storage.

Other data sets, including yearly surveys of participating farm households, as well as the systematic collection of women’s and men’s participation in specific activities and their feedback, e.g. to on-farm demonstrations and trials, and M&E data for the quarterly FtF reports.

4. Story:
The woman farmer Monowara Begum from Jessore and her family were struggling to make ends meet from growing only one rice crop per year. In 2013, CIMMYT started with the introduction of maize in her region. Ms. Begum attended a training on intercropping maize with other crops, followed by several trainings on management practices on maize/wheat cultivation. Also her husband and her son attended. She was the first one in that region cultivating hybrid maize, resulting in a good harvest of high value. Given her agricultural and economic success as well as her pioneer spirit, Ms. Begum was chosen to be the leader of a CIMMYT-supported women’s group. They started to grow maize, intercropped with garden pea and bush bean, and by selling their produce they could earn an income. By accumulating the earnings, the group was able to purchase a power tiller. The women also decided to buy a seeder machine and earn additional income as service providers by seeding and tilling other farmers’ lands. Hunger Free World Bangladesh awarded Monowara Begum as the best entrepreneur in 2013. Similarly, as a consequence of their involvement with the project, four young women obtained loans after intensive training to buy laptops so that they could provide community members with Internet-based services.
Latin America and the Caribbean
Haiti’s farms yield some of the world’s best mangos, but they have rarely yielded big profits for the farmers who own them. The country’s mango sector has long been chaotic, with scattered production, volatile market channels, and extremely limited investment. Farmers were largely unable to reach potentially lucrative and relatively stable export markets.

The Coca-Cola Company, the Inter-American Development Bank, and the U.S. Agency for International Development, alongside implementing partner TechnoServe, launched the Haiti Hope Project in 2010 to address these challenges. One of the project’s major initiatives involved the creation of producer business groups (PBGs) to aggregate the members’ mangos and manage bulk sales to exporters. As the Haiti Hope project staff mapped the value chain, they identified an important issue: while women controlled much of the sales in the informal mango trade, they held just 9 percent of leadership roles in the country’s farmer associations supplying the formal export market. How could the project support female leadership in a more formal, efficient mango export sector?

THE HAITI HOPE APPROACH

In designing an approach to encourage female leadership in the new PBGs, the project held conversations with farmers to identify obstacles that kept women out of such positions in other farmer associations. The low rate of literacy among women in Haiti’s rural areas posed a significant barrier. To address this, TechnoServe partnered with a local microfinance institution, Fonkoze, to pilot literacy training for women in the area. Evidence from focus groups suggests that this was well received, and that it helped to nurture women’s confidence in their own leadership abilities.

Another significant obstacle to women’s participation is the demand placed on their time by domestic responsibilities, such as childcare. Therefore, training was scheduled at times when women were more likely to be able to attend, such as non-market days, and were held in more accessible locations. However, women were still constrained from assume leadership roles at the PBGs because their husbands were unwilling take on tasks that were considered women’s activities.

To address this, the project made the business case for female leadership. Trainers used a metaphor of a bird, which soars only when both of its wings are strong. If the PBG was the bird, women and men were its two wings. By making the business case for female participation in leadership—how this would help the PBGs, strengthen the mango sector, and boost household incomes—the staff encouraged households to develop strategies to provide women with the time needed to assume those roles.

The Haiti Hope staff also worked to ensure that women outside the formal PBG structures continued exercising leadership in the market, reaching out to Madan Saras, the informal traders who work in the local mango market. PBGs identified local Madan Saras in their business plans and contacted them to organize sales, especially when quality issues or low volumes prevented the group from selling on the export market. Armed with this knowledge, these traders adapted to new market opportunities, discovering that it was efficient and advantageous to purchase mangos aggregated by the PBGs. Over time, certain zones developed mango sales networks comprised of farmers, PBGs, Madan Saras, and packing houses to sell on local and export markets. 90 percent of the PBGs’ rejected mangos, deemed unsellable on the export market...
due to aesthetic reasons, were sold by women on the local market for a competitive price.

**MARIE-CARME FILS-AIME: RISING UP**

In a rural community 100 miles north of Port-au-Prince, Marie-Carme Fils-Aime and her husband joined a local producer business group called Leve Kanpay, or “Rise Up,” in 2013. With the support of the Haiti Hope Project, they have improved their production techniques and earned USDA Organic and Fair Trade certification. Their fruit has been exported to the United States, and Marie-Carme has used the profits to buy seeds for other crops. The couple has also planted a 76-tree mango orchard.

Marie-Carme had also been chosen to serve as the PBG’s marketing agent, directly managing the sale of the group’s mangos to an exporter in the Haitian capital. With input from Marie-Carme, the PBG has used the premiums it has earned to repair the main line in the community’s water pump, improving access to potable water. The group has also invested in tilapia farming, providing a diversified source of income.

Marie-Carme’s influence in the community has grown since the Haiti Hope Project’s end. She was elected to serve as the Junior PBG Trainer, tasked with carrying on the agronomy training for member farmers that had been part of the project. She has even been urged to run for public office. “We’re working together and growing stronger,” Marie-Carme said. “And as women, we’re not just selling mangos now. We can do everything.”

**SUPPORTING FEMALE LEADERSHIP**

By the time it finished in early 2016, the Haiti Hope Project had helped farmers organize 262 PBGs—94 percent of which were profitable. 38 percent of leadership roles were held by women, more than four times the average in Haiti’s farmer associations and exceeding the project’s target of 30 percent. 47 percent of the 19,138 participating PBGs’ members are women, as were 52 percent of the farmers who accessed loans.

The success of the Haiti Hope Project in supporting female leadership in the PBGs reflects several lessons. First, it is critical to understand and address the structural causes for low rates of female participation in those leadership roles. Second, it is important to make the business case for greater female participation in those positions. Finally, it is important to understand formal and informal markets, and how women and men interact with both, to create market channels that are as inclusive as possible.
**WOMAN-OWNED BUSINESSES SPUR EMPLOYMENT, INCOME, EMPOWERMENT**

More than 70 percent of value addition clients under USAID-ACCESO were women.

Recognizing that women have the potential to be the drivers of economic activity that improves quality of life and increases food security for rural families, Fintrac prioritizes the inclusion of women in activities along all points of the agricultural value chain. In Honduras, however, most women are not involved in crop production, so Fintrac, through the four-year Feed the Future program USAID-ACCESO, engaged women in value-added processing and small business development to encourage their participation in economic activities.

Women’s participation in processing, value addition, and micro-, small-, and medium-sized enterprises (MSMEs) under ACCESO was higher than in other project activities such as production. The project had overwhelming success working with women in value addition activities, where more than 70 percent of all individual clients were women. Many of these women formed off-farm MSMEs to produce and sell processed products such as pickled vegetables, plantain chips, fruit concentrates, dried fruits, and baked goods, opening up a variety of income-earning opportunities for themselves and their families.

MSMEs provided significant paid employment and self-employment opportunities for female clients. Out of the total number of employment positions created through MSMEs, 37 percent were for women, compared to just 15 percent of positions created outside of MSMEs. Forty-two percent of MSMEs that received technical assistance and training from ACCESO were woman-owned. Of these woman-owned MSMEs, 72 percent were focused on processing and value addition.

Technicians provided woman-owned MSMEs with comprehensive and integrated training on good manufacturing practices, processing systems, food safety standards, and business skills such as recordkeeping, budgeting, cost analysis, and profit margins.

Nearly 2,000 woman-owned MSMEs accessed new market opportunities through the project. They learned about packaging, labeling, and branding and received support in company registration and legalization, sanitary licenses, and credit access. The project helped these small businesses identify new markets and buyers, and worked with them to develop delivery schedules, helping to ensure long-term viability and profitability.

All of this resulted in concrete results for the businesses. On average, woman-owned MSMEs improved their sales by 50 percent above baseline, resulting in an increase in net incomes of 81 percent.

One of these businesses is Café ARIMEL, a coffee processing company run by two sisters in Santa Rosa de Copan. In 2012, with help from ACCESO technicians, they conducted a full business diagnostic to identify opportunities for growth. Based on this diagnostic, project specialists provided a suite of trainings in market-driven production, improved productivity, and finance and administration. With these interventions, Café ARIMEL increased its total sales by 35 percent over two years, translating directly to increased income and empowerment for the women, who have since invested in new equipment and are expanding their distribution network.

"We expect to grow by at least 100 percent over the next five years,” Eunice Arita said after attending a business conference where she networked with leading supermarket chains.

Their success is proving to the larger community that women are capable of running efficient and profitable businesses – something long assumed to be the purview of men. “In my country, when we talk of a coffee
producer, people think of a man in a sombrero,” Karen Arita said. “They did not believe all our [processing] work was done by women.”

USAID-ACCESO’s follow-on project, Feed the Future ACCESS to Markets, began in December 2014 with a target of benefiting 15,000 rural households. In order to increase and diversify household incomes, ACCESS to Markets is involving family members, particularly wives and daughters of producer clients, in developing small-scale businesses that utilize local production and focus on local markets. These include: processing milk into cream cheese, passion fruit into pulp, and sweet potatoes and plantains into chips; roasting coffee; and producing baked goods such as pasteles and bread.

In 2013, two women from Callejones, Santa Barbara formed a small plantain processing business called Fuente de Bendicion. They started receiving technical training in plantain chip production and when processing operations began, the women sold roughly $170 per month. With ongoing support from ACCESO, and later ACCESS to Markets, the women made steady improvements in production efficiency, packaging, and labeling. By incorporating some basic technologies such as new stoves, they were able to ensure quality control and workplace safety.

Their investments and training have paid off. The women recently started filling weekly orders for large regional buyers and are processing 1,500 plantains a day, turning them into 1,300 bags of chips. Their monthly sales now exceed $1,900 – a dramatic tenfold increase from their initial operations. They have invested part of their earnings into new equipment and a delivery truck.

The success in engaging women in agriculture through value-added processing and MSMEs teaches us important lessons. When women in Honduras are given the opportunity to participate in activities that are accessible from their homes, do not add significantly to their workloads (thanks to improved technologies), and result in additional income for their families, their participation rates and interest levels are high. These activities empower women by boosting household incomes, giving them control over more household financial decisions, and expanding their networks of like-minded entrepreneurs.

Women like those running Café ARAMEL and Fuente de Bendicion exemplify the entrepreneurial spirit that exists in rural communities and can inspire others to venture into non-traditional economic activities. Making a concerted effort to target women specifically for income-generation through processing results in improves household income and helps families move out of poverty.

####

**Photo captions**

**Honduran business owners:** Glendy Nery Medina (left) and Lourdes Medina Hernandez started their own banana chip processing business in 2013. Thanks to technical assistance from Fintrac, their monthly sales have increased by nearly 1,000 percent and they have a steady stream of clients from surrounding towns.

**Coffee processing women:** Eunice Arita (right) and Karen Arita package ground coffee at their shop in Santa Rosa de Copan, Honduras. After receiving extensive training from Fintrac, the sisters expect to increase sales by 100 percent over five years.
Learning for Gender Integration and Women’s Empowerment
A Case Study from Lutheran World Relief

Background
In Honduras, an estimated 51 percent of the population lives below the poverty line, with the most extremely poor populations concentrated in six departments in the west. With that region, only 28 percent of households are headed by women, but 64 percent of those households live in poverty.¹

Despite public policies at the national level, which provide the legal framework for supporting gender equality in agriculture, nonexistent or ineffectively implemented policies at the municipal and community levels prevent women from accessing the resources that would allow them to achieve food security.

Gender in Agriculture: From Policy to Practice
Lutheran World Relief recognizes that women and men best fulfill their personal, family and community responsibility when they have equitable access to government services and programs, it is important for local governments to understand gender roles and responsibilities and promote gender equality through their policies and programs.

LWR learned that in order to achieve equitable access to program and services at the local level, there must be participation by women and men in consultative processes and local government decision-making. Women and men should be able to participate fully, allowing them to influence the outcomes of decision-making processes and play a substantive role in deciding local government priorities as well as the allocation of public funds. To achieve this required an increased capacity for women and men to practice leadership skills, with women in particular increasing their ability to take leadership roles in decision making at the municipal level.

The Gender in Agriculture: From Policy to Practice (GAPP) project is a two and a half-year activity (2013-2016) funded by the United States Agency for International Development (USAID) through its Feed the Future (FtF) Program that is piloting a methodology that empowers both to advocate for policy changes that enhance women’s access to credit.

The project works in nine municipalities in Western Honduras with 2,721 women members of ten Municipal Women’s Networks (Red Municipal de la Mujer, RMM), as well as with 895 male leaders of 60 rural credit institutions (Instituciones de Credito Rural, ICR) from the department of Lempira.

Capacity Building Activities
Qualitative needs assessments at both the RMM and ICR level determined the need for several interventions to strengthen the capacity of women to serve as leaders and advocates, as well as for male leaders in rural credit institutions to be supportive of women’s business and agricultural initiatives. Women in the department of Lempira contribute nearly half of all members’ savings to rural credit institutions, yet receive less than a third of all issued credit. Further, they face significant obstacles to

accessing credit including high interest rates, collateral requests and high transaction costs, among other factors. 2

To address these issues, the GAPP project carried out interventions aimed developing a cadre of women and men with knowledge and leadership skills in the areas of equity, agriculture, and food security. One intervention, carried out with members of the RMM, focuses specifically on building women’s leadership skills and improving their understanding of gender equality. The intervention consisted of five workshops, each with multiple modules, focusing on the topics of facilitation techniques, leadership and self-esteem, gender equality, masculinity and agriculture.

To expand the overall reach of the intervention, the workshop followed a Training of Trainers (ToT) model where women who completed the training were expected to replicate it to other RMM members. Women also received coaching by the GAPP team to address challenges or questions that emerged during the ToT. Men took part in participatory and reflective trainings to build understanding of how masculinity contributes to (or impedes) the achievement of gender equitable outcomes. This was carried out through workshops aimed at changing behavior among men that had them confront and deconstruct their perceptions of masculinity to rebuild a more positive and supportive image of what it is to be a man.

Impact and Outcomes
As of year two, the GAPP project delivered training to a total of 2,142 participants (1,545 women and 395 men). Following year one, a sample survey was conducted that found 80 percent of women surveyed were using the knowledge they gained and felt increased confidence and willingness to participate in the development of municipal gender policy. A survey of 40 men found that 75 percent surveyed were interested in supporting policies and programs to promote gender equity in the agricultural sector. Following year two, another sample survey of 217 participants found that 90 percent were using the knowledge they gained to either support or execute a policy or program that promotes gender equity.

Testimonials
Women’s leadership in the agricultural sector remains limited by disparities in earned income and wages, as well as limitations in political empowerment3. National laws such as Equal Opportunities for Women and Food and Nutrition Security legislation have yet to define mechanisms to ensure effective implementation at the regional and municipal levels4. Through LWR’s GAPP project, Feed the Future is addressing these challenges through the development of activities that allow equitable access to resources while promoting the role of local governments as institutions seeking the equitable development of the communities they serve. Idalma Cárcamo is a single mother who lives in Erandique, where poor quality water has a negative effect on children. After receiving training on leadership development from the GAPP project, she and other single mothers decided to work through their local women’s network to draft a proposal to establish a water purification company. The proposal process had many steps, negotiations and follow-up with their local government officials, but with the skills they learned, the women navigated the process with tenacity and confidence. Now Agua Erandique provides safe water to more than 700 families in and around Erandique, and employs 10 low-income women.

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4 Equal Opportunities for Women and Food and Nutrition Security legislation have yet to define mechanisms to ensure effective implementation at the regional and municipal levels.
José Maximino Cruz is the president of the "Progressing Together" Rural Credit Institution in Erandique. He reports he initially thought he was practicing gender equity in his leadership role, but after undergoing training he realized ways he could greater support and promote women’s agricultural initiatives. “Now that we know about this idea of masculinity, we have had to deal with some problems. And that is a big deal, because when we began we had the capacity and the skills (but) sometimes we didn't use them like we should have,” José says. “But now we understand why it's important to let all people participate.”
Sub-Saharan Africa
Training women researchers brings science closer to culture

Despite the large role that women play in agriculture in developing countries, they are critically underrepresented in agricultural research. In Sub-Saharan Africa, women represent just 30% of all researchers (UNESCO, 2010) and 14% of management positions in agricultural research and higher education agencies (Beintema & Di Marcantonio, 2010). Veterinarian and researcher Esther Molell of Sokoine University in Tanzania describes how in her country, “(d)eeply rooted traditional values very often pose serious obstacles to gender equality. Many cultural forces continue to stand in the way—ranging from women being steered toward other professions from an early age. It was believed that boys (do) better in science than girls” (Molell, 2016). In Tanzania, women represent just 24.8% of public agriculture research staff and 25% or researchers at academic institutions (UNESCO, 2010).

As part of the USAID Feed the Future Innovation Lab for Genomics to Improve Poultry, Molell is proving that women can play an important role in advanced scientific research. This 5-year research program has emphasized mentorship and capacity-building of women in research laboratories that are using genomic and genetic approaches to develop a breed of chicken with improved resistance to Newcastle Disease and heat stress. Women represent 55% of the long-term graduate student staff associated with this University of California, Davis led project, which partners with the University of Ghana, Sokoine University of Agriculture in Tanzania, the University of Delaware, and Iowa State University (USAID Feed the Future Innovation Lab for Genomics to Improve Poultry, 2016).

As it works to develop this improved bird, the Genomics to Improve Poultry project is simultaneously committed to providing hands-on, practical training to students. In the first two years of the program, the University of Ghana and Sokoine University have hosted trainings in biosecurity, laboratory safety, laboratory techniques, and sample collection. Ghanaian graduate student Princess Botchway has worked for the project for two years, and says that it has increased her confidence to work as a researcher in animal breeding and genetics. “Prior to this project, I never had the courage to handle chickens. This project has therefore given me that courage and taught me appropriate bird handling and restraining techniques” (Botchway, 2016).

Figure 1: Graduate student Melissa Hermann training Tanzanian graduate students to conduct ELISA assays

Figure 2: Princess Botchway processing newly hatched chicks
2016). Graduate students are also trained to perform advanced research techniques including tear collection, ELISA, RNA isolation, and qPCR. These assays are rarely available and accessible for scientists in Africa, especially women, which can empower them to pursue science in these areas. “(I have gained) hands-on experience in key aspects of chicken production, laboratory and on-farm biosecurity measures and team work” explains Botchway.

By gaining practical experience in the lab, trainees empower themselves to work in advanced laboratories that are contributing to the fight on global food insecurity. The objectives of the Genomics to Improve Poultry program are especially important for women in African countries, who are often cited as the primary owners of poultry (Guèye, 2005). “(L)ocal chickens are very important to the rural farmers, especially women and children, who make-up a majority of farmers in Ghana... Due to limited access to veterinary care resulting from poor access routes, lack of electricity, field personnel, funds, education, etc., most of these farmers lose a substantial number of chickens during an outbreak of Newcastle disease. It is important therefore to provide another alternative which is resistant local chicken breeds” (Botchway, 2016).

Molell agrees, and insists that women can help to bridge the gap between science and the real world, an important concern for the Genomics to Improve Poultry program. “Women have been centrally involved in the transmission of culture, given their close involvement with the education of children, and have thus been key transmitters of values and norms from generation to generation. Because of their closeness to family and children, women have a unique approach to science and its application that emphasizes the human dimension of science and technology, and its value in improving the quality of life and the empowerment of humankind. The integration of science into culture is a prerequisite for bringing science closer to society in which women are closely involved” (Molell, 2016). By integrating diverse expertise and perspectives, this program is addressing the need for the product in development, an improved chicken breed, to meet the specific needs and be relevant for the expected beneficiaries, rural smallholder farmers.

Figure 3: Princess Botchway collecting tear samples from chicks to assess presence of Newcastle Disease Virus

Figure 4: Dr. Esther Molell (left) brainstorming best models to breed and distribute improved chicken breeds to smallholder farmers with poultry experts from Kenya, Tanzania, and US in September of 2015.
References


Pay for Performance Incentives to Empower Women in Agriculture through Access to Finance

DEVELOPMENT CHALLENGE

According to the Feed the Future (FtF) Women’s Empowerment in Agriculture Index (WEAI) baseline report, access to productive resources, including access to and decisions on credit, is the main challenge that contributes to the disempowerment of women in Ghana. This has implications not only for women’s empowerment, but also food security, as women are responsible for the production of 70 percent of food crops in Ghana. Access to finance is a challenge for all agribusinesses in Ghana due to supply side constraints, including financial institutions’ (FIs) reluctance to make agriculture-related loans, lack of understanding of the opportunities and risks in agricultural lending, and limited product offerings suited to borrower needs, as well as demand side challenges, such as borrowers’ unfamiliarity with how to interact with the financial system. Women in Ghana’s north face additional economic and cultural barriers that impede their access to credit. Structural issues also play a role; women working in staple food value chains are mostly concentrated upstream as producers, primary processors, and small-scale traders—segments of the value chain that FIs often have difficulty catering to profitably due to their risk profiles, lack of collateral, remote location and small-sized loans.

THE USAID-FINGAP MODEL

USAID’s Financing Ghanaian Agriculture Project (FinGAP), implemented by CARANA Corporation (now Palladium, following its acquisition of CARANA in 2015) was designed to support a wide range of beneficiaries working with FtF Implementing Partners in Ghana so that they could increase their level of access to finance. The project’s design placed specific emphasis on targeting unbanked actors in the ‘missing middle’ seeking financing amounts of $25,000 to $500,000. USAID-FinGAP was tasked with identifying a large set of agribusiness lending/investment opportunities, and then experimenting with technical assistance and “smart subsidies” to stimulate the expansion of the financial sector into agricultural lending.

USAID-FinGAP mobilizes finance to male and female-led agribusinesses in Ghana through a two-pronged approach (acting on both the supply and demand sides) utilizing “smart subsidies” (e.g. performance-based sub-awards). To build demand for banking services and products by agricultural value chain actors, USAID-FinGAP began by building a network of Ghanaian business advisory services (BAS) providers to identify investment opportunities, and to help these structure and package financing requests for FIs. It then put in place a parallel program on the supply side to encourage financing for those investments by Ghanaian banks, microfinance institutions (MFIs), rural community banks (RCBs) and investment funds—also using a pay-for-performance approach. In the case of both BAS and FIs, payments are made upon proof of financing and investment into the target value chains.

Gender-related challenges identified by the project early on, included that USAID-FinGAP was designed to directly benefit actors in segments of the value chains seeking “missing middle” financing, in which few women were found. Female-led BAS providers were also few in number. The USAID-FinGAP team recognized that innovative approaches were needed to connect more women from the Feed the Future value chains with appropriate financing.

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1 Hazel Jean Malapit et al., “Women’s Empowerment in Agriculture Index: Baseline Report”(USAID and IFPRI, 2014)
THE SOLUTION

USAID-FinGAP employs several strategies to ensure the project’s pay-for-performance framework reaches women operating in the maize, rice, and soy value chains in Northern Ghana. First, the USAID-FinGAP team targets agribusinesses (e.g., processors, traders, aggregators) for financing which frequently “on-lend” to upstream actors where most women are located within each value chain. The project also includes a bonus within its performance incentive scheme to encourage FIs and BAS providers to identify and facilitate financing for women-led agribusinesses. The USAID-FinGAP team actively pursued female consulting firms to encourage them to join the BAS network, expanding the number of female-led providers by several-fold, leading to more female agribusinesses served. The team also decided to take their Investment Summit concept “on the road”, and in addition to hosting a large Agribusiness Investment Summit in Accra each year, hosted a series of “Mini-Summits” in rural areas where upstream actors are located to facilitate business linkages between women-led BAS providers, SMEs and FIs. FIs jumped at the opportunity to meet more potential clients directly in the field. Last, BAS providers began to aggregate women’s financing applications into one larger application, for submission to rural community banks and MFIs, thereby easing collateral requirements, reducing the transaction costs for the banks evaluating them, and increasing the likelihood of loan approval.

IMPACT

By March 2016, USAID-FinGAP efforts had generated a total of $87 million in new, private, incremental financing to more than 700 small, medium, and large businesses for targeted investments in the maize, rice, and soy value chains. As of this date, 248 female-led agribusinesses have received direct financing from the project and an estimated 25,000 female smallholder farmers in Northern Ghana have received on-lent input financing from beneficiary SME firms to support their agricultural production and trade activities, in addition to being linked with a secure buyer for their goods. For example, Premium Foods, a USAID-FinGAP-supported poultry firm that benefited from a loan facilitated through this program, provides interest-free input financing for smallholder farmers, including women. USAID-FinGAP’s “Mini-Summits” have successfully enabled BAS providers and FIs to identify new potential borrowers while expanding SME understanding of the benefits of BAS. Holding these and other events (e.g., meet and greets, events at markets) closer to where the women in the value chains are physically located has been a successful strategy to identify new, rural clients, especially women. USAID-FinGAP has engaged five women-led BAS providers to facilitate deals for women-led agribusinesses, which has proven to be an effective approach: nearly one-third of all women-led agribusinesses the project works with are partnered with these BAS providers.

SPOTLIGHT

One of the most successful strategies to unlock financing for women in agriculture is aggregating the financing requests of many small-scale producers and aggregators. This model has been widely used by the northern Bonzali Rural Bank, an FI in USAID-FinGAP’s network. Heavily leveraging a performance-based grant from USAID worth $33,000, it has so far released $820,000 in agribusiness loans to mostly female-dominated farmer-based organizations in the target value chains. Over 740 women from 91 different women’s groups expanded their agribusinesses in Northern Ghana because of these individual and group loans. Ayishetu Adama, a rice, maize, and soy aggregator, is just one of the hundreds of women impacted by USAID-FinGAP, but her experience typifies that of many. Before USAID-FinGAP, Adama was selling 10-15 bags per week in Tamale, now with the support of loans from Bonzali, Adama is aggregating 50-80 bags per week.

For further information on USAID-FinGAP’s progress in reaching women, a Gender Report completed by the project is available upon request. The Palladium team would be happy to present it at the Learning Evidence Exchange as well.

USAID Financing Ghanaian Agriculture Project (USAID-FinGAP)
AID-641-C-13-00002
Reducing gender gaps in agriculture – a story from ADVANCE Ghana

Background
ADVANCE is a five year project, funded by USAID/Feed the Future and implemented by a consortium led by ACDI/VOCA, with Technoserve, PAB Consult and ACDEP as the partners. The project’s main goal is to increase the competitiveness of the maize, rice and soya value chains in Ghana, more specifically in the Northern, Upper East, Upper West, Ashanti, and Brong Ahafo regions. ADVANCE achieves this through boosting the agricultural productivity of the three commodities, improving the value chain actors’ access to market and finance, and strengthening local capacities.

Gender strategy
The project will reach over 113,000 smallholder farmers by end of 2018, out of them 40% will be women. At the end of 2015, since the beginning of the project, a total of 70,238 smallholders benefitted from the project, 30,510 of them (or 43.44%) were women. To impact women farmers’ lives and mainstream gender equity in the targeted communities, ADVANCE designed and implements a gender strategy. The related activities in FY14 and FY15 evolved around the key points below:

- **Actively engage women in capacity building**: This includes among others making sure that the women can attend and benefit from the trainings through gender appropriate materials (more pictorial given their low literacy level) and training settings (sometimes with husbands), times, frequency and duration (in the afternoon or after serving dinner where they have more free time, for not more than two hours), in local languages etc.
- **Recognize relevant technology**: Technologies that meet women’s needs and preferences, and are time saving, less physically demanding, and affordable will be the ones promoted towards women farmers through trainings and demonstrations
- **Build women’s leadership capacities** through training, mentorship, awareness campaign, and networking
- **Improve women’s literacy and numeracy skills** through specific trainings
- **Facilitate women’s access to land** through advocacy activities, sensitization, and linkage development with outgrower businesses
- **Increase women’s access to agriculture inputs** through community input promotion and Village and Savings Loans Associations (VSLAs) formation to save for inputs acquisition during crop season

As of end 2015, the project was able to train over 20,000 women in good agricultural practices, farming as a business, sell more for more, post-harvest handling, leadership, literacy and numeracy, business management and the like. The targeted number of women training beneficiaries for the whole life of project is 36,000.

Purpose
This note summarizes the extent to which the project was able to reduce the gender gap by increasing women’s yields through the above mentioned activities.

Methodology
ADVANCE conducts every year a survey to estimate beneficiaries’ yields from a representative sample, through crop cut procedures. In addition, the projected collected in 2015 data on women’s ownership and uses of assets, resources and income, as well as decision making processes in the households from a representative sample of its FY15 beneficiaries, which included 1,592 women planting maize, rice and soya. Data was analyzed and statistical tests were conducted to assess relationships and their significance between the support provided and women’s yields.
Findings
Analysis of the 2014 and 2015 yields showed that men farmers always obtained higher yields, across crops. However, as seen in Table 1 below, women’s yields increases were much higher than the men’s, especially in maize and soy.

Table 1: Yields values and changes in 2014 and 2015

<table>
<thead>
<tr>
<th></th>
<th>Maize</th>
<th></th>
<th>Rice</th>
<th></th>
<th>Soy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>2015 yield (MT/ha)</td>
<td>3.65</td>
<td>3.73</td>
<td>3.81</td>
<td>4.07</td>
<td>1.8</td>
</tr>
<tr>
<td>2014 yield (MT/ha)</td>
<td>3.18</td>
<td>3.58</td>
<td>2.82</td>
<td>3.04</td>
<td>1.49</td>
</tr>
<tr>
<td>% increase</td>
<td>14.65%</td>
<td>4.14%</td>
<td>35.28%</td>
<td>33.95%</td>
<td>20.42%</td>
</tr>
</tbody>
</table>

To ascertain whether the project’s gender strategies contributed in those significant changes, further analysis and tests were conducted. Data on the 2015 crop season indicated that the women who attended the good agricultural practices (GAPs) trainings were more likely to use improved seeds (chi-square test p-value of 9.99797E-72): 50.8% of the female farmers who attended the GAPs training used improved seeds while this percentage is only at 42.9% for those who didn’t attend.

Further analysis showed that use of improved seeds significantly influenced yields (t-test p-value 3.60861E-08). The women who used improved seeds had their yield 21.23% higher than those who didn’t in average. This implies that those who attended GAPs trainings, were more likely able to get higher yields as they were more likely to use improved seeds. This assumption has been confirmed by a t-test on the relationship between GAPs training attendance and yields that was found significant (p-value of 7.91841E-05). The women who attended had over 20.43% higher yields in average. Many other factors were tested (ownership and use of assets, inputs into decisions, attendance to other trainings etc.), but no relationship was found as significant. However, further analysis are being carried out.

Lessons
These findings imply that to increase women’s yields, the key activity would be training them on GAPs. Any other type of assistance has to be accompanied by GAPs to get better impacts, in the case of ADVANCE. It is also fairly assumed that the GAPs trainings delivered so far are effective and are properly reaching the women farmers. The project implements those through demonstration sites. Inputs providers sponsor the setting up of these sites through donation of all the needed inputs. The demo sites represent a marketing opportunity for those companies, allowing them to expand their customer base and sell more products. Through the established relationships between them and the farmers, the project increases women’s access to improved inputs, which would have been difficult to them otherwise. This fits into ADVANCE’s sustainability strategy, as that relationship is likely to remain, even after the project ends. Implemented corollary activities helping the beneficiaries to apply the GAPs knowledge are the formation of VSLAs by the project so that the women can finance the inputs purchase, and provision of women friendly tools and equipment through small grants programs.

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CASE STUDY:

WOMEN EMPOWERED BY MOBILE MONEY

The merits of financial inclusion are strongly rooted in empowerment. And yet, in Malawi, only 33 percent of the adult population is banked. The primary reasons for this low number are remote distances from bank branches and cumbersome procedures to open bank accounts and access formal credit. These barriers are particularly acute for women. Only 28 percent of Malawian women are banked, compared to 37 percent of men (FinScope Consumer Survey Malawi 2014). So what if that distance was removed? And what if women could safely store money and access financial services through their phones? Technology makes this possible. In Malawi, there is no discernable difference in mobile phone ownership between women and men. Affordability, rather than gender, is the main determining factor in mobile phone ownership.

Research by Women’s World Banking in rural Malawi showed that Malawian women fill many roles within their families. They lead domestic as well as economic activities at home, on the farm, and in the markets. Women are often very involved in household financial decision making around farm inputs, school fees, and housing rent. Malawian women are unique in that they identify themselves as providers and have an expected role in saving for the family’s future. Thus, it is imperative that Malawian women have access to financial services.

This access becomes even more important when you factor in women’s limited property rights and that they tend to own fewer assets than men. Combined with low levels of wages and labor force participation, women are often left with insufficient collateral to even obtain credit. Even if women have collateral, married women remain barred from full membership in farmers’ clubs — the main sources of credit and extension services for small farmers. And yet, access to credit is a key link between economic opportunity and economic outcome.

Recognizing the barriers to credit that women face in Malawi, FHI 360 partnered with The Hunger Project to pilot the use of mobile money in the process of microloan disbursements and repayments. Through this pilot, 186 beneficiaries opened mobile money accounts and FHI 360 delivered training on financial literacy and mobile money and subsidized the cost of the mobile handset to offset burden on the beneficiary. In total, the pilot disbursed microloans to a total of 48 recipients (43 females and 5 males), disbursing a total of MWK 1,532,000.

While programs such as The Hunger Project’s microloan program are making considerable efforts
to ensure financial inclusion for women in Malawi, FHI 360 was able to support the addition of a layer of technology – mobile money – to make these efforts easier and more inclusive for women.

So now we have answers to our initial questions: What if the distance was removed? And what if women could safely store money and access financial services through their phones? Registering for a mobile money account is less cumbersome than procedures required by banks. It also brings financial access points closer to the beneficiaries through the agent network rather than requiring them to traverse long distances to reach a bank branch or other location through which they could receive or repay their loans from The Hunger Project.

Perhaps most importantly, a mobile money account provides a safe and secure way for women to have control over their money. This point is illustrated well by Melina Chizimu\(^1\) aged 39 from Msamanyada Village in Ntcheu District. Melina is a married 39 year old woman. She earns a living through farming and small scale income generating activities. She and her husband have four children – three girls and one boy. She comes from Msamanyada Village in Ntcheu District. Melina does not have a bank account so finding a secure place to save money had been a challenge for her. That changed in November 2013 when she opened her first mobile money account with the support of FHI 360 and The Hunger Project.

Melina said, “Before I had a mobile money account I used to keep money in my handbag. But very often I would find that the money is not there. My husband drinks beer and he would take the money regardless of where I hid it. This was causing quarrels in our family. With a mobile money account, I have done away with him and the problem is over. He does not even know the PIN for my account.”

Melina used to hear about mobile money on the radio, but she lacked the confidence and understanding of the system to open her own account. When FHI 360 and The Hunger Project implemented the pilot in Blantyre and Ntcheu, Melina received training on mobile money and financial literacy. In addition to using the mobile money account to save money securely, she has been using it for many other things – as a wallet, for buying airtime, and for sending money. In January 2015, Melina saved MWK 3,600 ($8.60) in her account. In the next month, she saved an additional MWK 5,000 ($12).

Melina further says she wants to use her mobile money account to save more money. “Now I plan to keep more money in my account the same way we keep money with Village Savings and Loan groups. I plan to accumulate savings to buy fertilizer to use in my garden.”

\(\text{www.feedthefuture.gov}\)

\(^1\) Name has been changed to protect the beneficiary’s identity.
Empowering Women Cooperatives through Public-Private Partnerships for Shea Value Chain Development in Mali

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In the framework of the Feed the Future (FtF) USAID-funded project on Scaling-up Climate-Smart Agroforestry Technologies for improved market access and food and nutritional security in Mali (SmAT-Scaling), a particular emphasis has been placed on empowering women through tree-based public-private partnerships (PPP).

Key Lessons: Since its inception in 2014, the SmAT-Scaling project has placed particular emphasis on empowering women through tree-based agroforestry using the following scaling-up approaches: (1) diffusion of bottom-up, demand-driven, market-oriented agroforestry technologies and practices including high quality seeds and seedlings; tree grafting and planting; farmer-managed natural regenerations; climate-smart soil and water conservation, etc.; (2) multistakeholder innovation platforms; (3) rural resource centers, which are managed by grassroots organizations, that serve as training and demonstration hubs and provide opportunities to farmers, especially women, to share experiences with peers and receive technical guidance and services that are tailored to their livelihood needs; (4) capacity building, demonstrations, and learning visits; (5) radio broadcasting on agroforestry practices, tree planting, and climate information for decision making; and (6) market opportunity development for priority tree species that have high market potential through PPPs.

This development-oriented project, which implements its gender-specific activities in the Mopti, Sikasso, Segou, Kayes, Koulikoro, and Timbimkutu regions of Mali, works in more than 810 villages across 104 communes. The project has contributed to creating awareness and improving rural communities’ consumption of nutritious, tree-based products, including fruits and tree-based leafy vegetables, for improved food and nutritional security. This assistance has helped create incentives for women to include Moringa and Baobab leaves as part of their household food consumption. With private sector support, SmAT-Scaling also contributed to improving the quality and competitiveness of shea products; strengthening the management skills of women’s cooperative organizations; improving access to and management of loans; access to finance; and improving food and nutrition security. This assistance has created opportunities for more than 14,000 women to develop business plans with the support of business development services providers.

Activities: The World Agroforestry Centre (ICRAF) is implementing the five-year project, which is funded by USAID/Mali, from 2014 to 2019. Field activities are being implemented in partnership with the Aga Khan Foundation (AKF), World Vision Mali (WV), Catholic Relief Services (CRS), the Interchurch Organization for Development Cooperation (ICCO Cooperation), Mali Biocarburant SA (MBSA), the Near East Foundation (NEF), Institut d’Economie Rurale (IER), and the Regional Directorates of Agriculture and Forest (DRA and DREF).

SmAT-Scaling emphasizes cascade and farmer-to-farmer training and experience sharing through inter-country and inter-community learning routes. More specifically, the shea value chain development PPP, with the support of national and international NGOs and research centers, including ICRAF, ICCO Cooperation, Société Abdoul Talla et Frères (SOATAF), TERAFINA, OIKO, and Olvea-Burkina, has empowered Malian women through the following activities:

- Improving the quality and competitiveness of shea products through market assessments and business plan development; promotion of energy- and time-saving technologies and business processes; building of warehouses; and training on best processing techniques to achieve certification standards
- Strengthening the financial and administrative management of shea cooperatives while also streamlining gender considerations. To this effect, a capacity gap assessment is being carried out, and a development plan to address the main
In terms of women’s needs related to financial products, the SmAT-Scaling project facilitated support from Terrafina Microfinance to assist local microfinance institutions in providing innovative financial products that are tailored to the needs of shea cooperatives. This collaboration with financial institutions has also allowed SOATAF to obtain a line of credit of 500 million CFA francs ($1 million) from the Banque Nationale de Développement Agricole (BNDA) as a guarantee to purchase shea nuts from women cooperatives in 2015.

Collaboration has been strengthened between ICRAF, ICCO Cooperation, and Fair Match Support (a business development provider with strong experience in providing support to cooperatives on shea certification) to work on capacity building for cooperatives in the production of certified shea nuts. The SmAT-Scaling project, through ICCO Cooperation, has signed agreements with Olvea and Fair Match Support to facilitate the certification of shea nuts in Mali. More specifically, actions are being taken to (1) improve the revenue of 3,000 Malian women who are certified shea nut processors; (2) build the financial, management, and governance of five women’s groups; (3) improve the quality of shea nuts; and (4) supply Olvea with 60 tons of certified shea nuts in 2015, 200 tons in 2016, and 500 tons in 2017. The linkage between women’s cooperatives and local financial institutions improved women’s access to better quality financial services, particularly credit.

As the value chain is strengthened and incentives are aligned, shea cooperatives are becoming more attractive, more credible, and more reliable customers for the microfinance institutions that are on board. Now that the cooperatives are becoming stronger, more professional, and more bankable, they are more likely to be able to hire financial and administrative managers (i.e., accountants and cooperative and business coordinators) and pay them based on their own revenues. They are also more likely to be able to pay fees to business development service providers for training and other services such as quality improvements to ensure the sustainability of achievements.

**Story:** ICRAF, in partnership with ICCO Cooperation, has engaged SOATAF and Olvea, two private partners that are committed partners in the SmAT Scaling project. ICCO Cooperation discussed building a storage facility with SOATAF to aggregate shea nuts from cooperatives. ICCO Cooperation and SOATAF have purchased shea nuts from cooperatives at competitive prices and are issuing long-term commercial contracts with shea nut and butter cooperatives. The SmAT Scaling project has also engaged Olvea, a private sector firm that processes oil for cosmetic products, on sourcing shea bio from cooperatives. SOATAF signed a $1.2-million purchase agreement contract with women’s cooperatives for shea nuts. Olvea is committed to purchasing higher volumes of shea nuts from 2015 to 2017. More specifically, they intend to purchase 360 MT of organic certified and conventional shea nuts in 2015; 500 MT in 2016; and 800 MT in 2016 from women’s cooperatives in Mali. Increased production is being achieved through awareness-raising activities, capacity building, greater access to and use of improved agroforestry practices (seedlings, nursery, grafting techniques, etc.), and value addition. The social status of women is improving as the project is working to ensure that women are in leadership and other decision-making positions, and that they are more proactively advanced to management positions in cooperatives and federations. Improving women’s resiliency to external shocks, given that many live in women-lead households, is considered to be part of capacity-building activities. Additionally, the project is working to register 25 women’s cooperatives under the Global Shea Alliance sustainability initiative. This will provide women’s cooperatives with greater visibility and more direct access to higher-level markets, thus bypassing middlemen. ICCO Cooperation has committed to linking these groups to the national shea association and has also helped them achieve ASBI-type certification standards. Moreover, the food security and nutrition of these households are a major focus as actions are being taken to facilitate access to diverse, high-quality food, including Moringa and Baobab leaves.
Photos:

Photo 1 Caption: Training workshop for women cooperatives representatives on shea nuts aggregation, commercialisation, and negotiation techniques. Tominian, Segou Mali

Photo 2 Caption : Women hand depulping freshly harvested shea nuts. Sangana Cooperative, Sikasso Mali
Photo 3 Caption: Women cooperatives members being trained in quality shea nuts that meet markets requirements, Kemeni, Segou Mali

Photo 4 Caption: Women cooperatives members being trained in Baoba juice processing in Mopti- Mali
Have capacity building and increased leadership or management opportunities for women led to increased participation of women in leadership roles in the community?

Through collaborative research with the Rwanda Dairy Competitiveness Program II (RDCCP II) and the Integrated Improved Livelihood Program (IIILP) in July 2014, the Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) Project attempted to build a comprehensive understanding of how increases in income affect purchasing and consumption patterns among these programs’ participants, their care seeking and caregiving practices, and women’s empowerment.

A key component of women’s empowerment is their right to have the power to control their own lives, both within and outside the home. SPRING wanted to see whether or not activity beneficiaries increased their presence and participation outside their home and how their perceptions of status may have changed as a result.

One USAID-funded activity that focuses on training and empowering its beneficiaries, many of whom are women, is RDCCP II. The five-year program, which started in 2012, seeks to reduce poverty through expanded marketing of good quality milk that generates income and employment, and improves household nutrition. The program has made conscious efforts to engage women at different points along the value chain (e.g. holding training sessions at times most convenient for women, setting targets of female participation before training sessions and actively encouraging women to participate, stipulating to service providers to reach out to women, and encouraging women to actively engage when they attend training sessions).

Over time, RDCCP II has seen a positive trend in self-efficacy, self-confidence, and equity among its female beneficiaries. The activity assesses those three key program indicators before and after trainings that focus on improving beneficiaries’ ability to secure grants and loans, increasing the quality of their...
product, and enhancing their business and management capabilities. Using both quantitative and qualitative data collection methods, SPRING looked more closely into if and how participation in RDCP II increased women’s presence and participation in activities outside their homes. Change in women’s status was captured in several ways including involvement in decision-making, engagement in development projects and in income-generating activities, reduced dependency on their male partners, and taking up leadership positions within their groups and in the local committees.

While the overall trends were positive, one story stood out: Immaculee Kayitesi’s. Immaculee is a window of the Rwandan Genocide against the Tutsi. In 2013 RDCP II started working with Immaculee on her small dairy enterprise with only a handful of employees. Over the past three years, the activity has provided Immaculee with a range of trainings and business opportunities in order to boost her milk and yogurt company. The transformation has been remarkable.

After Immaculee participated in trainings on financial management and business performance, RDCP II encouraged her to apply for a loan to enhance her dairy business. With the loan secured, the activity worked with her to improve milk quality, emphasizing the importance of milk testing at the source and good hygiene. To facilitate improved milk testing, RDCP II provided Immaculee with testing kits.

After receiving training in good manufacturing practices, RDCP II linked Immaculee with the Rwanda Bureau of Standards (RSB). Working alongside the RSB, Immaculee is acquiring two certifications to signify the quality of her milk and manufacturing practices to consumers: the S-Mark and HACCP certifications. She has successfully passed all the tests needed to acquire the S-Mark, and is currently waiting to be approved. She will start the application process for HACCP shortly.

It is evident that through capacity building and creating business opportunities for women, people like Immaculee are able to transform an idea into a profitable company. RDCP II’s Gender Expert, Alice Bamusiime, articulated it best when she said, “Female entrepreneurs just need mentors that help them pursue their own dreams. And once they have the right ones, they can make powerful strides in their community and their country.”
The Rwanda Private Sector Driven Agriculture Growth (PSDAG) Program is a five-year project funded by USAID/Rwanda that began in August, 2014. The goal of PSDAG is to increase smallholder farmers’ incomes by promoting private sector investments, with particular focus on women, youth, and persons with disabilities (PWD’s). PSDAG’s two main objectives are 1) Assist the GoR to increase private sector investment; and 2) Facilitate increased private sector investment in upgrading agricultural value chains. Now through the first year and a half of implementation, PSDAG is gaining greater understanding of how paid employment for women is created through the increased commercialization of value chains. Both wage and self-employment for women has been found to increase in some cases.

PSDAG developed the Value Chain Competitiveness Grants (VCCG) Facility designed to solicit applications which facilitate increased private sector investment in upgrading agricultural value chains. Ninety-nine applications were received from private partners involved in all stages of the project’s four targeted food crop value chains.

In January 2016, PSDAG partnered with local private sector firm, Kigali Farms, under the VCCG Facility for the production of button mushrooms in the first production facility of its kind in East Africa. This activity is ongoing through January 2017 and will assist Kigali Farms to make necessary investments to build and operate a commercially successful mushroom substrate and growing plant in the Musanze District of Rwanda’s Northern Province. Kigali Farms is working closely with the local community, specifically with some 800 farmers, 368 of whom are expected to be women, in order to produce and export a total of USD 110,000 of fresh button mushrooms to regional markets.

Kigali Farms collects and reports on its transactions with beneficiary communities through aggregation centers. Data collected is disaggregated by gender and location and includes quantity and value of wheat straw supplied to Kigali Farms by beneficiary community members. As the project and activity are still in nascent stages, strong quantitative data is in the process of being collected for this case under the VCCG Facility. Despite this, however, early successes have emerged under Kigali Farms’ activities.
Smallholder farmers working with Kigali Farms have the potential of realizing multiple benefits from their involvement in the endeavor. Since the production of button mushrooms requires the use of wheat straw in February 2016, Kigali Farms began purchasing wheat straw from farmers through a collection center mechanism. Three collection centers have been established to date in Musanze District, Busogo Sector for this purpose. Wheat straw has not traditionally been viewed as a marketable commodity, and the collection and disposal of it was usually left to women.

Straw collection is now emerging as a good business opportunity that farmers are beginning to consider for off-farm incomes. Before Kigali Farms engaged farmers, wheat straw was either burnt or used as manure. Most farmers and communities saw no economic value attached to wheat straw, and therefore considered it a woman’s responsibility to burn and clear the farm. When Kigali Farms engaged the community for supply of wheat straw, women saw an opportunity to convert the ‘worthless’ waste into family income.

Kigali Farms have so far purchased approximately 20 tons of wheat straw, generating earnings of USD 800 in less than one month to 26 farmers and collectors, 21 of whom are women. Purchase of wheat straw through collection centers has not only increased women’s’ off-farm income, but is increasing women’s employment and entrepreneurship as well. Kigali Farms works with paid facilitators to coordinate collection, aggregation and storage of wheat straw.

Anne Marie Ukwimanishaka, a 25-year-old high school graduate, is employed by Kigali Farms as a facilitator for Kabuye Ka Kavumu collection center in Musanze District. Anne Marie earns $2 a day and since she started working in February 2016, she has used her earnings of $60 per month to buy a sheep for her family, and also materials for her new basket-making business. She expects to generate more income for her family from this side-business. During the day, Anne Marie works at the collection center and at night, she makes 2 baskets which she sells at $1.40 per basket. Her business generates a weekly profit of roughly $15, and Anne Marie says her income from her salary as a facilitator and her basket business has made her the bread winner of her family. She plans to buy more sheep and expand her basket making business.

“Kigali Farms has created an opportunity for me and other women to earn income to our families. It is a great economic opportunity for women in this village, and the impact of earnings from wheat straw is visible at household level as demonstrated by myself.”

-Ann Marie Ukwimanishaka

The USAID/Rwanda PSDAG program is implemented by IRG, an Engility Company, www.engilitycorp.com/irg
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Anna Gaye from the village of Mampatim in the Casamance Region of Senegal has emerged as a leader of her rice growing group with the support of USAID/Senegal’s Feed the Future initiative. Since 2012, she started working with the Kissal Patim farmer organization in her capacity as a development worker with a local NGO. When she started working with Kissal Patim, the organization was made up of some 600 members. —two thirds of whom were women. USAID/Senegal’s Economic Growth Project forged partnerships with existing producer groups and local NGOs to expand rice production and empower women in leadership roles in their organizations, communities and households. Anna has continued her involvement with the group which has now grown to 2,016 members and still the majority women through the Feed the Future Senegal initiative Naatal Mbay. Anna was trained by Feed the Future as a lead farmer to share best production practices with her fellow farmers, as a data base manager to monitor and track critical production and business information, and as a community advocate in marketing and organizational skills to promote the expansion of the rice value chain in southern Senegal.

Feed the Future has introduced and expanded access to new high-yielding rice varieties and improved planting techniques. Anna’s group has been able to produce as much as three times greater yields while using less water, and other inputs. In 2012, they produced 584 tons of rice with average yields of 2.1 tons/hectare. In 2015, Kissal Patim produced an average of 3.02 tons/ha, for a total of 2,569 tons of rice. Their group was surpassed by only one other group in the Naatal Mbay affiliated groups, and Kissal Patim has 60% women in leadership positions. Anna says of her involvement in the project, “I work as a facilitator, training other farmers on best practices, quality, and other important skills. Since the work I do is at the family level, I find I am always in the role of facilitator or a moderator—even my own family now says that I’m the “grandmother” (matriarch) of the family— even my grandmother says it.”

Anna explains that an empowered woman is one who takes control—not from men—but she is a woman whose perspective is heard and taken into consideration by society. In the home, she contributes to household economic activities from start to sale, and after sales are finished she has a say on what is done with the money- for school, childcare, and more- without needing to ask her extended family for help. In the rural world it is really up to the woman to take care of the household, but she needs to have the means to do so.

Before working with Feed the Future, Anna admits she was too shy to speak in public, especially to share her personal point of view, adding “It was impossible!” But gradually, through the project trainings she received on best practices, and business principles, she came to
appreciate the importance of her work and her contributions in meetings. In her words, “I became truly passionate about it so I overcame my shyness. Now people say I talk a lot. Maybe I do, but it’s because I know I can help. Being seen as an empowered woman in my community, I am often sought after by women’s groups, even from other communities, to help them get ahead. I want to sensitize women about what they can do and inspire and motivate them to advocate for themselves and each other. I want to show that women can work and participate in meetings, in different activities, projects, etc—and even if they are illiterate they can still understand the work and do it well. Women also have a responsibility to overcome their shyness and show the world that their opinions are important.”

At the 2016 national agricultural trade fair held in Dakar, Senegal, Anna was front and center of the marketing effort to promote Riz du Sud – the rice produced in Southern Senegal’s Casamance region. Long in the shadow of its production giants from Northern Senegal’s River region, the Casamance traditionally produced only enough for home consumption. However, with the new adapted and high yielding varieties, commercial rice production has now become a viable economic activity for predominately women smallholder farmers in the zone. Alongside Anna’s group, Kissal Patim, 24 other groups are producing quality rice for the national market. While local rice was always a preference, especially for the population in the Casamance region, previously the supply could not meet the demand, making way for imported rice. Since 2014, local rice production has increased by at least 100%, which has allowed women to rise to the forefront of the emergence of the Casamance rice trade.

Anna is looking ahead to the future, and her aim for women’s empowerment goes beyond rice marketing. “I also want to enable other women to send their children to school, because that’s what really changed my life: my mom was able to send me to school. It wasn’t something I chose when I was little - but it made the biggest difference and now I can serve my community. I could do as many other educated people do and leave to get a better paying job, but I told myself, “I know the realities in the rural world and I can help women there. I am one of them and speak their language and know I can help.” Anna notes that luxuries are an illusion, and there are more important things for her to do. She wants to change lives and help women get out of their precarious situations. “That is what truly makes me happy,” says Anna.

Drawing on a combination of technical training in rice production, and backed up with a clear business perspective, Anna was able to directly influence her level of leadership, first targeting her peers, but then in many ways, by-passing the traditional male leaders, as she was able to demonstrate a clear understanding of the technical elements, and more importantly, she had the confidence to speak up and lead others. Naatal Mbay will continue to support Anna’s skills development with the introduction of new data monitoring tools to track the impact of the various production practices she is promoting, and make critical business decisions along with her fellow group members.

"I know the realities in the rural world and I can help women there. I am one of them and speak their language and know I can help."

- Anna Gaye

Naatal Mbay, a Feed the Future Senegal program, is implemented by USAID contractor IRG, an Engility company.
Learning for Gender Integration and Women’s Empowerment

In March 2016, Naatal Mbay launched the Abbreviated Women’s Empowerment in Agriculture A-WEAI study to deepen the understanding of women’s current situation in agriculture production in the Zone of Influence, and to track the project’s impact on women’s empowerment. While the A-WEAI results are still in the process of being analyzed, Naatal Mbay’s core objectives and workplan have been developed based on the learnings and successful approaches that were carried out under the USAID/PCE project. It is anticipated that the results from the A-WEAI will strengthen Naatal Mbay’s activities and ability to scale-up the successful examples of empowerment that were achieved under USAID/PCE.

Under PCE, a gender assessment was carried out using the Gender Integration Framework (GIF). One of the key findings was that women lacked equal access to resources, decision-making, management and leadership roles, and strong social networks. Specifically, the assessment found that 43% of women do not have a say in productive decision-making. As such, PCE activities focused on building the productive capacity of women and promoting women’s leadership in producer networks. To track the progress in these areas, the project monitored indicators such as “input into productive decisions,” “autonomy in production” and “group member.”

Gnima Koma, from the Sedhiou region in Southern Senegal, exemplifies how women can overcome barriers to participation in agricultural decision-making through capacity training. Through PCE interventions, Gnima received training on agricultural best practices, climate change adaptation, activity monitoring, mapping, and data analysis with simple tools like Excel. This inspired her to increase the number of hectares under rainfed rice production. Gnima also works as a database manager for the local association of ASSOLUCER where, thanks to support from PCE, she is able to prepare reports and deliver presentations at debriefing workshops with both internal and external value chain stakeholders. Gnima has become a role model for other women in the community and an example of how the GFI framework was able to identify and monitor progress towards removing key constraint.

Gnima now has control over her production decisions, and as a member and manager of ASSOLUCER, she demonstrates how women leaders can increase opportunities for women to engage in agribusiness in their regions.

One of Naatal Mbay’s objectives is to scale-up women’s participation and empowerment in the agriculture sector to create more success stories like Gnima’s. The A-WEAI is a crucial tool to identify the types of needs and opportunities for women in agriculture, however, it is imperative that the tools and methodologies are well-designed. Naatal Mbay has identified key lessons concerning the A-WEAI planning and implementation process that should be taken under consideration when the A-WEAI is employed in other projects. These include:

1. The A-WEAI study must be a team effort between the project implementers and the external service providers responsible for collecting and analyzing the data.
2. The translation and adaptation of the original English version of the A-WEAI questionnaire requires a keen understanding of the local culture and context.
3. The WEAI guidance documents are useful but some terms and concepts can be misinterpreted (e.g. the meaning and difference of primary and secondary
activities), and thus service provider training on A-WEAI jargon and tools is necessary.

4. The elaboration and validation of the methodology is a critical phase and should be allocated sufficient time for review and discussion before launching the field work.

5. The time required for careful data collection and analysis is significant, especially for those conducting the assessment for the first time.

6. The time occupation patterns for both men and women are tightly dependent on the season and therefore any replication of the analysis must be done at a similar period for the results to be comparable.

7. It is helpful to go beyond the strict quantitative WEAI questionnaire and investigate broader gender issues through additional focus groups and targeted interviews if the results are intended not just to compute an index but also to inform intervention programming.

Building from PCE experiences in capacity building and leadership empowerment for women, and the anticipated results from the A-WEAI, Naatal Mbay will be able to design effective, targeted interventions, and monitor progress and report on outcomes.

*Naatal Mbay, a Feed the Future Senegal program, is implemented by USAID contractor IRG, an Engility company.*
As a result of activities carried out under the Feed the Future Senegal Naatal Mbay project, and its predecessor, USAID/Projet Croissance Economique (PCE, running from 2009 to 2015) capacity building and increased leadership and management opportunities for women have led to increased participation of women in leadership roles in the community. The project relies on a farmer-driven structure, where farmer’s networks undertake the responsibility for extension of technical trainings and support services. Naatal Mbay provides direct trainings of trainer (ToT) sessions to farmer extension agents (“facilitators”), who then deliver trainings to other members of their producer network. Facilitators and lead farmers extend the messages to “satellites,” who grow their crops around demonstrations sites. Lead farmers in charge of the Project-supported demonstration sites receive regular follow-up support and on-site training and guidance from network facilitators and liaison agents known as “relays,” who provide training support for facilitators that support large satellite groups. Data collection and analysis is led by trained database managers who work closely with the technical team (lead farmer and facilitator) to collect and track seasonal activities and performance data that is used for network-wide decision making. This farmer-led model provides a natural platform for inclusion, but certain checks and balances must also be in place to ensure that all able actors may benefit regardless of gender, age, social status or ethnicity. Naatal Mbay’s expansion approach is directly targets partnerships with women’s groups particularly in irrigated rice. Naatal Mbay is extending its geographic coverage to the women dominated lowland zones for rainfed rice, while also promoting women’s leadership in the maize sector. The project has targeted the hiring of women as technical specialists deployed in the field to encourage women’s involvement in many different aspects of the value chain development. Promoting “gender champions” through economic empowerment of women in value chain activities has resulted in the emergence of women role models and leaders, who are becoming known on the national and international level. In addition to advocacy and dialogue, Naatal Mbay has informally promoted these women as positive deviants within local communities and producers groups.

In addition to increasing the capacity and leadership of women as lead farmers, facilitators/trainers, and database managers at the network level, the success of women-led and women-only producers’ groups has had a significant impact on the role of these women as leaders in their respective communities. Many of the women engaged with the Naatal Mbay and USAID/PCE projects have come to be known on the national level and have become staunch advocates for women’s economic empowerment. In addition to these empowered women serving as role models for other women in the agriculture sector, farmer groups are coming to recognize the business case for equal inclusion and empowerment of women in agriculture sector development. During annual seasonal farmer debriefing sessions, farmers analyze and discuss differences between women’s and men’s yield profiles, and work together to set targets to increase women’s inclusion and access to productive resources in subsequent seasons, in the interest of increasing the profitability of the farmers’ group as a whole. Fixing these objectives as tangible targets in seasonal partnership contracts has seen exponential growth of women’s inclusion.

In its final years, USAID/PCE placed a special focus on identifying and engaging additional women’s groups for FY14 and FY15 across all value chains. As a result, the number of women receiving U.S. Government (USG) assistance through USAID/PCE increased from 11,533 to 15,645 between FY13 and FY14. Most notable was the increase in women’s associations in

"My daughter is still very small, but already she sees other adults coming to me for advice, that I am on the municipal council, and invited to high level meetings in Dakar and even abroad - I hope she will see that she can do all this and more." - Nimna Diayté
irrigated rice that were reached – from 2 to 12, and the significant scale-up of rainfed rice demonstration sites to 780, 36% of which were led by women. Women’s participation in capacity building trainings increased project-wide in all value chains, from 17% in FY 2011 to over 40% in FY 2015. In the first year of Naatal Mbay’s implementation, women’s involvement has already reached nearly 32,000 women receiving capacity building trainings, representing nearly 45% of farmers trained across value chains.

Nimna Diayté, president of the FEPROMAS maize producer’s federation spoke to us about her experience, beginning as an empowered woman farmer, rising to president of a mixed-gender federation. “I want to help other women advance, too. I simply can’t gain this new knowledge and success and not share it with other women. In fact I can’t see a future where more women are not doing what I and other women leaders have done. I see that this is already happening in my community—women come to ask me what I have done to get where I am, and I share my experiences and inspire them to become leaders and develop themselves further. I work with other women leaders to get the word out about the importance of women’s economic empowerment. I attend meetings where I encourage youth and women to help their communities by becoming a resource for others by sharing the best practices and other new approaches. I want to see women continue the model we’ve started and to continue reaching out to help empower them to multiply their potential well into the future.

With my new economic status I am now on the municipal board and invited to more and more institutional meetings, and even ministerial meetings in Dakar. Now that I am attending these types of meetings I intend to do my all to make sure that more women have a voice in these spaces as well.

What we are doing with my cooperative, which is mostly women, has a bigger impact than our economic empowerment- we are proof that women can succeed as professionals in the agriculture sector- that women can be a force in agriculture. So, we are starting to apply pressure politically to get policies changed to improve women’s access to land. This is historically one of the most discouraging factors for women since it is such a longstanding problem, but I have insisted that we address it and work to overcome it. It’s one of the reasons I wanted to become a member of the municipal board in the first place. I have a daughter, and I am glad to see her making an effort to advance in school. Above all I want my children to have the best possible chance in life. I can now afford to send them to the best schools, make sure they have the materials they need and that they are well taken care of to concentrate on getting good grades. My daughter is still very small, but already she sees other adults coming to me for advice, that I am on the municipal council, and invited to high level meetings in Dakar and even abroad- I hope she will see that she can do all this and more.”

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Women’s Leadership and Economic Empowerment are Bolstered through Partnerships with Agricultural Education and Research Institutions: Lessons from Value Chains in Senegal

Thomas Archibald, Yaye Fatou Seck, Bineta Guissé, and Demba Mbaye  
USAID/Education and Research in Agriculture

In the suburbs of Dakar, Senegal, a group of women entrepreneurs crowd around three women who are leading a demonstration of improved methods for making thiéré lalo, a traditional millet-based couscous. They take notes and record videos on their smartphones. Elsewhere, in the city of Touba, another group of women entrepreneurs gather to learn how to use a small but powerful extruder machine to produce instant flours, made from a mixture of millet, peanut, and cowpea, enriched with mango, baobab, and other local fruits. The instant flours are suitable to feed to small children, which offers these entrepreneurs an opportunity to make a profit while also addressing childhood malnutrition in their communities. In recent years, Senegal has witnessed a rapid expansion of its value-added processing sector for products made from local fruits and cereals. The great potential for women’s economic empowerment through food processing is attracting an increasing number of women to the sector, mostly through women’s groups that promote entrepreneurship (Groupements d’Intérêt Economique, or GIEs). However, lack of capacity on two different levels has hindered this potential. On one level, many women and GIEs lack the technical capacity to produce high-quality products that meet food safety norms. On another level, the GIEs lack the group management capacity to ensure economic and social outcomes for the groups.

Lesson
To address needs such as these, the USAID/Education and Research in Agriculture (ERA) project, funded by USAID/Senegal as part of the Feed the Future initiative and implemented by Virginia Tech’s Office of International Research, Education, and Development (OIRED), works to strengthen human and institutional capacity throughout the agricultural education, training, extension, and research system in Senegal. ERA fosters new partnerships and catalyzes the creation of innovation platforms for public institutions to support private entrepreneurship. ERA works with universities, training centers for agricultural technicians, an agricultural high school, and two national research institutes to help them better connect research and practice in service of community and economic development.

ERA has demonstrated how such partnerships and platforms can support women’s economic empowerment in food processing value chains. Specifically, in relation to Feed the Future Learning Agenda questions three and four, we have learned that agricultural education and research institutions can be important actors supporting capacity building and leadership opportunities for women, which in turn strengthens small-scale commercial food processing and promotes women’s empowerment. Empirically, this lesson is manifest through evidence of improved management skills for women leading GIEs, increased numbers of women trained in research-based food processing techniques, creation of new wage employment and self-employment opportunities, increased numbers of product commercialization authorizations by the government, and

(3) Capacity Building and Leadership: Have capacity building and increased leadership or management opportunities for women led to increased participation of women in leadership roles in the community?

(4) Commercialization and Women’s Empowerment: Have interventions advancing commercialization in value chains affected access to paid employment or types of employment for men and women? Or, have they led to increases or decreases in unpaid work for men or women?
creation of new agreements between GIE platforms and Senegalese universities and research institutes. Two especially salient takeaways from this lesson pertain to project sustainability and to democratic knowledge sharing.

In terms of project sustainability, the public-private partnerships and innovation platforms that ERA catalyzes are designed to ensure that women entrepreneurs in Senegal have access to capacity building and leadership development opportunities for years to come. The institutional partners in the platforms see the partnerships as ‘win-win.’ Universities and research institutes can contribute to women’s empowerment and economic development while simultaneously enriching their own educational and research agendas. In terms of democratic knowledge sharing, our activities first faced a challenge because some university and research institute leaders saw collaboration with women’s GIEs as outside of their traditional institutional missions. With time, however, when the mutually beneficial nature of the partnerships became more apparent, those same institutional leaders came to value the practical wisdom of the GIE leaders, and the GIE leaders gained confidence in their own expertise and voice. Below, we elaborate further on these lessons by describing our activities, providing data on results to date, and situating the lesson in an illustrative story of successful women’s leadership.

Activity
Starting in 2011, ERA facilitated the following activities to foster two-way knowledge translation and shared capacity building: (1) A rapid assessment to document the needs of women’s food processing GIEs; (2) A study tour to U.S. land grant universities, involving select GIE leaders and Senegalese university and research institute leaders to learn from successful community-university partnerships; (3) Support for food fortification research by Senegalese food scientists at the national Institute for Food Technology (ITA); (4) Establishment of a Memorandum of Understanding for capacity building between Cheikh Anta Diop University of Dakar (UCAD) and the Platform of Professional Agroalimentary Organizations of Senegal (POPAS); (5) Support for training by UCAD food science professors of GIE leaders on a suite of food processing competencies such as hygiene, Hazard Analysis and Critical Control Points (HACCP) systems for small and medium enterprises, packaging, barcodes, marketing, commercialization, and sensory and consumer tests; (6) Support for a research and training partnership between ITA and a large GIE, Touba Darou Salam, led by Ms. Sokhna Astou Mbake Gaye, on fortified instant flour production; (7) Support for nutritional and other analyses needed to obtain governmental certification for food products; (8) Leadership training in GIE management by the president of POPAS, Ms. Nafy Diagne Gueye, in partnership with another Feed the Future USAID project, Africa Lead; (9) Support for train-the-trainer sessions to scale up technical knowledge, whereby trained GIE leaders gain the skills to train their individual GIE members on the research-based techniques provided by ITA and UCAD; (10) Launching of a revolving fund to provide sustainable microcredit for POPAS GIEs to access quality packaging for their products; (11) Placement of university student interns with GIEs to offer follow-up support; and (12) Support for POPAS leaders and their UCAD and ITA partners to replicate the model elsewhere in Senegal—in Saint Louis and Ziguinchor—whereby platforms similar to POPAS have been established and trained on group management.
Data
As a result of these activities, 12 GIEs initially benefitted from the suite of ERA-supported analysis and training provided by UCAD. Thirty-six women leaders were trained and 12 interns were placed in women’s enterprises. Fifty-six different products were certified for commercialization. Through the scaling up process, led by Ms. Nafy Gueye, the suite of training has been expanded to over 1000 women through the POPAS network in the Dakar suburbs. Through POPAS, plus the recently established platforms in Saint Louis and Ziguinchor, over 3000 women will be trained. In Touba, the technology is still at an earlier stage of the knowledge translation process, but scale-up activities led by Ms. Mbake Gaye are already planned as a next step. Her GIE was chosen because it, like POPAS, is a network of smaller GIEs, which will eventually reach approximately 2000 women in the Touba region. The extruder machine, which was refined and tested with support from ERA, was recently granted to Touba Darou Salam by a partnering Feed the Future project, the Food Processing Lab housed at Purdue University. While we do not yet have economic impact data on the benefits of these trainings and analyses, we hypothesize that the large number of GIE leaders and members trained in research-based food processing techniques, plus the added value of the government certification and the association with the national university, will soon have positive economic impacts. We have evidence of young women entrepreneurs now hiring wage employees to help meet the increased production demand for their improved products. What’s more, in terms of capacity building and leadership, both Ms. Mbake Gaye and Ms. Nafy Gueye have become nationally renowned leaders in the food processing sector, while dozens of GIE leaders they have trained have also become more confident and engaged leaders in their associations and in their communities.

Story
When these Feed the Future activities began through ERA in 2011, food processing GIEs existed, but product quality varied and some groups were not managed well. The aspiring women entrepreneurs often received support from development projects and non-governmental organizations, but felt shut out from the national system of education, training, and research. One early encounter between Ms. Nafy Gueye and a UCAD professor resulted in the professor (who is a woman) asking rhetorically, “Why are you mixing us with these rags?” Just a few years later, Nafy and the many women she herself has trained are now sought-after consultants, creating a niche market not just for their high-quality local food products but for their knowledge and leadership competencies, too. Recently, the Minister of Higher Education and Research invited Nafy and her POPAS colleagues to his office to plan for how to make POPAS’s local food products available to the tens of thousands of UCAD students, and to find a way to bring the expertise and practical wisdom of these women entrepreneurs into the classroom, as instructors in UCAD’s Institute of Agriculture and Entrepreneurship. Thus, through these new partnerships and platforms, two-way knowledge sharing connects research and practice for capacity building, leadership, and women’s empowerment.

A video (in French) about the partnership between POPAS and UCAD can be found here: https://youtu.be/gup2C1YjuVI
Women in the Fisheries Sector in Senegal Increase Participation in Leadership and Decision Making for Sustainable Fisheries Management

The Collaborative Management for a Sustainable Fisheries Management Future in Senegal Project (USAID/COMFISH) has contributed to a transformation of attitudes by artisanal fisheries stakeholders, including women themselves, about the role of women as leaders and decision makers. As a result, practices that increase women’s participation in leadership roles have been institutionalized. The lesson learned highlighted below informs question three from the Feed the Future Learning Agenda; Capacity Building and Leadership: Have capacity building and increased leadership or management opportunities for women led to increased participation of women in leadership roles in the community? A new Feed the Future Project in Ghana, the Sustainable Fisheries Management Project (USAID/SFMP) is directly benefiting from USAID/COMFISH lessons learned in women’s empowerment. In early 2016 leaders of women’s civil society organizations in the fisheries sector in Ghana and Fisheries Commission representatives went on a study tour to learn from Senegalese peer organizations that benefitted from USAID/COMFISH capacity building support.1

Lesson Learned: Women can play an important and powerful role in sustainable fisheries management, fisheries livelihoods and value chain improvements beyond their traditional post-harvest processing activities.

In Senegal women are now represented among leadership and participate actively in Local Artisanal Fisheries Councils (CLPA), the legally recognized governance structure for artisanal fisheries at the district level. They are decision-makers and key actors in recently approved Sardinella Fishery Management Plans and in Ethmalosa Fishery Management Plans under development. Before USAID/COMFISH’s support for the renewal of CLPA governance structures over the 5 year project period from 2011 - 2016, the number of women on the Councils was limited to a maximum of two women per CLPA out of a total of 38-40 members. Now women’s membership ranges from 6 – 11 per CLPA in 10 CLPAs nationally. These women are all on the CLPA Coordinating Councils and are, therefore, in a decision making role.

COMFISH achieved this result through its facilitation of a participatory fisheries co-management planning process that included renewal of CLPA governance structures and provided the opportunity for training in governance best practices. Inclusiveness and empowerment of underrepresented stakeholders, including women, was highlighted as a key governance best practice. COMFISH then supported the institutionalization of best practices in CLPA by-laws. COMFISH field-based facilitators and community “relays” accompanied CLPAs as they put the by-laws into practice through the formation of Coordinating Councils and through the actions of the Coordinating Councils in the execution of their roles and responsibilities. COMFISH also provided training in administrative and financial management for CLPA members. This helped to ensure a common understanding and skill level among CLPA members in management and decision-making roles and facilitates transparency.

1 The University of Rhode Island Coastal Resources Center is the lead implementing partner for both the USAID/COMFISH and USAID/SFMP Projects.
At the national level, women in Senegal’s fisheries sector have come together to form an active, powerful and self-sustaining civil society Network of Women in Artisanal Fisheries in Senegal (REFEPAS). As a result, women are now invited to national policy dialogues and conferences as well as international meetings and conferences, where previously they were not represented and their needs and concerns not considered a priority. Their presence is already resulting in a transformation of “business as usual” dominated by men’s interests.

COMFISH supported REFEPAS to renew and mobilize its membership from the 5 largest sub-national women’s fisheries groups and sub-groups under this national level organization that enabled women to increase their visibility and influence at the national and local levels. REFEPAS members highly appreciated the COMFISH approach that emphasized the important role of participatory action research using local knowledge (as opposed to just hiring an outside consultant) to document the number of women involved in fisheries nationwide and their contribution to the sector. The exercise served to engage members who take ownership of the results and who now use the data to present compelling evidence to government that women should lead and be represented proportional to their contribution in the sector. COMFISH also assisted REFEPAS to develop an Action Plan and to begin to implement it, including support for an operational budget and some equipment. The Action Plan is instrumental for REFEPAS to articulate clearly to members, other fisheries stakeholders and donors how they intend to accomplish their objectives and to catalyze support. As a result REFEPAS today has a physical and operational identity in addition to its legal identity. It is very much respected by the Government of Senegal, which includes REFEPAS in all important processes related to artisanal fisheries.

“Women’s interests are taken into account. Women keep the money as treasurer. Women enforce monitoring by refusing to buy juvenile fish. We are powerful.”

Anta Diouf, Local Artisanal Fisheries Council (CLPA), Mbour, Senegal.

“Without women there is no sustainable development”

Maty Ndao, REFEPAS
Study tour participants from the USAID/Sustainable Fisheries Management Project in Ghana met with two different CLPAs, visited the landing sites under their management and saw first-hand how women’s roles in CLPA leadership and decision-making are influencing sustainable fisheries management on the ground. They also met with REFEPAS leadership to share experiences. Participants from the Ghana National Fish Processors and Traders Association (NAFPTA) were particularly interested in how REFEPAS was self-financing its activities and ensuring sustainability through membership fees. They resolved to re-evaluate their own token membership fees in light of the more sustainable business model demonstrated by REFEPAS.

(Credit: Albert Boubane)

Study tour participants from the Ghana USAID/Sustainable Fisheries Management Project with leaders of REFEPAS and the USAID/COMFISH Project team in Senegal.

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The Innovative Agricultural Research Initiative (iAGRI) is a Feed the Future project supported by USAID Tanzania that concentrates its efforts and project activities in not only providing support for Tanzanian students to pursue advanced degrees in the agricultural sciences, but also engages in institutional strengthening to ensure that gender-sensitive policies are adopted and women are encouraged to pursue leadership roles in the various departments of SUA. In the summer of 2013, iAGRI and Sokoine University of Agriculture initiated a mentoring program where students were paired with established leaders at the university. The goal of the program was to increase the capacity of entry and mid-level academic staff and to encourage positive attitudes of women in leadership roles and management positions.

LESSONS LEARNED: The 2013 mentoring program was evaluated and feedback from participants is being used in preparation for the 2016 session. The original target for participation for the program was 50 individuals. However, established professionals felt there was little incentive to participate. Feedback from the evaluation indicated the following challenges:

- **Lack of incentives to participate:** Senior staff members expressed they had limited time to devote to mentoring activities. Suggestions obtained during the evaluation included the distribution of material incentives such as portable electronic devices to encourage greater participation.

- **Conclusion joint session:** In addition to the orientation session, mentors specifically requested that there be a session concluding the program to assess overall achievement.

- **Mentee Feedback:** Mentees requested for future programs to incorporate an emphasis on the development of teaching skills and methodologies, specifically those needed for handling large classes.

- **Mentor Feedback:** Mentors suggested that mentees should be attached to ongoing research at the universities to increase both incentivization and relevance of the program.

- **Communication Challenges:** Mentees reported lack of power and limited internet connectivity as challenges in communicating with mentors.

ACTIVITY: Components of the program included: 1) orientation session, 2) pairing of mentors and mentees, 3) goal-setting, 4) regular meetings and discussions between pairs on a monthly basis, and 5) training workshops on gender mainstreaming, scientific writing, and leadership skills. The participants developed a blog (http://suamentor.blogspot.com/) to share experiences, photos, upcoming events, and increase awareness. Mentees reported that mentors were able to develop constructive ideas on how to improve their professional development. Overall achievements of the mentees attributed to the mentorship program (obtained through self-assessment evaluation and participant feedback surveys) included:

- Encouragement to participate in scientific conferences
- Assistance with proposal writing and presentation skills
- Encouragement to pursue management and leadership positions
- Successful implementation of their personal “road map” of professional development goals i.e. conference attendance, new skills, improved data analysis capabilities
- Improved professional (and social) networks

DATA: According to the ASTI, there are 818.8 total agricultural researchers (full-time equivalents - FTEs) in Tanzania of which, 24.8% are female. At SUA, out of 484 academic members of staff, 19% female; whereas 36% of administrative staff are female. A follow-up study would be needed to determine the career progression of participants following the mentoring program. Of note, one of the female participants was promoted from the role of Assistant Lecturer to Lecturer at SUA. Another follow-up question would be to assess whether or not male participants in the program are more likely to see females as leaders than previously.
Call for Cases from Feed the Future Programs: Learning for Gender Integration and Women’s Empowerment
Mentoring Program for Capacity Building: Leadership and Management Opportunities for Women
Innovative Agricultural Research Initiative (iAGRI)

STORY: The mentoring program distributed a call to multiple departments at SUA for mentors to participate. The program began with an orientation workshop led by facilitators experienced in mentorship from the African Women in Agricultural Research and Development (AWARD). Mentoring pairs met on a monthly basis. As part of the initiative, funds were allocated to support three mentees to attend scientific and professional conferences to encourage their development in the areas of public speaking, presentation of research, and improve their networking skills. Funds were also provided for mentees to join professional associations thereby increasing their network and contacts in their respective fields. The program involved key leaders in the university including the Deputy Vice Chancellor-Academic, the Head of the Department, Dean of the Faculty of Agriculture, Prof. Susan Nchimbi-Msolla.

Key informant interviews of female participants found that participants gained greater self-reliance, improved capability, and empowered. Informants described the mentoring program as an opportunity to drive their own learning and career development goals and develop soft skills essential for successfully performing leadership and managerial positions. Female participants included the following:

- **Neema Sumari (pictured below with mentor Isaac Minde):** Currently an Assistant Lecturer in Software Engineering at SUA, Neema stated, “Much of our learning that contributes to our success happens not through a book, but through world experience.” Neema was paired with Prof. Isaac Minde, a Professor of Development Economics and Deputy Director of iAGRI.

- **Nyamizi Bundala:** Formerly an Assistant Lecturer in Nutrition at SUA. Since the program, she has been promoted to the role of Lecturer. She stated, “Through the mentoring program, I managed to get a PhD scholarship under the ScaleN project. I am expected to start my PhD in May 2016. My supervisor taught me publication skills. I managed to co-author a manuscript and submitted to the Journal of Food, Agriculture and Nutrition Development... She also gave me an opportunity to attend a workshop held in Addis, Ababa to present issues related to nutrition.” Nyamizi was paired with Dr. Joyce Kinabo, a Professor of Human Nutrition at SUA in the Department of Food Science and Technology.

- **Victoria Gowele:** Assistant Lecturer in Nutrition at SUA. Since the mentoring program, she has since started a PhD in micronutrient status of women in rural Tanzania. The mentoring program inspired me to shape my career dreams. I set my road map to acquire a PhD and to become a competent professor in nutrition.” She also stated, “Through the inspiration from the mentoring program, I have realized most of what I intended in the road map.” Victoria was paired with Dr. Bernard Chove, an Assistant Professor of Food Engineering at SUA.

In the formalized mentoring program, mentors were comprised of established faculty members at SUA and paired with emerging students with an equal proportion of male and female mentors and mentees. The effect of this was two-fold. Male students were mentored by established female professors while females were paired either with male or female mentors. Both aspects of the mentoring program contributed to improved opportunities for female scientists to pursue managerial positions and attitudes about women in leadership roles at SUA.

CONCLUSION: The Mentoring Program is one of the tools used by iAGRI to facilitate HICD to improve both the capacity and confidence of women, but also to improve the enabling environment within the institution for the realization of gender empowerment. Capacity building in leadership skills are critical for achieving increased management opportunities for women at SUA. The ultimate goal of the program is to advance the empowerment opportunities for women in the agricultural sector; not only at the farm-level, but also at institutions pursuing research shaping the policies and practices needed to modernize the country’s agriculture sector. The next program will begin at SUA on June 27-30 2016.

Organization: [www.iagri.org](http://www.iagri.org)
Project Webpage: Mentoring Program
Contact Information: Carolyne Nombo, iAGRI Gender Specialist, nombo@iagri.org, +255 232 640 033
How horticulture technology is surging the income of professional women

Sustainable income generation has for a long time been one of the unreachable targets for women in Tanzania, even for those employed due to increasingly high costs of living and limited chances of innovating multiple income sources. Some of these women, having learned on businesses opportunities in horticulture have taken up initiative to invest in the industry to boost their income.

One such a woman is Renalda Mlay. Renalda, who runs a landscaping design and commercial cleaning company, realized that with increasing and unbearable living expenses, she needed to explore other business opportunities and create stable income generating source. She initially engaged into staple crop production (maize and beans) which earned her very little.

That is when she opted to engage into horticulture production in greenhouses; the technology which requires minimal labor force and optimizes resources such as water and fertilizer. Initially, she invested TZS 9 million in 2 greenhouses (8 By 15m) where she produced red and yellow capsicums. Renalda hired a permanent Assistant to manage the production process. After the first production cycle, she made a total of TZS 6.7 million with a deficit of 2.3 million to her investment costs. Although she did not manage to break-even in the first production cycle, she was guaranteed to enjoy the staggering profits from the second season and onwards. With good practical lessons, knowledge and experience obtained in the first production cycle, Renalda perfected her skills and in the second production cycle within the same year, her income from sales of capsicums increased to TZS 8 million, after spending TZS 1.2 million as business operational costs. Meaning in just one year, she realized return on investment and made a total profit of TZS 4.3 million.

Greenhouse effective life is at least 10 years, during which the Renalda will be able to earn more and more incomes from greenhouse farming; while incurring some costs for minor repairs and materials replacement.

Just recently, with TAHA’s assistance on funding linkage Renalda acquired 2 larger (8 By 30m) additional greenhouses for expansion. Eventually, with the kind of investment she will create more jobs (2 permanent and 1 casual).

Renalda’s aggressive nature impressed TAHA Associate Members who convinced her to take up a leadership role in TAHA Board of Directors, as Associate Members’ representative. She vied for the seat with 3 male competitors and she won the elections in December 2015, becoming the first Female to represent Associate members in the TAHA Board. Indeed this is a proof that through empowerment, women will not only grab the opportunities towards creating sustainable incomes, but in addition they will increase their participation in leadership.  

About 130 Kilometres from Morogoro town we are welcomed by a hip of harvested tomatoes awaiting the delivery vehicle. We later learn that we are in Mamboya village Kilosa district in Morogoro region. The region is one of the highest horticulture production zones due to good soil fertility and climatic conditions. There is assortment of more than 8 ethnic groups with majority population engaging in rain fed agricultural activities.
“Come on in and see for yourself” a delighted Professor Penina Mlama invites us while proceeding with tomato harvesting activity. Prof. Penina who is the Professor of Fine and Performing Arts at the University of Dar es salaam and a re-known artist and author is among women professionals who have demonstrated that even with intensively demanding jobs, one can still spare some hours in an additional income generating activity where technologies are applied to lessen labor intensity as well as increasing productivity.

One may wonder how a busy white color job lady would fall in love with soil and engage in farming activities defying the myth that farming is for non-skilled and poor. She is among the modern trend of professional women that have made substantial achievement in supplementing their income through horticulture.

Women make crucial contributions in agriculture and rural enterprises in all developing country regions, as farmers, workers and entrepreneurs. According to an FAO study on the role of women in agriculture: women make up more than 50% percent of agricultural labour force in East Africa (FAO, 2011). However, very insignificant number among these are professional employed women that are simultaneously engaging in horticulture production.

Defying her inexperience in farming undertakings, Prof. Mlama approached TAHA early in 2015 to establish the best way to utilize her 10 acres land productively. With her busy and dynamic work schedule and the travel distance to Morogoro where her farm is located, she managed to install drip irrigation in one acre on tomato production as trial. For easy farm management, Prof. Mlama employed two permanent farm assistants who worked closely with TAHA’s Morogoro Field Officer on technical support. Drip irrigation technology reduces labor intensiveness and utilizes optimal water in irrigation.

“I was hesitant to engage in something so new to me but now I have confidence after witnessing the first production cycle. Frankly speaking, the quality and volumes of harvested tomatoes have by far surpassed my expectations although I only utilized a fraction of my farm.” Declares Prof. Mlama

With a capital investment of TZS 4 million on irrigation technology infrastructure, improved seed and labor, Prof. Mlama earned TZS 4.7 million in just one tomato production cycle although she experienced some hitches in accessing profitable markets due to poor road infrastructures. This income is far much better than TZS 800,000 which she would have earned without improved technologies.

Her expectation is to triple profits by investing all the tomato earnings to expand on the remaining acres in the second production cycle which is planned for May. In addition to that, she has purchased a generator to assist in pumping irrigation water to substitute the current manual pump.

Through USAID support under Feed the Future Initiative, which supports TAHA in strengthening its institution, TAHA has been mobilizing and engaging more women and youth in horticulture value chains, some of them already in white color jobs as this will supplement their income. Consequently, a large number of studies have concluded that there is substantial positive impact when women control additional income as they tend to spend more of it on family needs especially food, health, clothing and education. This has positive implications for immediate well-being as well as long-run human capital formation and economic growth through improved health, nutrition, income and education.
Microcredit Savings Allow Farmers to Prosper

The Twifashe SACCOS began in Kagongo Village outside of Kigoma, Tanzania to help farmers deal with shocks, have access to finance, and to invest in higher income generating activities in 2009. Initially, SACCOS began with an initial collective savings of 300,000 TZS. The premise of the group was that members could apply for four loans each year to increase agricultural production, initiate small businesses, and pay for children’s school fees. In 2012 as part of the Promoting Sustainable Livelihoods program supported by the Jane Goodall Institute (JGI), increased investment was allocated to the group in order to formalize its operations.

JGI assisted the group by helping them to officially register as a SACCOS and to open a bank account. JGI advised the SACCOS’s council members to incorporate safety measures such as ensuring that no single member had control over the collective savings. Today, SACCOS members have amassed a total of 9 million TZS that provides individuals with loans for businesses and emergency funds for large, unexpected expenses. Members regularly buy shares of 5,000 TZS each month. In return, the group provides individual members with access to finance in the form of loans distributed between 5-15 members per month.

Access to finance is one of the challenges faced by smallholder farmers. With little collateral to ensure loans and limited earnings, agricultural producers struggle to obtain additional capital to move higher up the value chain to invest in more profitable crops or businesses. Farmers often resort to collecting firewood or expanding agricultural land to increase incomes. With access to finance; however, farmers are able to increase their earnings through higher value crops, reducing the need to depend on forests as a source of income. In addition, access to finance for the SACCOS group has led to improved livelihoods and food security for households, enabling smallholder farmers to cope with fluctuations in market prices and obtain the initial start-up capital needed for small businesses and income generating opportunities outside of food production.

The investments enabled by the micro-credit group are as varied as the members themselves, allowing individuals to pursue opportunities that maximize the knowledge, skills, and interests they already have to produce higher incomes. Three of the farmers we interviewed were able to significantly increase their earnings through small loans from the microcredit group’s saving. Whether investing in a store, processing of raw products, or in additional inputs such as fertilizer, farmers are reaping the rewards of saving together, drawing strength and funds from their collective savings.

Selena Samuel Bilabaye – shop owner and palm oil producer

“All of this is because of SACCOS. Before, I used to purchase cassava and walk 6 km to the miller carrying the load on my head. Now, I am able to invest in transportation via motorbike to get the cassava to the miller.”

Selena juggles several income generating activities. As her primary business, she owns a shop in the center of the village where she sells cassava flour. She initially took out a loan from SACCOS and invested in transitioning from primarily agricultural production to selling milled and processed goods. Once her cassava flour business was up and running, she borrowed an additional 150,000 TZS through the microcredit group to venture into palm oil production. She buys palm oil seeds from local producers and processes them into oil. She then sells the oil to soap makers who purchase the oil at a higher price than the initial input of palm oil seeds. Today, she earns 200,000 – 300,000 TZS per month through selling palm oil while her cassava flour shop provides enough earnings for household expenditures. The additional investment in a second income-generating activity has allowed her to pay school fees and to
invest in books and supplies for her four children. In the future, she plans to take out a larger loan from SACCOS to move higher up the value chain into soup production.

**Mchuma Halid Mchuma – shop owner**

“Before, my wife stayed at home and was farming. Now, she manages our second store that helps to support our eight children.”

Mchuma is one of the original members of the microcredit group. He joined SACCOS after being encouraged by the group’s chairperson. He began by contributing monthly reaching a total of 300,000 TZS and eventually took out a loan of 1.5 million TZS. He used the funds to purchase a small store and to start a business selling products in the center of Kagongo Village. After repaying the initial loan, he decided to invest in some additional products to increase his revenue. He took out a smaller loan to acquire items that are difficult to find in the village. Prior to his investment, the store generated a profit of 500,000 TZS. Today, the store has nearly doubled in revenue netting him a monthly profit of 900,000 TZS as a result of his decision to invest in specialty items. With the earnings, he was able to invest in a second store closer to the main road that now produces a profit of 1.5 million TZS a month. His wife, who previously was engaged primarily in small-scale agricultural production now manages the store and is in charge of purchasing the merchandise, taking stock of the store’s inventory, and accounting.

**Elesia Aron Mjoleka – business owner and maize farmer**

“Before joining the group, I was a normal farmer. After joining, I was able to start a small business selling palm oil and soap.”

Elesia is one of the most successful members of the group. Before joining the group, Elesia produced maize primarily for household consumption. She sold the surplus each season to generate income and to support her children. With a loan from SACCOS, she invested in a maize storage room in her home and in purchasing a key agricultural input, fertilizer. Before, her maize yielded an average of three bags weighing 100 kg each. Today, the same plot of land produces 20 bags of maize as a result of her decision to invest in fertilizer. From her additional earnings, she has been able to pay for school fees and books for her six children. In addition to maize, Elesia is also a soap maker and processes palm oil into fragrant varieties of soap of different grades. “When you take a loan, you are able to move forward, get help, and provide better support for your family.” In the future, she plans to take out another loan to invest in the initial capital needed to start a poultry farm. Her plan is to utilize her surplus of maize for feed, allowing her to move higher up the agricultural value chain maximize her initial investment in fertilizer.

By investing in income generating activities, farmers and business owners in Kagongo Village are working together to improve livelihoods and provide a sustainable source of credit and finance to group members. Farmers are able to produce more on the land they have and to invest in environmentally friendly ways of increasing revenues and incomes. Farmers are able to reduce their need to rely on surrounding forests as a source of income and resources. Their families are able to benefit from their increased earnings through school fees, business opportunities, and economic well-being through the investments tailored to their needs, resources, and skills. As a group, they hope to be able to invest in an office in the future, attract more members, and continue to building on the improvements they have made to improve the lives of individuals and their families.
LEARNING FOR GENDER INTEGRATION AND WOMEN’S EMPOWERMENT:
The Feed the Future PROFIT+ Project, Zambia
Learning for Gender Integration and Women’s Empowerment: The Feed the Future PROFIT+ Project, Zambia

Vincent Akamandisa (INGENAES), Kristy Cook (INGENAES), Moses Musikanga (ACDI/VOCA), and Alex Pavlovic (ACDI/VOCA)

Lesson

The Production, Finance, and Improved Technology Plus (PROFIT+) project approach to strengthening the agricultural market system in Eastern Province, Zambia, focuses on expanding local input and output market options for men and women farmers, while also improving women’s empowerment. The project first established a network of demonstration host farmers (DHF) and parallel savings and internal lending communities (SILC). The best-performing DHFs have been subsequently trained to become community agrodealers (CAD), small enterprises that serve as bridges between private sector service providers and rural community members. The PROFIT+ project deliberately reached out to women, for example, through women’s agricultural associations, and a reasonably high percentage of women became DHFs and CADs.

This inclusion of women in a market-based approach has led to greater leadership roles for women, increased knowledge of agricultural practices among these women and other women farmers they service, increased use of agricultural inputs by women farmers, and increased asset ownership on the part of the women involved in these activities. This locally based approach opens up economic opportunities for women who are often constrained in their mobility and access to credit. Leadership develops through their roles as entrepreneurs in the community and creates opportunities for more women in the community as these DHFs and CADs build a network among other women farmers. A qualitative survey conducted in April 2016 by the INGENAES project documents how women CADs have become leaders in their communities and are reaching an extended network of women with farming skills.

Activity

The PROFIT+ project, implemented by ACDI/VOCA since 2012 in Eastern Province, Zambia, is the primary Feed the Future value chain project in the Zambia Zone of Influence. PROFIT+ aims to increase productivity and efficiency along seven value chains and increase trade and private sector investment, expanding benefits to include women and vulnerable yet viable groups. The strategies applied to achieve the benefits of women’s leadership, entrepreneurship, and expanded roles in agricultural extension include implementation of a demonstration host farmer model, where lead farmers are selected to train other farmers and promote awareness about improved technologies, practices, and products. One DHF works with five lead farmers, each of whom reaches out to 20 smallholder farmers; in this way, one DHF will ultimately reach over 105 smallholder farmers. Best performers and motivated DHFs have been assisted to become CADs.

The CAD model facilitates local access to and availability of improved seed varieties and other inputs and services (such as spraying, mechanization, etc.) for community members by building partnerships between CADs and input companies as well as commodity buyers. CADs serve as input suppliers to local farmers, but they continue to demonstrate improved technologies on demonstration plots, such as conservation farming methods that reduce labor input and maintain soil fertility, promotion of soil testing, methods of proper spraying, fertilizer application, etc. Women CADs thus effectively facilitate farmer-to-farmer extension through regular visits around the demonstration plots and farmer field days, with information aligned to the crop and marketing calendar and promotion of locally available technologies, inputs, and services. CADs also connect to SILC members, where the savings model enables farmers to generate funds for improved inputs. Recently in certain

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1 The PROFIT+ project is implemented by ACDI/VOCA and other consortium members, including Catholic Relief Services. Alex Pavlovic is chief of party of the PROFIT+ project, and Moses Musikanga is the M&E officer. The INGENAES Project (Integrating Gender and Nutrition in Agriculture Extension Services) is implemented by a consortium led by the University of Illinois, Urbana-Champaign. Kristy Cook and Vincent Akamandisa work for Cultural Practice LLC, an INGENAES consortium member.
areas, PROFIT+ has assisted some of the most successful CADs to form producer companies (PC), private sector trade enterprises that generate profits at the cooperative or commercial-farmer level, making them even more attractive to potential private sector partners.

**Data**

A recent qualitative survey of women CADs explored their roles in agricultural extension: particularly, how women’s leadership roles as community agriculture input suppliers (a role previously performed mostly by men) extended their agricultural knowledge and their outreach to a greater number of women farmers.

The project developed a gender strategy at the beginning and reached out to women’s groups to identify interested women farmers. Women were targeted in all trainings and represented over 50 percent of all participants in past project years. Starting from 72 DHFs in 2012/13, of whom 34 were women, the project now works with over 1,000 DHFs, of whom 323 are women. These women reach a network of up to 30,000 farmers throughout five districts in Eastern Province. In 2015/16, 115 women advanced from demonstration farmer to functional community agro-input dealers, selling inputs and providing advice to other men and women farmers. Although there are fewer women than men CADs, women have performed better than men in general: 35 percent of women DHFs became CADs, while only 26 percent of men DHFs became CADs. CADs work with SILC groups, of which 76 percent of the 17,000 members are women and 79 percent of leadership roles are occupied by women. Women represent 24 percent of all members in the newly formed PCs, which are community businesses that aggregate inputs and outputs and function as wholesalers, retaining profits in the communities.

In a recent survey, women CADs reported the ability to pay school and medical fees, improve their houses, and purchase assets such as cattle, goats, and bicycles. In the survey, women articulate how owning a shop and having access to improved agricultural knowledge has increased their status in the community providing them with more business opportunities. In the Feed the Future baseline Women’s Empowerment in Agriculture Index (WEAI), leadership was cited as a domain in which women were most disadvantaged with 26 percent not yet empowered in terms of group membership. The PROFIT+ project is having an impact on women’s involvement in organizations, especially as CADs and PCs, but also in their roles as processors, members in input companies, and buyers. Access to savings has increased through the SILC groups as well. More women are involved in decision making, have access to finance, apply improved agricultural technologies, and are leaders in their communities as a result of the progressive PROFIT+ gender strategy, which deliberately identifies women in all activities. As a result of this strategy, the PROFIT+ community-based market model allows women to become leaders and viable entrepreneurs within their own communities, linking community members to external input and output businesses.

**Stories**

**Grace Phiri**

As a lead farmer with the PROFIT+ program, a Feed the Future program funded by USAID/Zambia and implemented through ACDI/VOCA, Grace was trained by extension agents in advanced techniques: irrigation, greenhouse seedlings, tenting and drip lines, installing water tanks, managing tomatoes (especially in pest and disease management and fertilizer use), and recordkeeping. She is now growing tomato seedlings from seed for individual customers; white onion; rice; chili pepper; and 10 acres of orange maize, a vitamin A enriched hybrid. Grace has successfully applied her training, but she also trains women in these techniques. Many other women are benefitting from this type of extension as a result of the project.

*Interview: Katy Heinz, Nikki Grey Rutamu, and Vincent Akamandisa, INGENAES Project, March 2015.*

**Nelia Banda**

Nelia Banda, household head, is the owner of the Small Small Agro Store in Sinda county, Eastern Province, Zambia. Nelia is one of the women farmers who PROFIT+ assisted to become a CAD. Within the Small Small Supply Store are four shelves with several types of seeds, including okra, tomato, and rape (kale), among others, as well as herbicides, pesticides, and other basic farming inputs. She says about 150 people come to her shop
every day during planting season, some from as far as Mozambique. Nelia also serves as an unofficial extension worker, fielding questions about crop health and planting and harvesting techniques – even visiting the farms of community members facing challenges in their fields. From 2012 to present, she attended PROFIT+ trainings on business management and new technologies, including reaping and fertilization, use of certified seeds, and orange maize. Nelia shared that PROFIT+ gender training has been an important part of agricultural livelihood improvements in her rural community. “If people learn about gender, they can learn to work together, they can both understand the work they can do,” Nelia said, explaining some of the changing roles of women and men in her community now that more women are leaders in the community.

*Interview: Katy Heinz, Nikki Grey Rutamu, and Vincent Akamandisa, INGENAES Project, March 2015.*
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Rwanda’s dairy industry

Over 75 percent of Rwanda’s population relies on agriculture for their income. In fact, agriculture has been one of the main drivers in Rwanda’s remarkable economic recovery following the 1994 genocide. According to the World Bank, the country’s gross domestic product (GDP) is increasing an average of 8 percent every year. Despite Rwanda’s economic progress, the country still faces challenges with food insecurity and malnutrition, particularly with children under the age of five. However, dairy, an emerging growth industry now contributing 6 percent to the nation’s overall GDP, is playing a critical role in moving Rwanda forward.

And yet, milk still faces a number of obstacles on its journey from cow to consumer. Farmers lack access to finance, and inadequate infrastructure on and off the farm can affect milk quality. While farmers look to produce the highest quality product while earning a decent living, at the same time the Government of Rwanda is looking to achieve economic and social objectives through its 2020 vision of becoming a middle-income country.

Feeding into this vision, in 2013, the Government of Rwanda launched the National Dairy Strategy outlining an ambitious and important strategic growth plan for the industry. The strategy is helping address challenges facing dairy, including but not limited to: improving animal genetics, improving animal nutrition, increasing economies of scale to lower production costs, improving quality across the supply chain, and increasing consumer demand.

From 2008 to 2014, Rwanda’s cattle population remained around 1.1 million. At the same time, milk production tripled. In 2012, Rwanda was exporting $85,000 worth of dairy products. In 2016, this figure grew to $11.5 million.
The purpose for this report

Since 2007, with funding from the U.S. Agency of International Development (USAID), Land O’Lakes International Development has been working with the Government of Rwanda to institute a dual-pronged approach to build up dairy at both the national and district levels to improve smallholder production, increase consumer demand, and provide regulatory support for safe, high quality products. This report looks back at the impacts and achievements of the $15 million USAID-funded Rwanda Dairy Competitiveness Program II (RDCP II), implemented by Land O’Lakes International Development from 2012-2017.

ABOUT LAND O’LAKES INTERNATIONAL DEVELOPMENT

Since 1981, Land O’Lakes International Development has applied an integrated approach to international economic development that capitalizes on our parent company’s 95 years as a leading farm-to-market agribusiness. We use our practical experience and in-depth knowledge to facilitate market-driven business solutions that generate economic growth, improve health and nutrition, and alleviate poverty. We believe in the value of people and ensuring our work is rooted in honesty, integrity and respect.

As a 501(c)(3) nonprofit organization, our vision is to be a global leader in transforming lives by engaging in agriculture and enterprise partnerships that replace poverty with prosperity, and dependency with self-reliance. Since our inception, we have implemented more than 284 programs and training initiatives in over 80 countries, which have enabled farmers and agribusinesses to become more profitable and to leverage economies of scale through well-functioning cooperatives and producer groups. Funded primarily by USAID and the United States Department of Agriculture (USDA), our programs not only improve production and food security for small farming operations, but they foster innovation, market linkages, and strengthen the private sector. Ultimately, they make small and growing enterprises in developing countries more attractive for investment, and build consumer demand for agricultural products produced by smallholders.
Starting in 2007, Land O’Lakes International Development implemented the USAID Rwanda Dairy Sector Competitiveness Project (now referred to as RDCP I) a $5 million four-year USAID-funded project. During this time, the Government of Rwanda was making significant investments in dairy. These two collaborative factors resulted in boosted productivity and profitability of dairy farms, bolstered milk quality at collection centers, and improved dairy-based nutrition for orphans and vulnerable children.

RDCP I primarily focused on a strong “push” approach by developing the capacity of 1,419 smallholder dairy farmers, including people living with HIV/AIDS. The project primarily worked with farmers from two Districts in Rwanda’s Eastern Province, Gatsibo and Nyagatare, to improve milk quality and strengthen the milk collection systems.

**HIGHLIGHTS**

- Establishment of the Dairy Quality Assurance Laboratory, a private lab dedicated to quality testing of dairy products.
- A 30-50 percent increase in milk production in the targeted districts (Nyagatare and Gatsibo) as a result of improved animal care and breeding practices.
- Over 3,500 people living with HIV/AIDS trained in cooperative management and/or animal husbandry.
Leveraging the momentum of RDCP I, in 2012 Land O’ Lakes started implementing RDCP II, a five-year $15 million USAID program with the goal of increasing competitiveness of Rwandan dairy products in regional markets. This competitiveness was achieved through multiple pathways including: increasing production and production efficiency, improving market access, improving milk and dairy product quality, and increasing local demand.

RDCP II applied a market driven approach that continued improving production and developing milk collection centers (MCCs). Throughout the program, RDCP II worked in 17 of Rwanda’s districts with focus on the following pillars:

- Farm production and productivity
- Milk and dairy product quality
- Policy and enabling environment
- Market access
- Technologies and business services
- Demand for dairy products
- Investment promotion and export market development

Important cross-cutting themes were integrated into the program, including:

- Women’s economic empowerment
- Nutrition and milk consumption
- Access to finance
- Environmental compliance

RDCP II was successful in achieving, and exceeding, most of its results, including the ones listed below in the summary indicator table:

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Target</th>
<th>Actual</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals receiving milk production and quality trained</td>
<td>35,000</td>
<td>63,000</td>
<td>+ 28,000</td>
</tr>
<tr>
<td>Farmers using improved technologies</td>
<td>28,000</td>
<td>54,000</td>
<td>+ 26,000</td>
</tr>
<tr>
<td>Gross margin per dairy cow (USD)</td>
<td>252</td>
<td>248</td>
<td>- 4</td>
</tr>
<tr>
<td>Increase in value of milk sales by farmers</td>
<td>31.5 million</td>
<td>66 million</td>
<td>+ 34.5 million</td>
</tr>
<tr>
<td>Increase in dairy income among producer households (USD)</td>
<td>9.5 million</td>
<td>54.3 million</td>
<td>+ 44.8 million</td>
</tr>
<tr>
<td>People reached through the milk consumption campaign</td>
<td>600,000</td>
<td>1.6 million</td>
<td>+ 1 million</td>
</tr>
<tr>
<td>Females reporting increased self-efficacy</td>
<td>95%</td>
<td>97%</td>
<td>+ 2%</td>
</tr>
<tr>
<td>Value of agricultural and rural loans distributed (USD)</td>
<td>1 million</td>
<td>3.2 million</td>
<td>+ 2.2 million</td>
</tr>
<tr>
<td>Volume of milk sold by milk collection center (liters)</td>
<td>25.7 million</td>
<td>142.5 million</td>
<td>+ 116.8 million</td>
</tr>
<tr>
<td>Value of input used by farmer organization members</td>
<td>7.4 million</td>
<td>32.6 million</td>
<td>+ 25.3 million</td>
</tr>
<tr>
<td>Milk marketed under Seal of Quality</td>
<td>35%</td>
<td>68%</td>
<td>+ 33%</td>
</tr>
<tr>
<td>Increase in milk that is processed daily</td>
<td>100,000</td>
<td>110,000</td>
<td>+ 10,000</td>
</tr>
</tbody>
</table>

The remainder of this report will dive into key achievements of RDCP II, including summaries of key areas of impact and success stories of lives transformed.
1. Policy and enabling environment

As one of the key pillars to lasting impact across the dairy sector, RDCP II placed great emphasis on improving the enabling environment. Throughout the life of the program, RDCP II partnered with government institutions and dairy actors to implement the following policies:

**National Dairy Strategy (NDS)**
Upon request by Rwanda’s Ministry of Agriculture (MINAGRI), RDCP II conducted various studies leading up to the design and approval of the NDS in 2013. The NDS is the current MINAGRI policy document identifying priorities and preferred approaches to sustainably growing the dairy sector in Rwanda.

**Rwanda National Dairy Platform (RNDP)**
Recommended by the NDS as the main public private stakeholder interface, RNDP was created by restructuring the Rwanda Dairy Board to become a more inclusive and legally accountable institution representing the interests of the industry.

**Dairy sector working groups**
Sector dialogue was enhanced through district-based working groups to better understand issues and strategies employed at all levels. The working groups have been instrumental in achieving sector efficiency and filling the knowledge gaps at the implementation level for both private and public sector.

**Mastitis control strategy**
In collaboration with the University of California, Davis and the Rwanda Agriculture Board (RAB), RDCP II facilitated multi-stakeholder dialogues that led to the development of a strategic plan for national mastitis control. This plan was later adopted by the RAB to spear head programs aimed at reducing prevalence of mastitis in Rwanda.

**Artificial insemination training and breeding technology decentralization**
RDCP II worked with private service providers to scale up their presence in local communities where the project was inseminating over 10,000 cows. Further, RDCP II worked with the Rwanda Vet Council to train and equip 102 vet technicians to increase the service coverage of artificial insemination across the 17 districts of project implementation.
Use of plastic in Rwanda
With the ban on plastics in Rwanda, the cost and quality of dairy packaging is a challenge to the sector. RDCP II worked collaboratively with RNDP to initiate dialogue on finding alternate methods (such as biodegradable plastics) with key agencies including Rwanda Development Board (RDB), Rwanda Environment Management Agency (REMA) and the Rwanda Standards Board (RSB). This conversation is currently ongoing with leadership from RNDP.

Milk consumption and school feeding program
RDCP II engaged with a select team of technical experts to provide input into MINAGRI’s strategy to sustainably scale up existing school milk programs. The program coordinated with RAB to implement the priorities into the strategy.

Ministerial order on milk handling and transportation
Since 2012, RDCP II worked with MINAGRI’s Agriculture and Livestock Inspection and Certificate Services (RALIS) to develop, pilot and scale up a national dairy certification program for primary value chain actors. Milk collection centers and emerging dairy businesses (SMEs) needed to adopt and practice basic milk quality control technologies leading up to the award of a Seal of Quality certificate. The award is an intermediary step preparing such businesses to aim for the quality marks provided by the Standards body in Rwanda.

Investment Policy with The Rwanda Development Bank
With support from Inspired International, RDCP II conducted market research leading to the development of proposed investment scenarios to motivate potential dairy investors. Further, the program worked with financial institutions to build their understanding of dairy businesses. This led to increased financial access for dairy actors including producers, transporters and processors.
In 1994, a stabilized political environment motivated Samuel Ndol to move his family back to Rwanda. "We had no security in the Democratic Republic of Congo (DRC), but I could see hope in Rwanda and a brighter future," says Samuel.

Twenty-two years later, it’s still difficult for Samuel to talk about his life in Congo, a time when he lost his job and property. He left most of those memories beyond the border. However, two important things have stayed with him: the love of his family, and his passion for dairy.

In the office of Fromagerie la reine, Samuel leans back in his chair and proudly smiles at his 26-year-old daughter, Angelique, as she cuts into the wax casing of a recently matured gouda cheese block. Dressed in a white lab coat, plastic gloves, big rain boots and a face mask – between this and the creamer machine roaring in the background, it’s difficult to hear her as she points to the gouda, “See those three small holes in the center of the cheese? The less of these, the better the cheese,” Angelique explains. “Three years ago, we saw a lot of holes.”

After completing business school in 2012, Angelique returned to her family’s home to work alongside her father. At the time, Samuel was processing only gouda cheese. His business struggled to secure more than two reliable buyers due to product quality inconsistency. He lacked several quality necessities, including the right processing equipment, quality testing kits and training.

Later that year, Samuel received a training on how to improve the quality of his products from RDCP II. He shared what he learned with Angelique and his other employees, and together they integrated these practices into their business. RDCP II also provided a pasteurizer, butter churn, stainless steel tables and milk testing kits to help improve processing capacity for Fromagerie la reine. Now, Fromagerie la reine can take in up to 1,000 liters a day. With the increased productivity, Samuel has expanded his product line to include cheddar, mozzarella, yogurt, cream, butter and fermented milk.

After entering five products at the 2014, 2015 and 2016 Cheese and Butter Expo and competition sponsored by RDCP II, Fromagerie la reine now has 12 reliable buyers, including hotels, restaurants and supermarkets in Rwanda’s capital city of Kigali. Samuel also markets some of his products in neighboring DRC and Burundi.

With these new expansion opportunities, Samuel continues to believe that Rwanda can provide a bright future for his family and business. “My hope is that eventually Angelique will take over the business. With her degree along with the support we received from Land O’Lakes, she will be able to take it to the next level,” he says.

"She will be able to take [the business] to the next level.”

Fromagerie la reine is just one of the many cheese processors that RDCP II has supported with training and small business grants. These initiatives not only support individual processors, but also dairy cooperatives and over 27,500 smallholder farmers who supply milk to the processors every day. Fromagerie la reine alone provides an income to 120 local farmers.

Success story: A foundation built with blocks of cheese
Farmer owned cooperatives form a key part of the milk supply chain and are an important means for farmers to access markets. Yet, when RDCP II began, many farmers were not aggregated in a way to efficiently deliver milk to the market. In response, the program worked to develop new farmer owned MCCs. When the program started, 40 farmer owned MCCs were collecting an average of 16.1 million liters per year. By program close, the amount of farmer owned MCCs increased to 77 with 48.4 million liters of milk collected and marketed per year. However, cooperatives faced many challenges related to governance and financial management. RDCP II helped build the capacity of cooperatives and small and medium enterprises by facilitating connections to service providers and by providing a tailored business training using the Land O’Lakes AgPrO manual curricula. Sixty-nine dairy related enterprises were reached through this training, and a number of them significantly improved their business practices. As a result, they saw increased profitability and improved services to members.

For example, one cooperative paid off a debt of one million Rwanda Francs, and assisted members by paying for medical insurance. Because of increased market access, farm-level milk sales increased from $4.6 million in 2012 to $66 million in 2016.

2. Market Access for Smallholder Farmers

MILK COLLECTED AND MARKETED INCREASED BY

300%
3. Smallholder farmer milk production

Smallholder milk is vital to the success of the Rwanda dairy industry. Along with partners African Breeders Services and Total Cattle Management (ABS-TCM), RDCP II focused on improving both farm level production and productivity (efficiency of production). During the course of the program, nearly 54,000 farmers applied improved farm management practices. While focused interventions to improve farm practices were important to the program’s success, emphasis was also placed on improving access to quality services and technologies. This was accomplished both by catalyzing new services and technologies through an innovation fund, and by facilitating market linkages between service providers, farmers and cooperatives. Examples of new technologies and services include decentralization of veterinary services, provision of mastitis testing kits, artificial insemination technologies, and training on improved animal feeding and feed conservation, such as silage making. Because of these efforts, farmers and cooperatives made significant investments – spending an additional $32.6 million on farm inputs to improve dairy production and marketing over the five-year period.

Overall, improved production and better access to markets led to an increase in farmer milk sales of over $66 million.

However, producing more milk in itself does not lead to a sustainable farming business. Therefore, the project also focused on helping farmers improve profitability through improving herd health and animal nutrition. These drivers contributed to 30-50 increases in gross margins per cow. Because of improved dairy farmer businesses, dairy income increased by an average of 192 percent over the life of the program.

ON AVERAGE, DAIRY INCOME INCREASED BY

192%
Success story: Tripled dairy production, one farmer at a time

Kids playing soccer; chickens at your feet; a cow chomping on fodder– not long ago this same setting was quiet and sedate. “We were only eating one meal a day,” says Eugenie Kawera, mother of five. “The children had no energy – they didn’t play or talk. They threw stones at our cow because it wasn’t milking.”

In April 2015, Eugenie, her husband and two children met three orphans on the road. “They were dirty and thin. It wasn’t a question, we would welcome them in. But with no reliable income, we worried about feeding our family,” says Eugenie.

Living in Kabeza village in Eastern Rwanda, the Kaweras became dairy farmers in 2013 when they received a cow from the Government of Rwanda’s “One Cow per Poor Family” initiative. Not having a background in farming, they weren’t getting much milk from the cow. They lived day-by-day on selling small volumes to a neighboring MCC Hinga Orora Kijyambere through Gramata - Gatunda, an aggregation point that was initially facilitated by RDCP II.

In November 2015, Eugenie attended a training on how to improve dairy cow productivity. Conducted by RDCP II, Eugenie learned about cattle management practices, how to ensure milk quality, and how to co-manage home finances with her husband.

After the training, Eugenie went back and trained her husband on what she learned. Practicing the lessons together, their cow has gone from producing 9 liters a day to 25.

As Eugenie and her husband finish milking the evening batch together, the kids know it’s almost time for supper: rice, beans, vegetables, tomatoes and a cup of milk – they keep 20 percent for home consumption and sell the rest.

Eugenie smiles, “Three meals a day is our new norm. It’s good to be happy.”

“Three meals a day is our new norm. It’s good to be happy.”

In February 2016, members of Eugenie’s village elected her to attend a model farmer training. In six months, she has trained 62 neighboring farmers. Since 2014, RDCP II has trained 1,064 model farmers like Eugenie. These model farmers have gone on to train an additional 12,346 in their communities.
At the start of RDCP II, one of the major constraints in the dairy sector was the availability of finance - especially to smallholder dairy farmers and entrepreneurs developing new businesses. Many of these businesses lacked collateral or were deemed high risk because of the lack of a track record.

RDCP II’s partner, Inspired International, conducted an assessment on financial products and services, as well as the different market segments. One of the major findings was that while some dairy sector lending was occurring, the underwriting practices were resulting in loans being made to some farmers and businesses along the dairy supply chain without appropriate appraisals. Further, existing products were not appropriate for dairy actors given the uniqueness of the industry. Recommendations were made to several financial service providers to adopt different underwriting methodologies that target higher potential opportunities in dairy. In addition the program supported banks to develop new products that would better meet the needs of a growing base of dairy farmers and entrepreneurs.

Initial uptake was slow, but innovative financial providers like Urwego Opportunity Bank worked closely with the program and developed improved ways to better serve dairy market players. The amount of lending gradually accelerated over the subsequent years and by project end, $3.2 million of additional incremental financing had been made to producers, local traders, wholesalers, and other market participants. In addition, 320 dairy businesses and individuals accessed financial support to make new investments and upgrade facilities. From 2014 to 2016, the trend of increasing loans to the dairy industry accelerated by 118 percent between 2014 and 2016.
Success story: Dairy coop grows with investment

Around every hillside of Rwanda, it’s easy to spot a cow or a bicyclist carrying a milk container. So it may come as a surprise that dairy was once considered a high risk investment for financial institutions. With so many factors threatening the reliability of the dairy value chain, banks weren’t confident that they would see returns on their investments. As a result, businesses struggled to get ahead.

Mr. Patrick Byabagamba has been a dairy farmer in East Africa his whole life. He understands the challenges that so many face. Like how long distances can easily turn morning milk sour, and how finding a reliable milk buyer is difficult without formal relationships. These factors and more make for inconsistent incomes – not an ideal equation for a bank. For Patrick and others, a cooperative model was the answer. After participating in an informal association for ten years, he and eleven other farmers legally registered and joined the Dukunde Amatugo Cooperative (CDA) in 2007.

This business decision opened a number of opportunities for CDA members. By doing business together, they held each other accountable for the quality of their product. They now have reliable daily buyers, including schools, local businesses and Inyange, Rwanda’s largest dairy processor.

As the years went by, CDA saw progress, but they still struggled with inefficiencies. One being a $1,000 monthly rental fee for a truck that transported their milk to Inyange. CDA knew that buying a truck would be more cost effective, but the banks were wary of investment.

RDCP II helped CDA make this connection by working with institutions like Urwego Opportunity Bank (UoB) to establish a path for low-risk, high impact investments to reliable dairy stakeholders like CDA.

“Land O’ Lakes mobilized us to consider service to dairy farmers. We had worked with agricultural partners in coffee and crops before, but never dairy. With standards now in place across the dairy sector, we were ready to try with dairy value chain players,” says Jackson Munyaneza, UoB Financial Officer. “We now work directly with the cooperatives and local Small Micro Financing Institutions to get them the loans they need.”

In 2014, UoB provided CDA a $29,000 (23 million Rwandan Francs) loan to purchase a truck to transport their milk from the cooperative’s MCC to Inyange. They are now making payments of $600 a month to UoB, nearly half of what they were paying previously for the rental. With demonstrated credibility as a business, UoB is now also distributing loans to individual cooperative members.

“In collaboration with the bank, 36 of our members have received a loan to grow their dairy business. This benefit is attracting new members to the cooperative. In 2007 we had 12 members. Today we have 157. And during this time our production has accelerated from 50 liters a day to 4,000,” says Patrick.

“**In 2007 we had 12 members. Today we have 157.**”

Since July 2014 UoB has distributed 500 million Rwandan Francs in loans to farmers and cooperatives in three Rwandan districts (Rwamagana, Musanze and Rubavu). Loan recipients have purchased cows, equipment, transportation vehicles and tricycles to expand their dairy businesses. While this lending program by UoB is new, not one loan has been defaulted to date.
5. Food safety

During the RDCP II program, consumer demand increased for higher quality cheeses, yogurts and other value added dairy products. At the same time, consumers faced increasing concerns about the safety of food, including dairy products.

To help address quality and food safety issues along the supply chain, RDCP II utilized a multi-faceted approach. In partnership with the University of California – Davis and University of Rwanda, RDCP II trained microbiologists and final year students in the veterinary faculty helped to improve the capacity to monitor and treat mastitis – an infection of the udder which causes excessive bacteria to build up in milk leading to huge economic losses.

RDCP II facilitated the transfer of knowledge of best practices and technology applications to the professors and students, and demonstrated mastitis testing and mitigation on model farms. Quality improvement efforts across the supply chain resulted in twelve new milk quality assessment technologies and protocols utilized by farmers, transporters, and processors. Competitions were instituted between MCCs to help drive better performance in milk quality. The program also implemented the first ever Seal of Quality program supported under the ministerial order on milk handling, transportation, and retail. The Seal of Quality certificate is awarded to different actors in the milk supply chain – providing recognition and reward for businesses and farmer groups that met standards and requirements for safe handling and retail of milk. Over the life of the project, 68 percent of total milk was marketed by coops under the Seal of Quality program.
Milk is a fragile commodity. Cleanliness, proper storage, temperature control—any mishandling from farm to processor can cause contamination or bacteria counts to rise, resulting in spoiled milk. In Rwanda, smallholder farmers and dairy businesses require proper equipment and training in milk handling and processing to produce a better quality product. Not long ago, farmers simply couldn’t reliably deliver substantial quantities of milk to buyers. And without a reliable supply, farmers suffered to make an income, as did every piece of the dairy supply chain.

Inyange Industries is Rwanda’s largest dairy processor. Like all other dairy processors in Rwanda, quality issues hindered business growth and innovation. “We used to reject 60 percent of milk coming from MCCs across the country. This limited our ability to both increase milk volumes as well as create value-added dairy products,” says Chris Kabalira, Marketing and Sales Manager at Inyange.

Recognizing the need to address the root of the problem, in 2012, RDCP II started working with stakeholders across the dairy supply chain to address issues of milk productivity and quality. Farmers received on trainings on milk production and quality, and MCCs and cooperatives received training and equipment to improve their dairy business operations.

“Our milk processing volume has increased from 20,000 liters a day to 100,000.”

Since the start of RDCP II in 2012, Inyange has seen a dramatic increase in quality and quantity of milk produced by smallholder farmers. “Rejection at the MCCs is nearly zero percent. As a result of the improvements in quality, our milk processing volume has increased from 20,000 liters a day to 100,000,” says Chris.

As a result, Inyange has been able to create new products which include: pasteurized milk, UHT, flavored milk, ghee, salted and unsalted butter, and yogurt. “In fact, Rwanda never used to have locally-made butter. We always imported. Today, our Butter products are on the shelves and are liked very much,” says Chris. “It’s exciting to watch the number of dairy products increase. And I’m happy to support an industry that makes local, healthy products and support farmers.”

The increase in number of products has not only strengthened Inyange’s business, but also the lives of farmers across the country. “Support a Rwandan farmer is our slogan and we believe in it,” says Chris. “We pay over 5 billion Rwandan Francs ($6.2 million US) to farmers every year. In the Eastern Province of Nyagatare alone, on an average day we provide reliable income to 1,753 farmers. When we do well, farmer’s live better – it works both ways.”

Milk is and always will be a fragile commodity, and so Inyange and other processors will continue to face challenges. However, young visionaries like Chris see the industry as full opportunity “RDCP II has added so much to the industry. The training of farmers has solved so many problems especially around milk production and quality. This program has really paved the way for the industry to grow.”

For the first time, Rwandans are now enjoying a variety of locally made products, like cheese, butter, reduced fat milk and a strawberry yogurt.
6. Increased Consumer Demand

Increasing smallholder milk production during the course of RDCP II was in direct response to increased market demand for dairy. RDCP II contributed to increasing market demand in several ways, namely:

**Shisha Wumva**
The Shisha Wumva dairy consumption campaign used a variety of tactics including radio slots, floats in parades, billboards and signs across the country and community outreach. Following this effort, the program focused on targeted messaging towards different segments of the population in both rural and urban communities on the importance of milk consumption and household nutrition.

**Urunana radio programming**
RDCP II partnered with Urunana Development Communications – a local organization and leader in behavior change communication to drive behavior change in milk consumption and family nutrition. The radio program utilized a combination of their popular radio program series, Urunana, as well as in village theatre production.

A combination of both Shisha Wumva and Urunana campaigns reached over 1.6 million consumers and have helped drive consumer demand for dairy across the country and raised awareness of the nutritional benefits of milk and milk products. Per capita consumption of milk has also greatly increased from approximately 40 liters in 2012 to 59 liters by 2016.

To meet increased consumer demand, both small and larger sized private dairy enterprises have had to innovate both in product development and distribution. Product innovations are rapidly occurring in the market as exemplified by recently introduced cheese varieties, such as ricotta, halloumi, gruyere as well as different types of flavored yogurts and butter products.

One of the most transformative innovations in the market has been through processors Inyange Industries and Crystal Industries, who have both invested in innovative new distribution systems that consists of a series of specialized milk kiosks, called “Milk Zones,” where individuals can purchase high quality, pasteurized milk using their own containers in quantities they can afford.

RDCP II has worked extensively to catalyze private sector investments from both small, medium and large businesses. Private sector investments have been an important driver in the transformation of the dairy industry – over the course of the program an additional $6.2 million has been invested in the industry.

The project also utilized platforms such as the Annual Cheese and Butter Expo, National AgriShow and the annual Private Sector Trade Expo to improve the marketing and branding capabilities of dairy businesses. By 2016, 78,000 additional liters of milk per day were being processed in Rwanda, helping to meet a growing need for milk used in value added products.
Success story: Milk plays a dramatic role

It’s 7:30am. Already hours into her day, Agnes crouches down with a baby swaddled at her back to milk the family dairy cow. She nods as another woman’s voice emits from a radio hanging nearby. It’s Murebwayire, her favorite radio soap opera character on Urünün. On today’s episode, Murebwayire is pregnant and secretly saving some of the morning milk for her own consumption. If her husband knew, he would be upset. He doesn’t understand that milk has health benefits for her and their future child. Agnes, also a farmer, can relate.

Urünün, which aired its first episode in 1998, is a popular radio program with an estimated 70 percent listenership in Rwanda. With one national language, varied literacy rates and a strong storytelling culture, radio is the preferred form of receiving information here. With each episode taking place in the fictional Rwandan village of Nyarurembo, public health messages are weaved into the everyday drama and comical moments of a typical Rwandan household.

“Health doesn’t exist in isolation,” says Sylvia Muteteli, Program Coordinator of Urünün. “It’s built into our social behaviors, the day-to-day of how we live. By meeting people where they are, we have the ability to positively influence behavior, attitudes and misconceptions.”

In 2015, RDCP II collaborated with Urünün to educate people about the health benefits of milk consumption. As Urünün does with every campaign, the research started in the village. “We send a writer to eat, sleep, cook and milk cows alongside a host family. This is how we make each character relatable, and realistic. And this is where we noted opportunities for messaging around four main themes: milk consumption and nutritional benefits, milk hygiene, handling during transportation to the MCC and responsibility sharing between wife and husband,” says Sylvia.

Using each of these themes across six episodes, people like Agnes not only learn how to transform seemingly small moments of their every day, but also talk about it with friends and family. “I love talking about the latest episodes with the ladies at the market. We chat about the drama, but the real life transformations too. Like how drinking milk can make our children healthy,” says Agnes.

RDCP II also took Urünün to its fans by organizing eight public performances. In one community, nearly 80 percent of the population (4,500 people) attended. Here, listeners received t-shirts with milk consumption messages, watched their characters live, got illustration brochures on nutrition and shared how the show has impacted their lives. One man commented, “Before, I would sell all of my milk. Now I spare some for my family; health comes first.”

“Health comes first.”

In the last year, it is estimated that Urünün has reached nearly 8.5 million people across Rwanda. Though the milk consumption campaign ended in September 2016, Sylvia believes it will have a lasting impact.

“Along with efforts on behalf of the Government of Rwanda, activities like these are contributing to reduced malnutrition rates in Rwanda. We are at 38 percent down from 44 percent just three years go (Rwanda Demographic Health Survey, 2015).” According to Sylvia, we have a long way to go, and many more public health messages to share through storytelling.
Throughout the life of the program, RDCP II encouraged the participation of women across all aspects of the program. The project supported development of women led businesses – particularly business service providers who play a vital role in supporting farmers and cooperatives. A catalytic innovation grants fund was used to pro-actively support such high potential women entrepreneurs.

In addition, the program made intentional efforts to weave in gender training and sensitization at different touch points in farmer trainings and through cooperative development efforts.

Also critical was highlighting successful examples of where women obtained the highest levels of leadership. This ranged from the exemplary work of Ms. Agnes Mukangiruwonsanga, president of IAKIB – one of the most successful dairy cooperatives in the country, to excellent leadership of Florence Umurungi, Chairperson of the Rwanda National Dairy Platform.

As a result of program interventions, 97 percent of women reported an increase in self-efficacy.
Land O’Lakes and USAID investments have made significant impact by helping build a more vibrant and dynamic dairy industry while also improving the lives of tens of thousands smallholder dairy farmers. Yet, there are many opportunities that await in order for the Rwanda dairy industry to achieve its full potential outlined in the National Dairy Strategy. A few examples include:

**Consumer demand** must continue to increase. Future efforts will need to continue to develop end markets and promote innovative products that meet diverse consumer needs. The Shisha Wumva and Urunana campaigns were very successful at reaching both urban and rural audiences and helping drive consumption from 40 liters a day per person to 59 liters a day by end of project. Still, more efforts are needed to increase per person consumption to 80 liters a day by 2020. And more is required by the private sector to more effectively market and target messaging to new and emerging segments in the Rwanda dairy market.

**Milk quality** has seen significant improvements, however both positive and negative reinforcement by MINAGRI will be required to signal the importance and seriousness of this issue. Incentives for high quality and compliance to standards can be best rewarded through market incentives including promotion and marketing of such enterprises. Likewise, where there are compromises in quality and food safety issues – appropriate and fair punishments must be levied.

**Farmer productivity** needs to continue to increase so that dairy farming is a more profitable business. To reach the Government of Rwanda’s production goals by 2020, crossbreed cows need to produce 9.2 liters a day and 13.3 liters for pure breeds. This can be achieved, but farmers need access to affordable, high quality inputs and services. Decentralized services such as artificial insemination and early diagnosis and treatment of prevalent infections such as mastitis remain critical. These factors should remain priorities for the Rwanda Council of Veterinary Doctors.

**Farmer groups and cooperatives** need to be further strengthened to improve service delivery to members and to market milk to buyers. The advocacy of value chain actors through the RNDP is critical to properly addressing the industry issues as they emerge. Ownership and accountability is important amongst value chain actors to objectively dialogue about their respective roles from farm to fork.

**Private sector investment** must continue for the industry to scale up. It’s important to incentivize such entrepreneurs who command a great deal of knowledge of the local dairy industry to stimulate an increase in both innovation and value addition. Local entrepreneurs will motivate larger industry players to acquire and set up confident of the prevailing conditions for business.
CLOSE OUT EVENT REPORT
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Introduction
This event, held at the Kigali Serena Hotel on the 8th December 2016, was designed to highlight the successes of the Rwanda Dairy Competitiveness Program II (hereafter RDCP II) whilst also identifying the next steps in order to ensure that the progress in this sector continues. The project will close on the 5th January 2017.

RDCP II was a multi-faceted 5 year, USAID funded program implemented by Land O’ Lakes International Development 2012 – 2017. Objectives to:

- Increase the competitiveness of Rwandan dairy products across regional markets.
- Increased support towards provision of high quality dairy products.
- Creating additional income and employment so as to reduce poverty.
- Improving nutrition of households across the country arising from higher consumption of dairy products, particularly in rural areas.

The program’s primary strategy for achieving these objectives has been to create a platform which links smallholder dairy producers to a growing market demand, with Land O’ Lakes acting as a mediator and facilitator of this platform.

Invitees and Exhibitors
The key invitees to the RDCP II Close out event were the Minister of Agriculture and Animal Resources (MINAGRI) represented on the day by the Permanent Secretary, MINAGRI, Mr. Jean Claude Kayisinga and the Mission Director of USAID, Rwanda Ms. Marcia Musisi-Nkambwe. Other MINAGRI invitees included the Directors General of Animal Resources Development; Agriculture and Livestock Inspection and Certification Services (RALIS), and Corporate Services among others.
Also in attendance were representatives of the Rwanda Agriculture Board (RAB); Rwanda National Dairy Platform (RNDP) and representatives from the Royal Embassy of the Netherlands and USAID Rwanda. The Department for International Development (DFID), UK, received invitations. A range of actors from private and civil society organizations were on the invitation list, along with Seal of Quality Awardees from co-operatives around the country.

In all, 100 individuals were invited to attend the Close-out Event. Invitations were also extended to 20 media houses who were invited to provide press coverage for the event.

On the day, there were 110 registered attendees including exhibitors.

The main themes for the mini-exposition were:

- **Dairy Processors;** represented by Blessed Dairy, Gishwati Farms, Inyange, Zirakamwa Meza Nyanza and, Ingabo Dairy.
- **Seal of Quality;** represented by RALIS and MCC (Milk Collection Centres).
- **Artificial Insemination and Mastitis Control;** represented by ERAGIC and COOVIGI respectively.
- **Animal feeding technologies;** represented by BAN (a feeds processor), seeds multiplication exhibit and, two model farmers.
- **RDCP II** presented an exhibit of the AgPrO model and;
- **Ururnana Development Communication** also exhibited.
Also in attendance was Megan Stalheim, from the Land O’ Lakes Headquarters in Minnesota, who was in Kigali to support Rwanda team at the event and the broader close out of the RDCP II program.

**Agenda for the day**
The agenda for the day was that participants were invited to arrive from 2:00 pm onwards, and following registration were offered a guided tour of the mini-exposition. The agenda for the event was as follows:

- **2:00 pm** Arrival, registration and guided exhibition tour
- **3:00 pm** Key note speeches and presentations:
  - Dennis Karamuzi, RDCP II Chief of Party introductory remarks
  - Agnes Mukangiruwonsanga, Chairperson of the IAKIB Cooperative
  - Milton Ngirente, Managing Director of Blessed Dairies
  - Marcia Musisi-Nkambwe, USAID Mission Director in Rwanda
  - Jean-Claude Kayisinga, MINAGRI
- **4:30 pm** Networking over dairy beverages

**Overview of the Speeches and Presentations**
The formal element of the event, including speeches and presentations, was facilitated by Regis Isheja, the Master of Ceremonies for the day. Mr Isheja greeted VIP guests upon their arrival, introduced the speakers, whilst also providing a summary of the speeches, and translation of content between Kinyarwanda and English.

Below is a summary of each of the key note speeches and presentations. Full versions of these speeches are available in the Appendix to this document.

Dennis Karamuzi, Chief of Party of the RDCP II program, gave the opening address where he gave an overview of the achievements of the program, including over 12,000 new jobs created, the increasing value of exports and the new products which had been awarded the Rwanda Seal of Quality. Dr. Karamuzi also outlined his vision for the future of the dairy business in Rwanda which
includes further strengthening the leadership of the industry which would boost investment.

Agnes Mukangiruwonsanga, chairperson of the IAKIB Cooperative from Gicumbi district provided an overview of the growth of her cooperative. The cooperative was created in 2003 as a farmers’ association, and in 2008 the cooperative built their first two collection centers. Today, the cooperative has 688 members, 575 of which are female. The co-operative has a current workforce of 46 employees. IAKIB currently operates several businesses and service providers, including seven milk collection centers (MCCs), a veterinary shop and a milk bar in Ngondore sector.

Milton Ngirente, Managing Director of Blessed Dairies, spoke about his business and how it had grown since 2004. In addition to supplying Inyange with over 20,000 litres of fresh milk each day, and providing regular income for hundreds of dairy farmers, Blessed Dairies established a production center in 2012 which now enables them to manufacture and retail a large range of dairy related products. The diversification of the company, and the high standards of quality which they are recognized for, are an excellent example of the type of legacy that the RDCP II project leaves behind.

Marcia Musisi-Nkambwe, USAID Mission Director in Rwanda, celebrated the breadth of the program’s accomplishments whilst highlighting that Rwanda now produces over 600,000 metric tonnes of milk each year, twelve times the equivalent amount in 2000. Her speech emphasized the vast investments made by USAID in to the Rwandan dairy sector in recent years, and the pride
which the organization takes in the progress which has been made with the collaboration of Land O’Lakes.

The final speaker for the day was Jean-Claude Kayisinga, Permanent Secretary -MINAGRI. His speech focused on the role that the modernization of the dairy sector to date has played in the overarching goal of commercializing the agricultural sector as part of the Government’s Vision 2020 strategy for development. In addition, the Permanent Secretary pointed to cross cutting issues which were addressed through the RDCP II program, such as the empowerment of women, and the continued reduction of poverty through job creation.

The Exposition
As guests arrived they were invited to view the mini-exposition which featured exhibitions from ten exhibitors. These included a selection of dairy processors, and representatives from the Seal of Quality. ERAGIC and COOVIGI provided demonstrations of equipment and materials used in artificial insemination and Mastitis control. Animal feeding technologies and samples of modern animal feed were exhibited by a selection of model farmers. RDCP II team members presented materials from the AgPrO model, whilst Urunana provided audio-visual and pictorial evidence from their previous work with RDCP II.

Guests of honor visit the exposition

Media Houses
The following media houses were represented at the event: The African Media Group; Umwezi Newspaper; The East African; Rwanda Today; The Radio Voice of Africa; The New Times; African Media; Flash TV; City TV; Radio Huguka; Imvaho Nshya; IRwanda24.com; Rwanda News Agency;
Umuseke.rw. USAID then issued a press release immediately after the event was concluded, with reports appearing in local media publications including:

The New Times: [http://www.newtimes.co.rw/section/article/2016-12-12/206188/](http://www.newtimes.co.rw/section/article/2016-12-12/206188/)
The event was also highlighted on the MINAGRI Website: *Rwanda’s Dairy sector celebrates the successes of 5 years Dairy Program:* [http://www.minagri.gov.rw/index.php?id=469&tx_ttnews%5Btt_news%5D=1439&cHash=1029fc2fe16904f2e0ff98e9a7bcb684](http://www.minagri.gov.rw/index.php?id=469&tx_ttnews%5Btt_news%5D=1439&cHash=1029fc2fe16904f2e0ff98e9a7bcb684)

**Cocktail Event**

Following the conclusion of the formal elements of the event, guests were invited to network over dairy based beverages and snacks. Many people commented on the high quality an novelty of the milk based cocktail and the food, and many guests took the opportunity to engage with co-participants, whilst others took a final opportunity to visit the exposition or purchase products from the exhibitors.

**Looking Forward**

As well as celebrating the achievements to date, the event provided the opportunity to outline the objectives for the future of the Rwanda Dairy industry and to exemplify the type of legacy which Land O’ Lakes hopes to leave once the program closes. Legacy and ambitions for the future were therefore prominent themes throughout the event.

Dennis Karamuzi emphasized the value of cooperation within the sector and the importance of the Rwanda National Dairy Platform, which he hoped relevant parties would take ownership of in the future. Dr Karamuzi outlined his hopes and ambitions for the industry as being to:

- Increase per capita consumption of milk to 80 liters per annum by 2020;
- Further enhance milk quality compliance monitoring;
- Increased farmer productivity and profitability;
- Group marketing through cooperatives;
- Strong leadership within the industry so as to boost investment.

Citing the large number of farmers who have been trained in high quality practices through RDCP II, Marcia Musisi-Nkambwe emphasized her hope that more farmers would soon be able to access artificial insemination services, comply with quality standards, and reach ever further into greater regional and international markets.

The speeches by both of the beneficiaries, Agnes Mukangiruwonsanga and Milton Ngirente, provided excellent examples of what can be achieved, with both the IAKIB cooperative and Blessed Dairies having become market driven, model businesses.

These lessons provided reinforcement for the speech by Jean-Claude Kayisinga, which accentuated how both the dairy sector and the broader agricultural sector must continue to strive to become market-driven, competitive forces in order for the Rwandan Economy to achieve its objective of becoming a lower middle income country by 2020.

**Conclusion**

The event as a whole was a success, bringing key actors from the community together to network, to celebrate the progress which has been made in recent years and also to address further steps which are needed in the future. The event gave participants the opportunity to informally engage with other organisations within the sector, which will ease collective development of the industry in future.

The presence of significant media houses provided the general public with details of the successes of the RDCP II program, whilst promoting the consumption of dairy produce across the country.
Speech for Honorable Minister of Agriculture and Animal Resources - MINAGRI

- Senior Government Officials here present;
- USAID Mission Director
- Representatives of National and International Organisations here present;
- Board Members of Rwanda National Dairy Platform
- Ladies and Gentlemen

It is my great pleasure to be with you today as we celebrate the achievements of the Rwanda Dairy Competitiveness Program II (RDCP II) and I would like to thank RDCP II, USAID and Land O’Lakes for their dedication to Rwanda’s development.
As Rwanda continues to strive towards becoming a middle-income country by 2020, agriculture has been seen as a priority sector in reaching this achievement. In fact, as many of us know, one of the six pillars of Vision 2020 is the modernization of agriculture and animal husbandry; and as the Ministry of Agriculture and Animal Resource’s role in the sector continues to shift from provider to facilitator, RDCP II was able to take on the role of developing the capacity of those involved in the dairy value chain, as well as help build a foundation for private investment within the dairy sector.

The dedication of RDCP II to their work has not only allowed the dairy sector to flourish throughout Rwanda, but has impacted the development of multiple cross-cutting issues. Highlighted throughout this celebration, we are able to see how RDCP II has reduced poverty through creation of employment, as well as worked to empower women, further policies concerning milk hygiene and increase sector investment.

Working in tandem with Vision 2020, Rwanda’s Economic Development and Poverty Reduction Strategy II (EDPRS II) underlines the valuable role agriculture plays as a source of jobs for economic development and has prioritized the development of those living in rural areas. RDCP II’s work highlights the economic importance of the agriculture sector, as their project created over 12,000 new jobs and benefit over 63,000 rural households. The alignment of RDCP II’s strategy with three of EDPRS II’s four thematic areas: economic transformation, rural development, and accountable governance, demonstrates our capacity to transform sectors when working towards Rwanda’s collective objectives.

In 2012, we were living in the times where raw, unpasteurized milk held the largest share of domestic milk consumption and milk processing plants operated below capacity. RDCP II has helped change this situation through their support of EDPRS II’s goal to double milk production and consumption between 2012 and 2017.

Linked to the success of the government’s One-Cow, or Girinka, program in increasing rural incomes and milk production, are the linkages RDCP II built between rural farmers and increasing their capacity to follow milk quality standards and access dairy markets. These linkages have been fruitful in creating a sustainable impact. In addition, RDCP II’s support to increase milk consumption through “Shisha wumva “ campaign complemented the GoR “One Cup of Milk per Child’ program, with
increased per capita consumption now estimated at 59 liters. This also contributes to on-going efforts to reduce malnutrition.

Looking at the strategic vision for the transformation of the Rwandan agriculture sector, one area of focus is to increase production of livestock products and agricultural exports by furthering the involvement of the private sector. This has allowed the sector to be viewed from a market-driven perspective and RDCP II has embraced this vision as they focused on an inclusive and incentive-based approach to the dairy sector. Fostering an environment where their approach would create change in a holistic manner, from the policy level, by supporting the dairy sub-sector’s institutional development and coordination, to the improved production of small-holder farmers who are the bedrock of the dairy value chain.

RDCP II has worked to transform Rwanda’s agriculture sector from one of subsistence farming to a market-driven, value-creating sector and RDCP II will continue to be a role model for what can be done within the sector. With much gratitude for all of your work, I congratulate RDCP II team and Land O’Lakes and we certainly hope there will be another opportunity to continue this collaboration. Special appreciation for the work of USAID in Rwanda beyond dairy, the GoR values this collaboration across sectors in particular the agric sector. I wish you all a great celebration and trust that through the Rwanda National Dairy Platform, we shall sustain the much needed industry leadership and advocacy to achieve our National Dairy Strategy goals.

Marcia Musisi-Nkambwe MISSION DIRECTOR USAID – Remarks

- Honorable Permanent Secretary Jean Claude KAYISINGA,
  Representative of the Ministry of Trade, Industry, and East African Community Affairs,
  Representatives from the Rwanda National Dairy Program, Representatives from the donor community,
  Distinguished guests,

- I am so pleased to be here today for the close-out of the second phase of the Rwanda Dairy Competitiveness Project. After hearing about all the accomplishments of this project, from better household diets to the improved livelihood of rural farmers, I feel honored that USAID has been part of this journey.

- USAID has supported the Rwanda dairy sector with approximately $21 million since 2007. Both the first and second phase of the Rwanda Dairy Competitiveness Project have been integral parts of the U.S. Government’s Feed the Future program here in Rwanda.
Before 2007, milk availability in Rwanda was sparse, at best, and handling practices were unhygienic, at worst. For example, milk containers travelling from the farm to the market would not be appropriately cleaned, milk was often watered down, and over 90 percent of milk samples collected in Kigali had bacteria levels above the accepted sanitary limits.

Today, thanks to our strong partnership with the Government of Rwanda, Land O’ Lakes, and the hard work and dedication of the Rwandan people, the Rwanda dairy sector has been transformed. Rwanda now produces over 600,000 metric tons of milk annually. That’s 12 times as much milk as was produced in 2000.

Not only has milk consumption in Rwanda significantly increased, but Rwanda also exported over $13 million worth of dairy products in 2015. The Shisha Wumva campaign sponsored by the Rwanda Dairy Competitiveness Program and led by the Ministry of Agriculture played a significant role in this.

Since the beginning, we at USAID have ensured that this program’s ownership by the government and the people of Rwanda was not just a footnote on official papers, but was a reality on the ground. In collaboration with USAID, the Ministry of Agriculture worked tirelessly to help pass policies and regulations that enable the environment for a competitive dairy sector. This included the National Dairy Strategy and the Ministerial Order on milk storage, collection, transport and commercialization.

As an even further demonstration of its commitment to strengthen the Rwanda dairy sector, the Ministry of Agriculture incorporated this dairy strategy into its Strategic Plan for the Transformation of Agriculture in Rwanda. And with our support, the Ministry of Agriculture also implemented the Seal of Quality program that has positioned Rwanda as a regional hub for high quality dairy products.

I would like to commend the remarkable leadership of the Ministry of Agriculture for its modernization efforts of the dairy sector.

Of course, I will not conclude these remarks without expressing USAID’s gratitude to Land O’ Lakes, our partner in the effort to strengthen the dairy sector.

While training farmers to adopt new dairy farming technologies, Land O’ Lakes nearly tripled their initial end-of-project goals. They trained 34,000 more farmers than we had hoped for. This exceptional performance helped create over 12,000 additional jobs in the dairy sector.

Distinguished guests, as we reach the end of the Rwanda Dairy Competitiveness Project, we are confident that the Government of Rwanda and the people of Rwanda will not just sustain what we have built together, but will continue to develop the dairy sector to new heights.

Of course, there is always more room to grow. As Rwanda’s dairy sector continues to blossom, we hope to see even more dairy farmers accessing artificial insemination services, complying with quality standards, and reaching ever further into greater regional and international markets.
• Honorable Permanent Secretary, I would like to thank you again for the continued support and partnership as we work towards our common goal of transforming the Rwanda agricultural sector from subsistence into a market-driven, knowledge-based sector.

• And I look forward to future collaborations between our governments that will have life-changing impacts on Rwanda’s rural populations.

RDCP II Closing Ceremony – Thursday December 8, 2016

COMMENTS Dennis Karaumuzi, Chief of Party, RDCP II Program

Protocol – PS & GoR reps, Mission Director, RNDP Board, and Partners

Background of RDCP II & Land O’Lakes in Rwanda 2007 – 2017 and RDCP II Partners: LOL, ABS, Inspired, UC Davis

USAID Activity alignment with S.O 7: Expanded economic opportunities in rural areas

Project goal: Rwanda Dairy products compete in regional Markets – I.R 1 : Products meet Comesa Standards, I.R 2: Expended investment in dairy processing & Marketing
**NDS Goal:** A competitive dairy sector providing quality dairy products which are affordable, available and accessible to all Rwandans and other consumers in the region.

**LOP target:** 60% increase in volume and value of dairy products sold; 30 new products with Rwanda seal of quality; 60% increase in net household income; 7500 new dairy related jobs created; $20M in non-USG resources leveraged; 9 policy reforms enacted/advocated for.

**Approach to success:** Market driven, Industry led, incentive based, results oriented, collaborative, inclusive, light touch, early exit strategy

**Key drivers at roll out:** Small holder productivity, access/use of inputs & services, Finance, Milk Quality, institutional capacity, industry organization, market efficiency, market demand and policy

**Achievements:**

**Industry level** - Constant livestock population with tripled production; exponential growth registered in dairy exports $85k to $11.5M in 2016.

**Highlights** – Establishment of **RNDP** for private sector led industry leadership, **Seal of Quality** campaign to attain high quality standards from producer to consumer with **68% milk marketed under SOQ**, $6.2M in new private sector investments, Robust grant program over Frw 1.3 Billion with cost share over $3M

**Policy** – NDS, DSWG, Mastitis control SP, A.I decentralization, and Ministerial order

**Market access and BDS support** – Milk collected and marketed through MCCs increased by 300%

**Production** – Training on quality and production leading to Dairy income increase by 192%

**Access to Finance** – Dairy loans from 2012 increased by 118% for re-investments

**Consumption** – Shisha wumva and Urunana radio soap opera reaching over 1.6M Rwandans and growth in **per capita consumption from 40liters to 59liters**.

**Women economic empowerment** – 97% self-efficacy of women

**The Future** – Increasing per capita consumption to 80liters by 2020, Milk quality compliance monitoring, farmer productivity for profitability, group marketing through coops and industry leadership to be strengthened to boost investments

**Appreciation:** MINAGRI and agencies, MINICOM and affiliated institutions, Collaborating Financial institutions, Provincial and district leadership, USAID and development partners and RDCP II staff.
“For us to have accomplished such results is incredibly rewarding. Not only have we helped to transform the dairy sector into a competitive industry, but also we’ve improved the lives of more than 63,000 individuals directly benefitting from project support. This will leave a lasting positive legacy,”

IAKIB COOPERATIVE Profile.

**Location:** Gicumbi district – Northern Province  
**Chairperson:** Agnes MUKANGIRUWONSANGA

**Membership:**  
- 688 members (575 female & 113 male)  
- IAKIB serves members and non-members from 19 sectors of Gicumbi district.
History: Created in 2003 as a farmers’ association, formally registered in 2006. In 2008, the coop built their first two collection centers and received equipment through donation from FAO in 2009.

Work force: current work force is 46 (13 female & 33 male)

Milk collection activity:
- Currently, IAKIB has 7 milk collection centers (MCCs),
- 2 MCCs constructed from own resources
- 4 were constructed and donated by MINAGRI
- 1 is a rented premises
- The cooperative mainly sells about 32,000 liters of milk per day to Blessed Dairy-owned by one of their founder members Milton Ngirente who has signed a contract to supply daily to Inyange Industry.
- 5 of IAKIB MCCs received Seal of Quality certificates from RALIS

Other services provided to members and non-members:
- A Vet shop /animal pharmacy to improve farmers’ access to inputs.
- A milk bar in Ngondore sector to serve the community with a trusted product
- Provides technical support to farmers through training.
- IAKIB also owns a dairy feeds plant.

Blessed Dairies: A Local Success Story
In 2004, Milton Ngirente saw an opportunity in collecting raw milk from local farmers and co-ops to increase yields. Today, they provide the largest dairy company in Rwanda, Inyange Ltd, with over 20,000 liters of fresh milk each day, which they want to increase up to 30,000 liters. In doing so, they have been able to provide regular income to hundreds of local farmers while maintaining a socially conscious business model.

Managing Director Milton Ngirente has already transformed this once small operation into a booming business, becoming one of the main players in the sector with ability to access 50,000 liters of milk a day through his vast network and strong collaboration with dairy producers.

A key milestone in recent history came in 2012, when Blessed Dairies invested in a production facility to convert milk into related products. They are now producing over 4,000 liters of yoghurt, pasteurized milk, skimmed milk, fresh cream and cheese each day, and looking to expand into new flavors and modernized packaging.

They have high approvals from the Rwanda Standards Board, are a HACCP certified company.
FOR IMMEDIATE RELEASE

Rwanda’s Dairy Sector Celebrates the Successes of a USAID 5-year Program

Thursday, December 8th 2016

KIGALI – On Thursday, December 8th, The United States Agency for International Development (USAID) held an event to celebrate the successful conclusion of the Rwanda Dairy Competitiveness Program II. The $15 million USAID-funded program was implemented by Land O’Lakes International Development. The organizations were joined by the Permanent Secretary Ministry of Agriculture and Animal Resources and members of Rwanda’s dairy community at the Kigali Serena Hotel.

The 5-year program aimed to improve national milk quality while modernizing Rwanda’s dairy production and growing the dairy market. By all metrics, the program was a marked success. It created over 12,000 jobs in the dairy sector, and generated a $66 million increase in revenue for Rwandan dairy farmers. Rwanda now produces 600,000 metric tons of milk annually, an increase of more than 300 percent in less than a decade.

The Rwanda Dairy Competitiveness Program II also enhanced the quality of milk in Rwanda by promoting the National Seal of Quality, and increased national demand for high quality dairy products with the Shisha Wumva ‘Feel the Goodness’ campaign. At the event, guest of honour Mr Jean Claude KAYISINGA, Permanent Secretary Ministry of Agriculture and Animal Resources, remarked, “As Rwanda continues to grow, it is imperative that we continue to commercialise the agricultural sector to compete internationally, and the dairy sector has rapidly become a model of what can be achieved.” Since 2012, the value of dairy exports has risen by $46.7 million.

Marcia Musisi-Nkambwe, USAID Mission Director in Rwanda, celebrated the breadth of the program’s accomplishments. “We are pleased to have supported the rapid transformation of Rwanda’s dairy sector, which has tripled the production of high quality milk since USAID stepped up efforts to fund the sector in 2007. It’s a tremendous achievement,” she said.

Dennis Karamuzi, the project’s Chief of Party, stated “Not only have we helped to transform the dairy sector into a competitive industry, but also we’ve improved the lives of more than 63,000 individuals.” He also remarked that sustaining these laudable achievements will be key to continuing the dairy sector’s rapid growth. Land O’Lakes urged all participants at the event to continue working collectively, from milk producers to dairy processors, transporters, and consumers.