



FEED THE FUTURE

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



Feed the Future Mali Livestock technology scaling program

Annual Report, October 2016–September 2017



USAID
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The Feed the Future Mali Livestock Technology Scaling (FTF-MLTS) program seeks to contribute to the inclusive growth of the ruminant livestock value chain for increased income, food and nutrition security for 266,000 cattle, sheep, and goat keepers and other value chains actors in three regions in the country (Mopti, Timbuktu and Sikasso), hence lifting them out of poverty. Supported by the United States Agency for International Development (USAID) as part of the US government's Feed the Future initiative, the program sets out to bridge ruminant livestock productivity gaps and to enhance the volume and value of ruminant livestock marketed through a wide-scale dissemination of proven livestock technologies and best practices.

The program is implemented by the International Livestock Research Institute (ILRI) working with a consortium of public institutions (Direction Nationale des Services Veterinaires, Direction Nationale des Productions et Industries Animales; Laboratoire Centrale Veterinaire, Institut d'Economie Rurale), private sector organizations (private veterinarians, feed manufacturers) and non-governmental organizations such as the Catholic Relief Services (CRS), the SNV Netherlands Development Organisation, the Association Malienne d'Eveil et de Développement Durable (AMEDD), and the Agronomes et Vétérinaires sans Frontières (AVSF). FTF MLTSP also collaborates with ongoing FTF projects such as Livestock for Growth and other rural development programs in Mali that are pursuing similar objectives in order to create synergies among them.

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Acronyms and abbreviations

AMEDD	Association Malienne d’Eveil et de Développement Durable
AVSF	Agronomes et Vétérinaires sans Frontières
AU-PANVAC	African Union–Pan African Vaccine Centre
CAHP	Community animal health platform
CBPP	Contagious bovine pleuropneumonia
CNASA	Centre National d’Appui à la Santé Animale
COVEM	Collectif des Vétérinaires Mandataires
CRS	Catholic Relief Service
DNPIA	Direction Nationale des Productions et Industries Animales
DNSV	Direction des Services Veterinaires
FEBEVIM	Fédération nationale des groupements interprofessionnel de la filière viande et lait au Mali
FTF	Feed the Future
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IER	Institut d’Economie Rurale
ILRI	International Livestock Research Institute
IP	Innovation platform
L4G	Livestock for growth
LCV	Laboratoire Central Veterinaire
LMIS	Livestock market information system
M&E	Monitoring and evaluation
MLTSP	Mali livestock technology scaling program
NGO	Non-governmental organization
PPR	Peste des petits ruminants
SNV	Netherlands Development Organization
USAID	United States Agency for International Development
XOF	West African CFA franc

Executive summary

Feed the Future Mali Livestock technology scaling program (FTF-MLTSP) is aligned to the USAID/Mali FTF program and more specifically to the Mali FTF livestock value chain component set out to boost growth in the Mali livestock sector. The overarching goal of FTF-MLTSP is to contribute to inclusive growth in ruminant livestock value chains for increased income, food and nutrition security for 266,000 cattle, sheep and goat keepers and other value chain actors in the Mopti, Timbuktu and Sikasso regions, hence lifting them out of poverty. FTF-MLTSP is set out to bridge ruminant livestock productivity gaps and to improve access to more remunerative markets through a large-scale dissemination of proven livestock technologies and best practices in the target regions. This reports highlights progress in the FTF-MLTSP implementation, achievements, and challenges encountered during October 2016 to September 2017 period.

Program management

During the fiscal year, staffing of the project coordination team was completed and the foundation for strong partnership with a number on implementing partners was laid out. Eight sub-awards were granted to various public and private implementing partners (Table 1) with extension, development or research mandates. By September 2017, the amendments of eight of the sub-awards were signed by the relevant parties.

Animal health

Peste des petits ruminants (PPR) thermostable vaccine. Significant progress has been made towards the production of the thermostable PPR vaccine. The Laboratoire Central Veterinaire (LCV) produces the three PPR vaccines using different protocols. The vaccine internal quality check was completed with satisfactory results. Vaccines samples were about to be sent to the African Union–Pan African Vaccine Centre (AU-PANVAC) for an independent quality check. The analysis the thermo-stability profiles of the three vaccines and the extent of sero-conversion achieved in animal experiments is underway.

Vaccination campaigns. Challenges to improve vaccination coverage to a critical rate were also better understood. To improve access by farmers to veterinary services and inputs, the project invested in private veterinarian capacity development, while enhancing innovation platform (IP) performance for better planning and implementation of vaccination campaigns. During the 2017 campaign, a total number of 289,153 cattle and 162,770 sheep and goats were vaccinated in the 31 FTF MLTSP target communes. When compared with the 2016 figures (in 2016, 231,116 cattle and 48,579 sheep and goats were vaccinated), there is evidence of a significant improvement of the performance of the livestock immunization campaign in project target communes.

Baseline and a post-vaccination epidemiological surveys were conducted to generate data on the immunization status in target communes and to identify priority animal health constraints to further guide the capacity development program for value chain actors. Contagious bovine pleuropneumonia (CBPP) and PPR sero-prevalence rates before vaccination were 14.93 and 54.7%, respectively. Post-vaccination sero-prevalence rates of CBPP and PPR were 22.9% and 65.1%, respectively.

Upscaling of fodder and forage crops (2015-2016 cropping season)

Forage and fodder production. To improve the availability of quality biomass supportive of the objective to enhancing livestock productivity, the project worked with implementing partners in the regions to consolidate the upscaling of dual purpose cowpea and sweet sorghum. Efforts were also deployed to expand on Bourgou production in Timbuktu and Mopti with the recruitment of new beneficiaries. Brachiaria was re-introduced in Sikasso and Koutiala and has met a great success. In Mopti and Sikasso, there is an increasing number of farmers who want to engage in Brachiaria production as expressed by the high demand of seeds. A total of 481 producers agreed to adopt integrated packages designed to improve ruminant livestock management. In Timbuktu, 15 producer organizations, totalling 675 members with 300 women, engaged in Bourgou production.

Integrated packages

To further improve on the efficiency and profitability of cattle and sheep fattening operations, MLTSP opted for the development of producers' capacity in fattening and feed conservation. The Institut d'Economie Rurale (IER) trained 27 trainers on forage cultivation and conservation techniques, cattle, and sheep fattening systems, feeds and feeding systems, choice of animals, planning and timing of operations, management of fattening operations, financial consideration and marketing. In turn, the training of producers organized by the Direction Nationale des Productions et Industries Animales (DNPIA) on the same thematic areas was attended by 205 producers.

Feed processing

MLTSP has supported the establishment of a women-led feed processing unit that produce multi-nutrient blocks at Farakala, Sikasso. A management committee was put in place. Committee members were trained on accounting and marketing. Twenty women benefited from a training on multi-nutrient blocks production techniques. Existing feed manufacturers in Koutiala and Sikasso have been assessed to identify their strengths and weaknesses and opportunities for future development of the feed value chains. Ways to improve their performances through the upgrading of their equipment and their access to information on feed quality from laboratory determinations and financial institutions were discussed. Technical options and potential suppliers of equipment, target actors (women group and private individuals) for the setup of additional feed processing units using motorized mobile feed grinders/shoppers have been identified. In addition, FTF MLTSP supported the establishment of four feed manufacturing units based on feed grinders imported from Niger. Following the training of a local blacksmith, the prototype equipment has been replicated in Niono and orders of about 30 grinders have been placed.

Market access

Scientists at the International Livestock Research Institute (ILRI) made a first assessment of the existing livestock market information system (LMIS) to devise options for its upgrading to reach out more end-users but also to provide them with the information they need. Key areas that need improvement include the limited awareness of the Mali LMIS among livestock producers, the long delay between data collection time and the availability of the market information to users and the need to develop a sustainable business model building on public-private partnership models to ensure its financial sustainability. The need to produce and disseminate accurate, timely, affordable and useful price information evidenced the development of an action plan to improve the LMIS. During the last quarter of 2016, significant steps have been taken towards building a solid partnership among many players including ILRI, AECOM, Texas A&M and VIA Consulting Group with the view of improving the overall performance of Mali LMIS. Seventeen enumerators and four regional controllers benefited from five days of theoretical and practical training on methodology of livestock market data collection, data codification techniques and their transmission by smartphone to the server. Data collection has resumed and information is available again from the server. Two hundred and three livestock production and marketing actors have been trained to enable them to use the information system. The data base has been updated by entering data from previous years (2014, 2015) during which the system was not operational. Server management and data quality control are ongoing activities of the market information system to ensure the availability of reliable, good quality and real-time data. Via Consulting has come up with a solution based on a mobile application to reduce the time delay between data collection and availability of the market information. A business model that ensure sustainable financing options was also recommended by Via Consulting.

Taking advantage of Muslim feast to promote livestock marketing. To increase the volume of supply and value of sheep and cattle sales during Muslim festivals, MLTSP and Livestock for growth (L4G)-supported Fédération nationale des groupements interprofessionnel de la filière viande et lait au Mali (FEBEVIM) missions to Ivory Coast. To stimulate export of Tabaski ram from FTF MLTSP target communes in Sikasso, three livestock borders markets (Kangaba, Kouremalé and Sikorelé) were promoted.

Connecting suppliers with quality well finished animals to slaughterhouses. Along with L4G, consultations with USAID cross-boundary program took place to determine ways to facilitate contractual arrangements between LAHAM Abattoirs in Kayes and fatteners associations in the program sites in Sikasso and Mopti regions. Constraints and opportunities of fattening operations and terms of contractual arrangements proposed by LAHAM were widely circulated among fatteners. Actual negotiations between LAHAM and producer organizations to reach agreements regarding the supply of quality well finished animals to LAHAM took place during the reporting period.

Background

FTF-MLTS seeks to contribute to the inclusive growth of the ruminant livestock value chain for increased income, food and nutrition security for 266,000 cattle, sheep, and goat keepers and other value chains actors in three regions in the country (Mopti, Timbuktu and Sikasso), hence lifting them out of poverty. Supported by the United States Agency for International Development (USAID) as part of the US government's Feed the Future initiative, the program sets out to bridge ruminant livestock productivity gaps and to enhance the volume and value of ruminant livestock marketed through a wide-scale dissemination of proven livestock technologies and best practices. The program is implemented by the International Livestock Research Institute (ILRI) working with a consortium (Table 1) of public institutions (Direction Nationale des Services Veterinaires, Direction Nationale des Productions et Industries Animales; Laboratoire Centrale Veterinaire, Institut d'Economie Rurale), private sector organizations (private veterinarians, feed manufacturers) and non-governmental organizations such as the Catholic Relief Services (CRS), the SNV Netherlands Development Organisation, the Association Malienne d'Eveil et de Développement Durable (AMEDD), and the Agronomes et Vétérinaires sans Frontières (AVSF). FTF MLTSP also collaborates with ongoing FTF projects such as L4G and other rural development projects in Mali that are pursuing similar objectives to create synergies among them.

The present report highlights activities carried out, achievements, challenges faced in rolling out project interventions in 25 target communes (Table 1) and lessons learned during the course of FY2017. As FTF MLTSP planning process is transitioning towards the USAID fiscal year, the annual report for the project, financial year 2017, overlaps with the 2016 report.

Table 1. List of implementing partners and their geographical focus

Organization	Region	Cercle	Communes
1. AMEDD	Sikasso	Koutiala	41. Sinkolo, 44. Zangasso, 34. Kapala, 39. Ngoutjina, 35. Koloningue, 38. Nafanga, 40. Sincina
		Sikasso	12. Fama, 24. Primpera, 17. Koufouziela, 11. Diomatene, 27. Zangaradougou
2. SNV	Sikasso	Sikasso	20. Kouoro, 22. Natien, 13. Farakala
	Mopti	Mopti	89. Soye;
3. CRS	Mopti	Djenne	64. Femaye, 62. Djenne,
		Mopti	88. Socoura, 87. Sio
4. AVSF	Timbuktu	Djiene	107. Fakala
		Nyafunke	109. Soumboudou; 110. Soumpi; 113.
		Timbuktu	111. Alafia; 113. Timbuktu
		Goundam	106. Douekire; 107. Kaneye
5. Agricultural Market Observatory (OMA)/DNPIA	17 livestock markets being monitored		
6. Hester Biosciences Ltd	Crosscutting		
7. IER	Crosscutting		
8. LCV	Crosscutting		
9. COVEM/ANAVEM	Crosscutting		
9. Direction des Services Veterinaires (DNSV)/ Centre National d'Appui à la Santé Animale (CNASA)	Crosscutting		

Progress during the reporting period

Program management, monitoring and evaluation

Staffing and contractual arrangements. Activities carried out during the reporting period focused on completing the setting up the program coordination unit, recruitment of the program office staff and laying the foundation for solid partnership and developing sub-awards for implementing partners. FTF-MLTSP has expanded its staffing with the recruitment of four agents: a livestock expert, a communication officer and two field officers. Furthermore, the International Livestock Research Institute (ILRI) continues to work with technical partners and non-governmental organizations (NGOs) to implement FTF-MLTSP. In 2016, ILRI signed collaborative agreements with nine partners. In 2017, we have finalized the renewal of eight of those agreements through amendments. These partners are: CRS, SNV Netherlands Development Organisation, AMEDD, AVSF, Laboratoire Central Veterinaires (LCV), OMA, DNSV and IER. Discussions continue for the renewal of Hester Bioscience Ltd contract. In addition to these existing partnerships, ILRI has decided to work with three new partners, VIA Consulting and Texas A&M University, for access to market information and Collectif des Vétérinaires Mandataires (COVEM), an association of private veterinarians in Mali. The collaboration with VIA Consulting and COVEM has been formalized through a service contract while a collaborative agreement signed with Texas A&M University. FTF MLTSP decided also to enter in a partnership with 4E CONFORM, a Malian Consulting firm, to facilitate access to financial institutions and improve the technical and managerial skills for fatteners, private veterinarians and feed producers and manufacturers.

Development of work plans and budgets. The second MLTSP annual planning meeting was held on 5 and 6 December 2016 at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)/Samanko to review 2016 achievements and draft the 2017 work plan and budget. A third planning meeting was held on 21–22 August in Samanko. In addition to discussion on future project interventions, these partner meetings were also opportunities to draw lessons learned from previous years of program implementation and to propose changes in the program implementation strategies. The following implementing partners participated in the meeting: AMEDD, CRS, SNV, OMA, LCV, DNSV/CNESA, IER, AVSF. New partners such as COVEM also took part of the meeting to get acquainted with program details and to discuss their future roles.

Consultations with communities. At the regional level, implementing partners carried out key initial project launch activities in target communes. These included: (1) the recruitment of project management and field staff working directly with project beneficiaries, (2) the development of contractual arrangements with local extension organizations to carry out specific program field work; (3) the organization of commune and village consultations to introduce the program objectives, future activities and modus operandi to local authorities and target population. The identification of program direct beneficiaries for various technologies was also initiated. Feedback from community consultations indicated great enthusiasm of target population who were especially attracted by proposed activities to improve feed supply and those that address animal health constraints and market access issues.

Monitoring and evaluation. The baseline field surveys were completed by October 2016. The findings of the surveys informed baseline value for project indicators and allowed the revision of targets. The annual surveys to update project indicators were launched in September 2017.

The project monitoring and evaluation (M&E) system was put in place following the following key steps:

- Development of an M&E operational manual. This manual contains the results chain, project logical framework, the M&E plan and the matrix of indicators.
- An M&E reference document was developed to serve as a guide for partners of the project. This document gives details of the M&E system, it complements the operational manual. This document was shared and finalized with implementing partners at the Koutiala workshop.

- Based on the indicators and information needs, M&E tools were developed to facilitate data collection. They are of different types: periodic reports (annual, quarterly and monthly formats); IP M&E tools. The data collection tools for indicators were first developed using a Word format and then transcribed into Open Data Kit format using XLSForm. ILRI-Nairobi (Kenya) colleagues supported the integration of Open Data Kit Collect to the M&E system. Implementing partners have been trained on the use of these tools.
- From 19–24 May 2017, a workshop was held in Koutiala to finalize the design of the project M&E system and to train implementing partners on its use to harmonize data collection methods across project sites. The workshop was attended by the project managers, M&E officers, supervisors and other field workers from the project areas. The six-day workshop brought together a total of 15 participants. First, an overview of FTF-MLTSP was presented to give participants a better understanding of the project context, objectives, and implementation strategies. This was followed by an introduction of the concept and methods of M&E, a presentation of the data flow map and two working groups were formed to review and refine the draft M&E document. Each participant contributed to the finalization of the M&E document, which enabled them to own and later apply it. This was followed by a presentation of required reports from various stakeholders and their timelines and guidelines on project reporting strategy. Different formats for monthly, quarterly and annual reports were presented and explained by Cheick Toure, project M&E officer, so that all partners can use the same reporting format. On the third day of the workshop, participants were exposed to the use of the Open Data Kit tool that will be used for data collection in the field. A session on the development of the 'Logical Framework' for the project was facilitated by ICRISAT Feed the Future Groundnut project leader, Hippolyte Affognon, as part of the collaboration among USAID FTF projects. The session enabled the participants to understand the vertical and horizontal logic of a logical framework and the different log frame formulations. The workshop enabled project partners successfully clarified project objectives, indicators and data collection methods.

Two data quality assessment missions were organized with both an office and field phases. The first mission took place on 30 November 2017 at ILRI offices followed by a field visit at Belesso, a village in N'Goutjina target commune located in Koutiala circle. The second data assessment mission was held on 14 July 2017 at ILRI offices at ICRISAT Samanko. The field visit took place on 17 July 2017 at Vamarabougou located in Kafouziela target communes, Koutiala.

Objective 1. Promote innovative animal health delivery systems and best health interventions to reduce disease burden in ruminant livestock

Activity 1.1 Produce and deliver a thermostable vaccine against peste des petits ruminants

As a reminder, a key contribution of LCV to FTF MLTSP is the production and deployment of the PPR thermostable vaccine in partnership with Hester Bioscience Ltd, India, using the protocol on vaccine thermo-stabilization developed by ILRI. LCV had also to produce batches of PPR vaccines using two other protocols for comparison purposes: classical LCV protocol using trehalose as stabilizer and LCV protocol using Xerovac as stabilizer. The comparative evaluation of the thermos-stability profiles of the three different vaccines and their levels of seroconversion in animal experiments and the estimation were planned 2017 sub-activities. In the second quarter of 2017, all three batches of vaccines were produced with the following number of doses per batch: (1) 219,200 doses for ILRI protocol; (2) 364,700 doses with classic LCV protocol, and (3) 319,000 doses for LCV Xerovac protocol.

Quality control of batches of the PPR vaccines produced using LCV classical and ILRI protocols was completed with acceptable results. The thermos-stability tests have started with the calibration of incubators at 37°C, 40°C and 45°C covering all the batches for a 28-day test. Titrations of vaccine samples up to day 14 have been completed. The rest of titrations will be completed by end of November 2017. The external control of the different lots mentioned above will be carried out by AU-PANVAC. In addition to the conventional safety, sterility and thermo-stability analysis, a test for residual moisture was added in the request to AU-PANVAC. A protocol for the transport of samples is

being validated and the administrative and customs documents are being prepared for delivery of the vaccine to AU-PANVAC. The results are expected by end of November 2017. The animal experimentation to determine the level of sero-conversion has been designed and animals are being screened for their immunological suitability. The study on the benefits and costs of deploying the new vaccine has also been designed. An intern has been recruited to conduct the field work.

Activity 1.2 Support the prevention of ruminant livestock major epidemic diseases

Vaccination campaigns

MLTSP makes priority investments to control key killer epidemic diseases PPCB, PPR, ovine pasteurellosis and bovine pasteurellosis to improve ruminant livestock productivity. With its current vaccination strategy, DNSV, being responsible for national vaccination campaigns, plans for only 80%, 10%, 10% and 35-40% vaccination coverage, respectively for the above-mentioned diseases. In Mali, livestock vaccination against the above-named diseases is mandatory, but enforcement of the policy is weak. This causes low farmer's adherence to vaccination. Vaccines are produced by LCV on request from DNSV who place orders based on the estimated animal population that are declared to be vaccinated. Vaccination is carried out by private veterinarians (called mandataires) in communes where they are accredited. Where there is no private veterinarian, public veterinary services implement vaccination campaigns. In Some regions such as Timbuktu, vaccination is done by NGOs free of charge because of the volatile security situation. Key challenges to effective and far reaching vaccination campaigns are mainly related to limited financial, and logistical capacities of private and public veterinarians, lack of vaccination infrastructures, low awareness of farmers on the importance of vaccination, deteriorating trust between farmers and private veterinarians and illegal practices in issuing transhumance permits and vaccination certificates. FTF MLTSP has taken significant steps in addressing these determining factors of the performance of vaccination campaigns.

Immunization coverage targets for 2017 were set as follows: (1) 80% for CBPP equivalent to 284743 cattle; (2) 50% for bovine pasteurellosis, or 281269 cattle and (3) 20% for PPR and ovine pasteurellosis, or 112 507 sheep and goats. During the 2017 campaign, a total number of 289,153 cattle and 162,770 sheep and goats were vaccinated in the 31 FTF MLTSP target communes. When compared with the 2016 figures (In 2016, 231,116 cattle and 48,579 sheep and goats have been vaccinated), there is evidence of a significant improvement of the performance of the livestock immunization campaign in project target communes. These achievements were made possible thanks to FTF MLTSP investments in improving the capacity of DNSV and private veterinarians. Cold chain and motorbikes that amplify the outreach of veterinary agents were provided to DNSV. Also, in collaboration with the DNSV and the CNASA radio programs and posters were produced to raise awareness among farmers on the practice of vaccinations. Radio programs were translated into local languages and broadcast in local community radios. Posters were designed to help farmers recognize diseases. During the reporting period, 110 messages were broadcast through two local radio stations in each of the circles of Sikasso, Koutiala, Mopti, Djenné, Timbuktu, Niafunké and Goundam. Three hundred posters on the PPR and 300 on the CBPP has been distributed to livestock farmers in target communes.

However, the vaccination coverage rate is still below targets for CBPP and efforts should intensify to improve this performance in the future. Significant achievements have been also witnessed in terms of small ruminant vaccination but there is still a long way to go to eradicate PPR. This is mainly due to vaccines shortage experienced by DNSV and private veterinarians in 2016 and the security situation in northern Mali that is a serious impediment to vaccination campaigns. Furthermore, livestock keepers rarely vaccinate their small ruminants hence the low rate of vaccination against PPR. Previous government efforts focused mainly on controlling CBPP. As a result of these constraints reducing vaccination coverages, the program has thought of measures likely to improve the performance of vaccination campaigns. The program and FFSWE project are investing to link up private veterinarians with bank. Access to credit will enable private veterinarians to place vaccine procurement orders on time and in sufficient quantity. The program is also making efforts to increase awareness of livestock keepers on importance of vaccinating small ruminants.

Table 2. Number of animals vaccinated for targeted diseases in 31 target communes

Communes	Total population		# of animals vaccinated against:			
	Cattle	Sheep/goats	PPCB	PPR	Pastobov	Pastovin
Natien	3,400	3,800	2,696	0	3,844	1,244
Pimperna	2,300	1,250	0	0	2,502	559
Diamatènè	2,000	1,450	0	0	373	30
Kafozièla	1,100	1,180	199	0	470	253
Zangaradougou	1,500	1,650	615	0	115	47
Farakala	3,500	2,500	3,708	1,607	4,718	2,081
Kouoro	8,200	17,000	9,164	976	4,663	2,088
Gongasso	6,000	19,000	1,235	668	3,126	1,499
Fama	4,800	15,000	1,861	1,831	3,492	859
Zangasso et sinkolo	15,000	13,000	14,741	2,685	3,984	
Kapala et kolonigué	10,700	32,370	9,557	4,812	3,775	
Nafaga et N'goutjina	6,000	10,000	3,822	767	465	1,125
Sio	19,538	27,465	18,170	13,687	20,484	3,700
Djenné	14,582	36,430	3,114	3,325	4,804	151
Ouro Ali	7,000	9,000	2,875	224	1,292	75
Famaye	11,000	27,500	4,771	1,603	1,988	3,055
Fakala	27,000	29,000	22,759	17,604	29,010	9,339
NemaBadegn	39,400	43,000	26,728	8,000	4,788	5,800
Kewa	30,000	37,000	11,564	1,800	1,000	0
Soye	49,306	35,303	6,360	4,049	1,497	3,109
Socoura	16,000	23,000	8,708	200	3,483	590
Koubaye	17,300	22,000	250	0	0	0
Soumpi	9,000	44,000	7,918	3,466	935	929
Somboudou	18,000	22,000	23,230	45,190	1,910	980
Douekire	7,000	15,500	390	4,641		
Kaneye	3,500	23,000	0			
Alafia	10,582	26,582	0			
Tombouctou	12,221	34,559	0	0	0	0
Total	355,929	562,539	185,435	125,135	103,718	37,513

Table 3. Targeted and actual numbers of animals vaccinated in 31 target communes

Disease	Target # animals to be vaccinated	Actual # vaccinated	Execution rate (%)	Vaccination coverage rate (%)
CBPP	284,743	185,435	65.1	52.1
Cattle Pasteur. bovine	281,269	103,718	36.9	29.1
Sheep Pasteur.	112,507	37,535	44.4	6.7
PPR	112,507	125,135	111.2	22.2

Serological surveys

LCV implemented both baseline and post vaccination serological surveys to evaluate the epidemiological situation of CBPP and PPR respectively in the cattle, sheep and goats in before and after vaccination in randomly selected herds and flocks in Koutiala, Mopti and Djenné. A total of 1,500 unvaccinated cattle (including 900 in Mopti and 600 in Sikasso) and 1,500 unvaccinated sheep and goats (900 in Mopti and 600 in Sikasso) were blood sampled. The same sampling protocol was applied after vaccination to assess seroconversion in cattle for CBPP and small ruminants for PPR. Figures 1 and 2 indicate sero-prevalence rates before and after vaccinations. CBPP and PPR sero-prevalence rates before vaccination were 14.93 and 54.7%, respectively. Post-vaccination sero-prevalence rates of CBPP and PPR were 22.9% and 65.1%, respectively.

Figure 1. CBPP baseline and post-vaccination prevalence rates

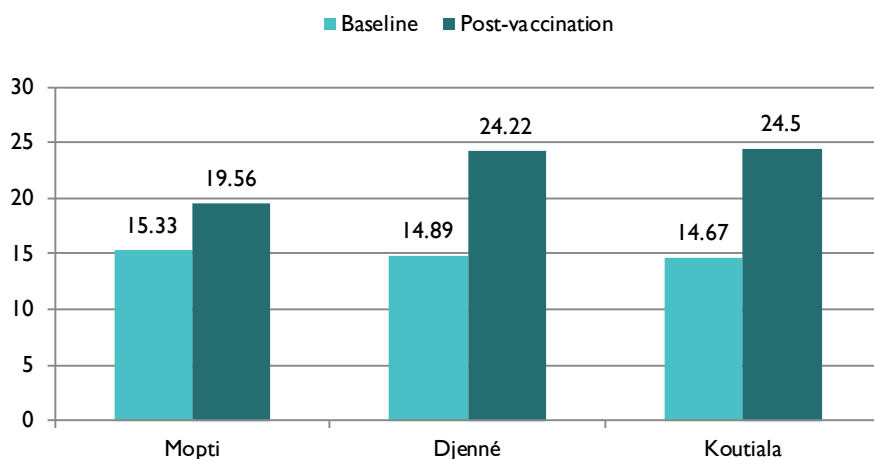
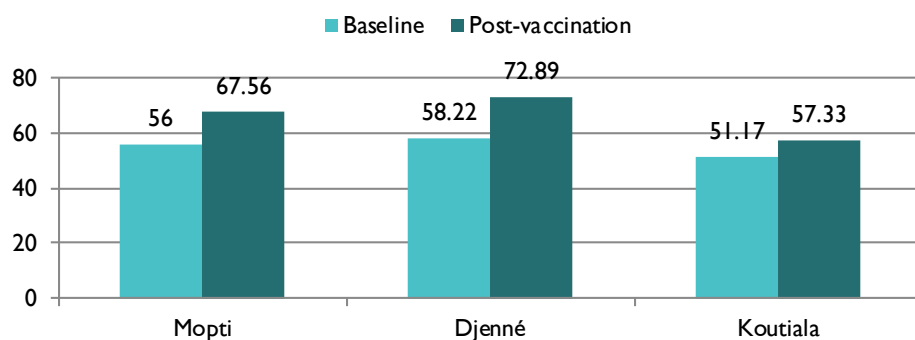


Figure 2. PPR baseline and post vaccination prevalence rates



Activity 1.3 Facilitate the formation and operation of community innovation platforms

Strengthening innovation platforms viability

The shortcomings of IPs such as the poor governing bodies, leadership, and coordination of activities have been identified. It was thus apparent that efforts should be geared towards strengthening IP capacities to make them play key roles in mobilizing value chain actors around the objectives of the project. Actions undertaken focused on IP operational planning and facilitation of IP operations. It was found necessary to shape the 2017 IP activities within their 2017 action plan aligned with the project objectives namely: improving livestock health conditions, increasing the volume of fodder biomass available to help improve livestock feed (forage crops and resource development) and easing market. In this perspective, the project organized a series of trainings for IP leaders and heads of partner organizations to identify incentives to strengthen endogenous dynamics within IPs. Ninety 90 participants from the Koutiala and Mopti were brought together on 3 to 12 May 2017, and from 8 to 18 June 2017. Target training thematic areas included concept of the organizational structure of IPs, and the role of the IP leaders. Emphasis has been placed on the need to strengthen the vertical links in terms of the representativeness of IP member cooperatives and horizontal links among the other stakeholders of the network of actors of the IPs chain of values. The training allowed IPs to reshape their action plans based on the following guidelines:

- Participatory planning of vaccination campaigns highlighting the role of IPs as leaders in the process of organizing and implementing activities to define immunization targets and develop with village communities the timing of field interventions;

- Promotion of fodder crops with emphasis on the professionalization of the actors by linking forage producers, seed producers, fatteners, institutional development actors;
- Rolling out of technologies with IPs as cross-learning spaces to promote training on integrated technological packages (fattening, dairy cows \ oxen, small ruminants, fodder use and management).
- Planning and implementation of livestock marketing activities with the aim of facilitating market access by producers through sharing of market information (training on LMIS), the introduction to innovative marketing practices through the strengthening of professional relations between stakeholders operating within the country and in the sub-region, the organization of border fairs (Operation Tabaski) and taking advantage of new commercial opportunities based on contracting the supply of slaughter animals to LAHAM abattoirs located in Kayes.

Activity 1.4 Improving producers and community animal health workers technical knowledge and skills to facilitate the uptake of selected animal health measures

Training of trainers on livestock disease management and food safety

Under the capacity building agenda of MLTSP, training manuals on animal health and food safety were developed by the project's scientists and experts. Twenty-seven veterinary officers and animal health workers from Sikasso, Mopti and Timbuktu have gained new knowledge and skills in managing endemic livestock diseases by partaking in a training of trainers workshop led by ILRI and other partners. The training workshop was held on 21–30 November 2016 in Koutiala and Mopti, it focused on disease prophylaxis and control including vaccinations targeting livestock diseases such as CBPP, PPR and bovine and ovine pasteurellosis. The participants were mainly technical staff from DNSV, local NGOs, and private veterinarians carrying out mass vaccinations. Other key thematic areas covered included management of internal and external parasites, use of veterinary drugs and laws governing veterinary practices in Mali, hygiene and best practices in milking and milk handling at the farm level, and best practices in housing and management of small ruminants. Finally, participants were trained on integrated packages for increased productivity (details are given in the section on integrated packages).

Objective 2. Increasing availability of quality feed biomass, improve feed utilization and husbandry practices and promote feed and fodder value chains

Activity 2.2 Facilitate introduction and the up scaling of improved dual-purpose crops varieties (cowpea, sorghum, millet) and forage species (Brachiaria and Bourgou) in selected regions.

Identification of participating communities and producers for the 2016–2017 cropping year

Implementing partners (CRS, AMEDD, SNV and AVSF) held consultation meetings with communities in their respective target communes to consolidate participation of old project beneficiaries and to identify new ones. For instance, CRS identified 55 producer organizations with 2,246 members (including 1,048 women) from Fakala, Sio and Socoura. These organizations will plan plant 2,775 ha of dual-purpose crops as detailed in Table 4 during the next cropping season.

Table 4. Projections of number of farmers and surface area under fodder crops in Sio, Fakala and Socoura

Commune	# villages	Producer organizations	Members			Ha with dual-purpose crops (ha)			
			Men	Women	Total	Sorghum	Cowpea	Groundnut	Total
Fakala	7	21	389	451	840	36	37	37	110
Sio	7	20	259	383	642	34	36.5	33	1,035
Socoura	8	14	550	214	764	17	26	21	64
Total	22	55	1,198	1,048	2,246	87	995	91	2,775

In 12 communes in Sikasso and Koutiala, which are covered by the AMEDD, 3,560 producers were identified to engage in fodder and forage production. They plan to plant at least 3,560 plots (1,780 ha). Thirty farmer field schools totalling 15 ha will also be established in the 89 villages. In Timbuktu target communes (Alafia, Timbuktu and Douekire), AVSF has identified 15 producer organizations totalling 675 members and 300 women for the production of Bourgou.

Identification of seed producers and procurement and distribution of fodder and forage seeds

To provide information to agro-pastoralists on sources of seed supply, CRS has identified potential seed producers of dual-purpose crops (sorghum, cowpea and groundnut) in the project sites. Thus, 14 producers and associations of millet and cowpea seed producers were identified in two communes—seven in Sio and seven in Fakala. AMEDD also identified 30 *Brachiaria* seed producers in Sikasso/Koutiala. They were priority recipients of *Brachiaria* seeds imported from Brazil. After establishment of the forage crops, the area planted will be georeferenced and the surface areas planted will be estimated to inform project performance indicators. In AMEDD, 12 target communes, the following quantities of seeds were distributed five tonnes of Fadda Sorghum; 1825 kg of dual purpose cowpea (992 kg of Sangaranka, 633 kg of Korobalé variety, 200 kg Dounanfana); 144.5 kg of *Brachiaria ruziziensis*; 30 kg of *Brachiaria decubens*, 20 kg de *Brachiaria brizantha*. SNV distributed 225 kg of dual purpose cowpea seeds and 276 kg of sweet sorghum. This seed stock was sourced from the seed revolving system that has been established in all project communes. In CRS target communes, the following of seeds were distributed (Table 5).

Table 5. Quantity of seeds distributed in Sio, Socoura and Fakala (Mopti) communes

Crop	Variety	Quantity distributed to beneficiaries (kg)	Supply source
Sorgho	Malisor 92-1	750	IER et Programme WAPP
	Emba Dendi	21	Coopérative de producteur du village de Orgnon (Sio)
	Emba Grenoue	21	
Niébé	Korobalen	120	IER
	Wilibali	120	
	Sankaranka	110	ICRAF/Scaling up Climate-Smart Agroforestry Technologies for improved market access, food and nutritional security in Mali (SmAT-Scaling)
	Dounanfana	50	
Arachide	Fleur 11	550	ICRISAT/ILRI
	ICGB	150	

In Timbuktu, AVSF supported the distribution of 150,000 Bourgou stems cuttings to 10 Bourgou cooperatives.

Training and demonstration on fodder production

Training of trainers on production of dual-purpose crops. In Mopti, a first session of intensive training was carried out in each of the three target communes covered by CRS (Fakala, Socoura and Sio) with joint facilitation by DRA and DRPIA. One hundred and thirty-two farmer-trainers, including 44 women benefited from the two-day training per site that focused on (1) the analysis of livestock constraints and alternative solutions, and (2) the roles and responsibilities of the trainers and a definition of criteria for the selection of farmer-trainers by the participants. The second training session, which was attended by 148 participants (including 36 women), was organized in each of

the three CRS target communes on fodder production techniques. CRS in collaboration with the DRA and DRPIA officers developed facilitation guidelines for modules relating to the production of dual-purpose crops. The second training session focused on the following topics: (1) composting techniques and importance of the use of well-decomposed compost; (2) importance of use of improved seeds; (3) seed treatment; (4) establishment of fodder crop plots; (5) ploughing and sowing conditions; (6) crop association techniques (millet/sorghum and cowpea); (7) techniques of single crop cowpea production; and (8) importance of crop rotation in soil fertilization. In Sikasso and Koutiala, 25 trainers, including 6 AMEDD agents, 6 resource persons, 4 trainees and 9 farmer association leaders, have been trained to, in turn, train 3,560 producers listed in the 12 target communes covered by AMEDD.

Training of trainers on Brachiaria production. A training of trainers' workshop took place at the AMEDD premises in Koutiala on 5–7 June 2017. The training was led by Sawa Camara, a scientist at the Institut de Recherches Agronomiques de Guinee. The theme of the workshop was 'Brachiaria production techniques: rationalization of practices through the production of seedlings in nurseries'. The training introduced trainers on techniques for the production and management of *Brachiaria ruziziensis* with emphasis on the production of seedlings in nurseries. This session was attended by 23 people, including one woman. Among these participants, 14 were agro-pastoralists (9 from AMEDD and 5 from SNV), 6 AMEDD agents, 2 representatives from the Sikasso and Koutiala SLPIA. During a first theoretical phase, the focus was on reviewing the general knowledge on the subject (analysis of the problem of feeding livestock, importance of forage crops, *Brachiaria* production condition (single crop or in combination with maize, sorghum, millet,). Emphasis was then placed on methods of producing seedlings in nurseries (wet nurseries, dry nurseries, transplanting conditions, etc.) in forage crops, the strategic importance of seedling production nurseries as part of the rationalization of practices. Indeed, the production of seedlings in nurseries allows savings on amount of seed needed of 66.7% to 87.5% (1 kg of seed/ha instead of 3–8 kg for seeding in line or 20 kg on broadcast seeding system). A second practical phase carried out in a farmer's field in the village of Bogoro, allowed participants to get familiar with different sequences of the technical itinerary through the field work carried out on two well-ploughed and fertilized plots.

Farmer field schools: Eighty-nine voluntary producers (one per village) were selected with respect to criteria that including individual motivation, accessibility of field schools and level of equipment to accommodate a FFS. In each village, 40 selected farmers were exposed to technical aspects of forage and fodder production. After the training, AMEDD officers developed and implemented training modules for the replication of the training of fatteners located in 89 villages with the support of technical services (SLPIA and private veterinarians).

Monitoring and evaluation (2015–2016)

In November, a monitoring and evaluation team composed of Souleymane Ouedraogo (INERA, Burkina Faso) and Sawa Camara (IRAG, Guinea Conakry) visited a sample of villages where *Brachiaria* was introduced to advise farmers on next steps in terms of seed production, biomass harvesting and storage techniques. They also made estimates of seed and biomass yields. Biomass production was estimated based the dry matter (DM) weight of *Brachiaria* forage samples harvested in 25 plots. Average production per hectare of 6 tonnes/ha was similar in Koutiala and Sikasso. The highest biomass yield was observed in Sincina commune of Koutiala (8.5 tonnes DM/ha) and in Pimperna in the Sikasso region (9.8 tonne of DM/ha). A low amount of biomass was produced in the municipalities of Fama and Zangasso (3 tonnes of DM/ha) reflecting large between plot variations. These variations can be explained by micro-variations in soil fertility, previous crops, soil type, planting dates, rainfall and plot management. If 80% of the biomass on these plots is harvested, the quantity of forage obtained could maintain 1 to 7 tropical livestock units /ha for 182 days from December to May. For the purpose of cattle fattening, the amount of feed harvested on one ha could feed 3 to 14 cattle for 90 days at the rate of 8 kg DM/animal/day. If given to small ruminant, the same quantity could feed 15 to 72 heads for 90 days on the basis of 1.5 kg DM per small ruminant/day.

In the Timbuktu communes of Somboudou and Soumpi (Niafunke cercle), AVSF carried out a rapid diagnostic survey among 18 local Bourgou-producing organizations. To encourage Bourgou production in target communes, 10 cooperatives benefited from training on Bourgou production techniques, and accessed Bourgou seeds and motor pumps to ensure irrigation of plots before flooding periods.

Table 6. Bourgo production by farmers in Timbuktu target communes (2016-2017)

Association	Site	Ha cultivated	Biomass production	
			# bundles	Weight (Tonne)
AV Kondjibermè	Kabara	3	1,000	4
Coopérative Agropastorale Nafagoumo		2	2,000	8
Coopérative des Eleveurs de Kabara		2	60	0.3
Association Site de Tondibangou	Korioromé	5	500	2
Bangaye Tawo	Houndibomo	5	3,523	14.1
Association Abba Kayittia		9	250	1
Association Dibardjindé		12	3,250	13
AV "MAH"		1,5	1,194	4.8
Association des pêcheurs de Bandia		5	5,481	21.9
AV Tassinsak	Tassinsak	2	500	2
Association Tamzizayat d'Assana	Assana	10	17,003	68.0
Association Alahfiat	Douékiré	1,5	80	0.32
fraction Taghamort2 de Gaoudel		5	2,400	9.6
Association Tartit de Tin gaïdan		4	2,600	10.4
Association Keynibomoga		2	150	0.6
Total	-	69	39,991	160.0

Activity 2.3 Promote the up scaling of integrated packages for improved cattle, sheep and goat productivity

Training on integrated technology packages

A series of training on integrated technological packages were organized with 1,627 participating farmers (Table 7). Training of trainers on integrated packages was done by the project team. Linking the theoretical and practical phases of the training sessions enabled future trainers to gain a better understanding of the concept and the approach that will be used to replicate training sessions with project beneficiaries. The sessions held in Koutiala and Sévaré, respectively on May and June 2017, covered the following topics: (i) management of a fattening operations; (ii) raising small ruminants; (iii) maintenance and management of work oxen; and iv) feeding lactating cows. Also, the census of participants with respect to their priority area of interest allowed the setting up of four training groups within each IP based on the modules mentioned above. The trainings were implemented as part of an integrated capacity building plan based on a holistic approach starting from the training of animal health professionals on how to implement the participatory approach of the livestock vaccination campaign planning. Based on the cascade training approach, training activities were implemented in two main stages:

- A first step was devoted to partner organizations agents responsible for technical supervision of project beneficiaries. They will deliver the modules to the target groups of volunteer agro-pastoralists for the application of the various integrated technological packages;
- The second phase was implemented by agents of partner technical services agents who were previously trained.

Table 7. Participants to the training on integrated technology packages

Integrated technology packages	Koutiala	Sikasso		Mopti	Djenne		Total
	AMEDD	AMEDD	SNV	CRS	CRS	SNV	
Operate a fattening workshop	400	200	29	70	60	28	787
Maintenance of lactating cows	125	75	29	60	50	28	367
Maintenance of oxen	75	50	29				154
Breeding of small ruminants	125	75	29	50	40		319
Total	725	400	116	180	150	56	1,627

Training on fattening and feed conservation.

Three training of trainers workshops were held from 8 to 13 December in Koutiala by IER. Twenty people (two women) from public and private organizations of Sikasso, Mopti and Timbuktu regions participated in the workshops. The training workshops focused on the following thematic areas: forage cultivation and conservation techniques, cattle and sheep fattening schemes with modules spanning fattening systems, feeding systems, choice of animals, planning and timing of operations, management of fattening operations, financial consideration and marketing. The next step in this process of capacity strengthening was the training of producers. All training sessions targeting producers on management of fattening operations and ways to improve their profitability were conducted by DNPIA/OMA as follows:

- 9–20 December 2016, 90 producers from Natie, Pimperena, Fama, Kafouziela, Djoumatete, Koro dam, Gongasso and Zangaradoudou communes benefited from a training course at the two Sikasso training centres (DRPIA and Regional Chamber of Agriculture (CRA), conference rooms)
- 22–23 December 2016, 64 producers from Koloningue, don't Goutjina, Sinkolo, Zangasso, Kapala and Nafanga communes took part at the training sessions on fattening at the Koutiala training centre (Catholic mission conference room).
- 26–27 December 2016, 21 producers from Socoura and Sio were trained at Mopti DRPIA training centre.
- 29-30 December 2016, 30 farmers from Nemabadeignakafo, Ouro Aly and Djenné benefited from the training courses on fattening.



Videos on integrated packages. During the reporting period AMEDD has produced four videos on integrated livestock management packages. The videos have been viewed by 2,700 farmers in 45 Koutiala villages.

Activity 2.4 Developing producer capacities on feed processing and promote the consolidation or establishment of private small-scale feed manufacturers

Production of multi-nutrient blocks by groups of women.

To address dry season feed shortage and support fattening operations, MLTSP has supported the establishment of a women-led feed processing unit that produce multi-nutrient blocks at Farakala, Sikasso. The blocks are made up of molasses, cereal brans, cotton seed cake, urea, cement and minerals. The main activities carried out with the women group in Farakala included first the participatory diagnostic of the unit to identify weaknesses, strengths and ways to improve the performance of the unit. A management committee was put in place and 20 women benefited from a training on the production techniques of multi-nutrient blocks, METOCOUR. Five (5) members of the management committee were also trained on accounting and marketing.

Under the technical guidance of LCB GEFAD, two training workshops were done. The purpose of the various training courses was to create livestock feed units to improve the income of women in the project area. The first took place from 12–14 February 2017 in Sofara for 20 women members of groups including: 10 for the communes of Socoura

and Fakala in the CRS zone, and 10 other women for the two communes of Femaye and Djenné framed/supervised by SNV. As for the second, it was held from 6 to 10 March 2017 in Zangasso against 20 other women from the commune of the same name. The next key steps are the development of business plans and linking the association with financial institutions to enable them to upgrade their equipment and processes and to have access to operational funds.

Monitoring of the production and marketing of multi-nutrient blocks by the multifunctional cooperative of Zangasso. From March to May 2017, 1,643 women benefited directly from the training on, and other benefits the production and marketing of multi-nutrient blocks. The Zangasso cooperative generated an income of XOF654,400 (USD1,175 as per 12 December 2017) in 30 out of 50 productions cycles which were planned.



Establishment of feed grinding units. To achieve the objective of significantly increasing the availability of quality livestock feed, FTF-MLTSP called on the National Center of Specialization for Livestock (CNS-EL) of Niger to train project beneficiaries on techniques of producing multi-nutrient blocks using feed grinders. The training workshop was designed and implemented by Dangoma Abdou, a scientist from the Institut National de la Recherche Agronomique du Niger (INRAN)-Niamey Niger along with Boubacar Adamou from DARMA-Dosso, Niger, an expert in charge of feed grinders operation and maintenance. To reach many beneficiaries, two workshops were organized. The first was in Mopti- Sévaré from 18–21 May and the second in Koutiala from 22–24 May 2017 in the village of N’Goutjina. The aim was to teach beneficiaries (1) how to manufacture multi-nutrient blocks (formulation of blocks based on local resources, use of blocks by animals, calculation of the related costs) and (2) how to operate, handle and maintain the feed grinders.

A total of 54 project beneficiaries were trained, including 32 men (59.3%) and 22 women (40.7%). In all sites, training on the formulation and manufacturing technique of Densified Multi Nutrient Blocks (DMNB) for livestock feed was conducted in two phases. In phase 1, the theoretical background on different stages of manufacturing feed blocks, details on equipment, materials and ingredients required, and hygiene and safety at work was presented. The second session was a practical demonstration of how the grinder works, feed materials to be used, formulation and manufacture of blocks, block molding and cost calculations by beneficiaries. A participatory approach associated with the translation of the modules in Bambara was adopted as a method during all theoretical and practical training sessions. A total of 230 blocks were prepared by participants, 138 of them in the Mopti-Sévaré site and 92 in the N’Goutjina site. The workshop concluded with key recommendations on ways the equipment could be made available for wider adoption in the regions and strategies to manufacture the equipment locally and how to operate and maintain it profitably.

Table 8. Distribution of trainees trained by training site

Training site	Number of participants		Total per site
	Men	Women	
Sévaré-Mopti	9	13	22
Koutiala (N’Goutjina)	23	9	32
Total	32	22	54

Objective 3. To leverage USAID-led livestock market development and policy initiatives in support to the up scaling of ruminant livestock productivity enhancing technologies

Activity 3.1 Revitalize the livestock market information system to capture market incentives

Assessment and improved operations of the Mali livestock market information system

ILRI scientists made a first assessment of the existing LMIS to gain a better understanding the status of the existing system to lay out options for its upgrading to not only reach out more end-users but also to provide them with the information they need. It appeared that there was a limited awareness of the Mali LMIS among livestock producers. Furthermore, the time delay between the time data collection to availability for end-users is long, hence the need to move to a more real-time information system. Findings of the assessment also revealed that the Mali LMIS is vulnerable as it is still highly dependent on external funding to sustain its operations. There are no real business models that ensure the financial sustainability of the system.

Discussions with team manager of the LMIS do not point to any clear view on income generation policy to cover system's operating costs (user-fees' policy, advertising for additional revenue, partnership with mobile network operators and so on). Information on market prices is usually considered and designed as a public good with a strong involvement of public services making it difficult for private companies to find their way in the system. A public-private partnership on funding and management of the information system would help to ensure a sustainable way forward. Recommendations to achieve the objective of sustaining an operational and useful LMIS have been articulated in the assessment report. The need to produce and disseminate accurate, timely, affordable, and useful price information paved the way for the development of an action plan to improve the LMIS. During the 2016 last quarter, significant steps have been taken towards building a solid partnership among many players including ILRI, AECOM, Texas A&M, OMA and VIA Consulting group with the view of improving the overall performance of the Mali LMIS. The resulting consortium put in place developed plans to address the above-mentioned constraints faced by the Mali LMIS. The assessment report also emphasized the usefulness to produce economic surveys such as the level of integration of livestock markets from data provided by the LMIS.

Capacity development and collection and transmission of livestock market data. With the resumption of data collection and availability of data on the server, the training of livestock production and marketing actors to enable them to use of the information system became than necessary. It worth recalling that this system has been designed and implemented to allow livestock value chain actors to access reliable and timely market information that guide their marketing decisions. From 18 to 31 December 2016, 203 livestock keepers and traders from Koutiala, Sikasso, Mopti and Djenne were introduced to the use of Mali LMIS. They learned how to make data queries from their cellphones through SMS messages. It should be noted that this new procedure to access market information got farmers much excited despite the low literacy rate of beneficiaries of training.

In the city of Ségou, 17 collectors and 4 regional controllers followed for five days theoretical and practical training sessions on the methodology of collecting information on Markets. They also received training on the coding techniques of the information collected and their transmission via smartphone on the server. During this training, work kits were given to them (smartphones, chips, boots, raincoats, nose covers, pens, pencils, collection cards, etc.) necessary for the smooth running of activities in the markets. This activity made it possible to train 17 collectors and 4 market controllers, to monitor 17 livestock markets in the regions of Sikasso, Ségou, Mopti and Bamako, send over 4,000 SMS messages to the server regarding livestock markets information, trained about one hundred, future trainers of members of the ILRI project's IPs, twenty-two local radio presenters and five participants of the partners involved in the implementation of the project, approximately 2,160 radio announcements were broadcast on private radio stations to breeders and livestock market professionals through local languages, approximately 1800 farmers and marketers have access to real-time market information through mobile phones.

From 14–18 September 2017, were respectively held in Sikasso, Koutiala and Sévaré (Mopti), the training workshops about how to use LMIS towards the members of the ILRI IPs. The workshop, led by two experts including one from the OMA and one from DNPIA, gathered about one hundred, future trainers of members of the ILRI project's innovative platforms, twenty-two local radio presenters and five participants of the partners involved in the implementation of the project. This team of future trainers is composed for each platform, a representative of the cattle traders, a representative of the breeders, a representative of the butchers and a representative of the fatteners.

From 01 January to 20 September 2017, livestock SIM data were regularly collected in 17 markets in Sikasso region (Sikasso cattle market, Sikasso small ruminant market, Niéna, Koutiala, Kouoro Dam, N'Togonasso, M'Pessoba, and Zangasso) and in Mopti region (Fatoma, Sofara, Somadougou, Konna, Mougna, Djenné). In addition, we collect data from livestock the markets at Bamako Abattoir, Niamana and Ségou because of their importance in the national livestock market system.

Dissemination of livestock market information through different radios stations is going on. Market enumerators and radios directors and broadcasters are working together to disseminate livestock market information throughout rural radios every week. During this period, one of the great things we achieved was the training of 22 radio presenters so that they can better understand the system and well disseminate livestock market information towards the population. The presenters of the radios showed their enthusiasm and their will to make the system better known by the professionals. They all promised to make every effort to regularly provide actors (pastoralists and agro-pastoralists, traders, policymakers and other users) with reliable information to enable them to make better decisions on livestock marketing.

This period was used to work closely with DNPIA staff and field collectors to ensure that the information collected was reliable and sent on time. The team also monitors the regularity of market coverage to avoid gaps in the database. I have to mention that we have four regional controllers who are responsible for monitoring the activities and doing quality control at the regional level. During the period, the monitoring activities on the relevant markets, found a good progress about the data collection procedures and sending data to the server. The regional control focused on the punctuality of the market collectors, the level of collaboration between collectors and traders and the quality control of data sheets.

Reduce time delay and develop OMA/LMIS business plans

In July of 2017, VIA Consulting Group was brought on by ILRI to perform the following:

- 1• Build and execute a business model for OMA. VIA Consulting Group will provide OMA with a recommended business framework for a user-centric livestock management system to become sustainable.
- 2• Develop sustainable funding mechanisms for OMA. For OMA to grow with the increasing needs of the various value chain actors, OMA must become sustainable.
- 3• Reduce time delays. OMA LMIS has time delays. After the enumerators capture data, it takes two weeks on average for the data to arrive within a centralized repository. VIA will study the entire process and provide recommendations to reduce the time delay.
- 4• IT environment options and recommendations. VIA will assist OMA in determining the best technical infrastructure to complement their desired business model.

To move from the static environment to the reactive environment, a mechanism must be in place to standardize data collection, increase the speed and reliability of data transmission, and improve overall confidence in the data so that it becomes actionable. In the reactive data environment, data is entered by the enumerators through the Sugu mobile application currently being supported from AECOM/L4G installed on phones perhaps purchased by OMA or jointly purchased through partnership with the Association of Livestock Management. In addition, all physical hardware is moved to a cloud-based environment.'

Within the current static data and infrastructure, OMA can only improve in its redundancy in hardware and address minor process efficiencies. These minor adjustments may or may not improve or reduce the time delays that OMA is experiencing. Some level of confidence in the static data can be improved through these infrastructure improvements or by having a local dedicated person to support the servers that are currently supported by Texas A&M. However, it is VIA's strong belief that the static phase alone cannot produce enough value for OMA to become self-sustainable.

Static phase	Recommended next steps
Business model	Develop of a holistic business plan
Revenue sharing	Research Sustainable Technology Adaptation for Mali's Pastoralists (STAMP) project Establish a memorandum of understanding
Governance model	Share in hardware and infrastructure expense and utilization Hold a collaborative meeting (11–12 December)
Hardware and infrastructure	Strengthen the association of livestock markets Establish some form of revenue sharing with the Livestock Market Association Establish redundancy in all aspects of the current hardware (server, modem, database etc.). Strengthen the partnership with OMA's current internet service provider and determine if additional services can be offloaded to this company. Purchase mobile phone for all data collectors Install the Sugu mobile app version 1 on all mobile devices
Data collection	Sugu data collection made available to OMA
LIS	Diversification of information by providing additional modules including animal feed prices, weather forecasts and alerts, crop-related information, transport costs and so on
LMIS	Incorporate IVR enhancements Incorporate Texas A&M enhancements
Data ownership	Establish memoranda of understanding with all institutions working in the ecosystem of the LMIS (including World Bank project, STAMP, DNPIA, AECOM)
Data sharing	Conduct an inventory of all OMA clients.
Data dissemination	Create data sharing ecosystem environment Make Texas A&M reporting capability available via mobile phone
Personnel	Make all of Texas A&M capability available via mobile phone Strengthen the association of livestock management. establish some form of revenue sharing with the association Hire internal data analyst and data scientist Hire two to three full-time equivalent field support staff Share in data collection personnel

Characteristics of a reactive environment

- Data becomes standardized, less prone to human error and more secure
- Hardware infrastructure becomes redundant, scalable, more secure and less expensive to maintain
- OMA's technical capacity expands as infrastructure support shifts from Texas A&M to a well trained cloud-based environment technical support team
- Timing delays and inaccuracies are reduced through the combination of items 1–3 above
- Reporting remains neither analytical or automated, but a greater level of confidence in the data is present
- Framework components necessary for a sustainable business model begin to be established
- Sugu community is entering into discussions
- Sugu mobile app is being transitioned to OMA.

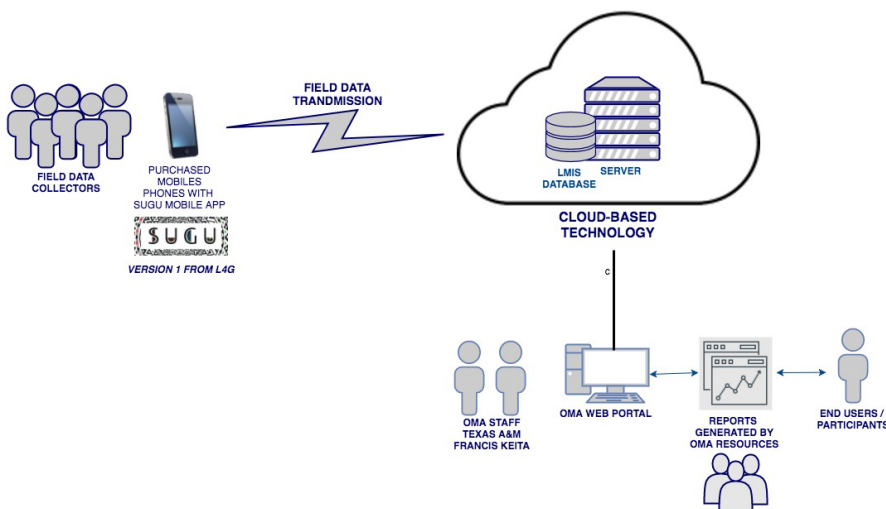


Figure 6: OMA reactive phase environment

The first version of the Sugu mobile application (**See Figure 7**) is compatible with iOS and Android operating systems. All field-level data entered through the Sugu App becomes standardized which results in the receivers having an increased confidence in the data and data analysis becoming more reliable. The Sugu mobile application seamlessly transmits data through a specific cloud-based telephony infrastructure that provides connectivity between regular telephone network and the Internet through APIs (application programming interfaces). This eliminates a direct dependency of OMA’s in-house infrastructure and on limits some dependency on the major telcos such as Orange, which can at time be inflexible when it comes to their pricing structures or policy.

The field data would then be sent to the cloud-based OMA server, LMIS Database, and web application, thus there is no need for the added in-house expense of purchasing and maintaining a local area network except for services outside of the LMIS. The delay from the time of data entry to the time of data arriving in OMA’s servers and database is reduced even more, and as result recipients have greater confidence in the platform that is delivering the data. The users of the data become more likely to act due to having a more confidence in the solution that is enabling the structured set of information and reports. The enumerators remain integral to the data collection process, but they are now seen as only one component of a two-prong business model. The interaction becomes dual: first in its focus on interaction within the value chain, and secondly the interaction occurring between OMA and the consumers of data. Most importantly, the addition of the mobile application and cloud-based infrastructure becomes the building block for creating a sustainable business model.

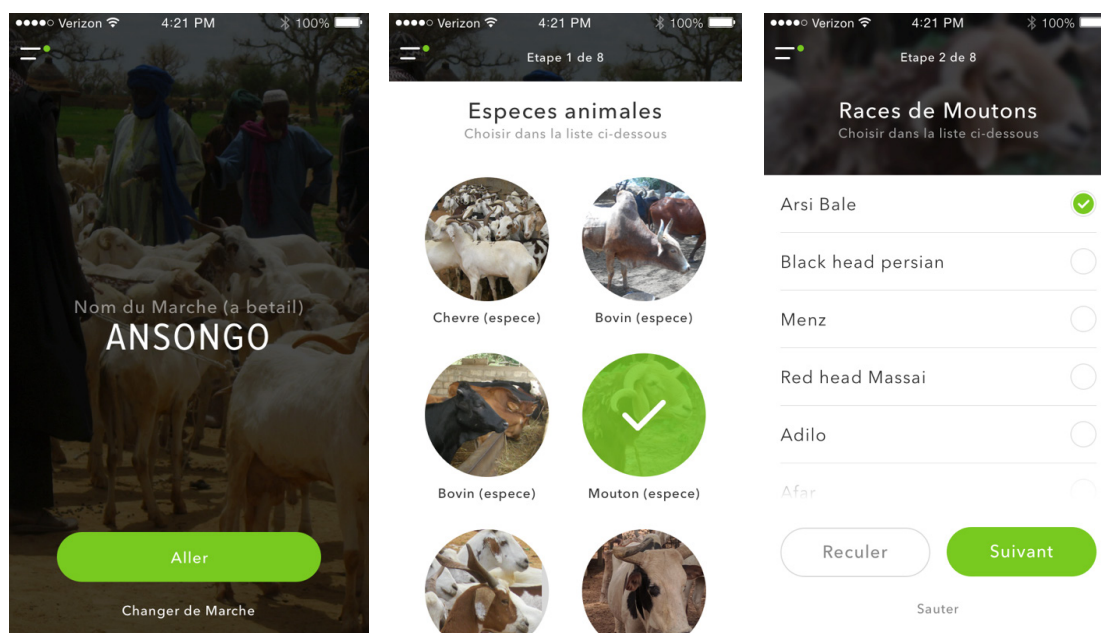


Figure 7: Sugu mobile app data collection screens (reactive environment)

Economic survey

Knowledge on the extent of market integration reflects the structure and level of interrelationships between these markets, which is a fundamental tool for improving competitiveness and market performance. Under the LMIS, data were collected weekly on animal prices by animal body condition, sex, maturity and breed. For each category, an average price is tabulated from the prices collected on a sample of five units. Given their availability, the data used in this study covers 14 markets in 6 regions of Mali: Bamako, Bambara Maoudé, Douentza, Kati, Kayes, Niamana, San, Segou, Sofara, Wabaria, Fatoma, Konna, Niena, and Niono. For more homogeneity, the study focused on a given category: those of 'medium male Fula Zebu'.

To assess the level of livestock market integration for areas monitored by the LMIS, a threshold autoregressive model was used with the market of Kati chosen as the reference market. The model was estimated both for constant and variable transaction thresholds over time. The speed of adjustment between the market of Kati and the others is on average -0.5 otherwise it takes a week for the price differential between two markets at a given date to be half of its original value. The average transaction threshold is around 11.53% of the average price, which is relatively high to stimulate the integration of these markets. This high level of transaction threshold reflects the high level of exchange constraints due to poor road infrastructure, high transport costs and heavy bureaucratic formalities.

Among all these target markets, only the markets of San, Wabaria and Niono present a dynamic adjustment over time with the market of Kati while the others show a level of integration that does not change over time. Furthermore, the markets of Bamako and Fatoma have a higher level of integration with the Kati market as the delay required for a shock to return to half of its initial level is less than three days and there is a decrease transaction cost thresholds over time. On the other hand, the markets of Bambara, Maoudé, Segou and Wabaria have lower levels of integration with the market of Kati as the delay needed for a shock to return to half its initial level is more than 17 days.

Design of informational products from LMIS

Two types of information products will be developed:

- A monthly informational product to compare current prices with those of the previous month (already done)
- An annual informational product considering the changing context of Sahelian farms by comparing both the prices of the current year (for example the year 2016–2017) with prices of the previous year (2015–2016), average prices for the last two years (2014 / 15-2015 / 16) and average prices for the last five years (2011/12–2015/16) (to elaborate by the end of this year).

Activity 3.2 Facilitating the development of competitive cattle and sheep production and marketing models

Taking advantage of Muslim feast to promote livestock marketing

Important progress has been made towards the goal of increasing the volume and value of supply of sheep and cattle sales in the zone of influence of the two projects, MLTSP and L4G. As part of the facilitation of commercial transactions on the small ruminant value chain on the occasion of the feast of Eid el Kebir, FEBEVIM, ILRI and AECOM/L4G visited Ivory Coast to link up Tobaski ram buyers with producers in project sites. The strategy suggested by the analysis of the situation of supply in sheep and the characteristics of the demand in countries taking into account transport opportunities and constraints was to position buyers targeting Senegalese markets to Mopti and Timbuktu. These two areas of production can also supply Ivory Coast markets. With regard to Guinea, in view of the specific nature of the demand for sheep in this country, operators targeting Guinea will be encouraged to get supplied from Sikasso region. For the 2017 Tabaski, ILRI and FEBEVIM organized three market fairs at border markets to target Guinea demand for sheep. Kouremale, Kangaba and Sikorole were selected livestock markets. Radio programs were aired both in MLTSP target communes and in target cities in Guinea to invite livestock traders

and officials (veterinary, customers) from Guinea to meet their counterparts in these selected markets. This was the first time that Kangaba organized a livestock market thanks to FTF MLTSP and FEBEVIM. Two weeks before the Tobaski event, 973 sheep and goats were presented in this market out of which 74% were sold and this was seen as a successful experience by local commune authorities who planned to develop this market in the future.

Identification of fattening operations

A census of fatteners and the number of animals they plan to fatten in the 12 target communes covered by AMEDD was carried out. As of 30 June 2017, 1,182 fatteners have been identified and will benefit from training on integrated packages including management of fattening operations. Out of 1,182 fatteners, 445 volunteers were targeted for the preparation of their business plans considering their current capacity and prospects for future expansion of fattening activities. Extension and advisory support provided to fatteners in feed, health and housing management, estimation of production costs and expected profits enabled 20 fatteners, members of Farakala and Kouoro IPs, to successfully complete fattening operations. Fattened animals, originally intended for Laham slaughterhouses, were finally sold in local markets especially due to high transport costs to Laham in Kayes.

Connecting suppliers of quality well finished animals to slaughterhouses

MLTSP is making efforts through its technical and organizational interventions to support program beneficiaries to increase the supply of quality cattle sheep and goats for domestic and export markets. Along with L4G, consultations with USAID Cross-boundary program took place to find out ways to facilitate contractual arrangements between LAHAM Abattoirs in Kayes and fatteners associations in the program sites in Sikasso and Mopti regions. Further meetings were held with fatteners associations in Sikasso and Koutiala to assess constraints and opportunities of fattening operations and to discuss with fatteners terms of contractual arrangements proposed by LAHAM. Following multiple meetings initiated by the MLSTP and L4G projects between fatteners in their respective zones of influence and the Laham slaughterhouses, agreements between the two parties on principles of cattle transport were reached. However, poor producer organization in handling cattle transport costs, traditional mindsets (animal sales based on live weight little known to producers) and the attitude of traditional livestock traders who undermined the new marketing system, were serious obstacles to transfer truckloads of cattle to Laham. We are working to minimize these challenges to increase the sales of cattle to Laham slaughterhouses.

Promote access to financial institutions by livestock value chain actors: Linking producers, producer organizations to local financial institutions.

One objective of the MLTSP is to support the competitiveness of family based cattle and sheep fattening enterprises to improve their further penetration in domestic and export livestock markets. Sustaining these fattening operations requires: (1) access to financial services to enable fatteners to have access to high payoff inputs such as feeds and finance their trade operations; (2) facilitate market access and reduce trade volatilities through contracting that link buyers to markets through agreement; (3) access to feeds, veterinary inputs and services and (4) improve fatteners' decision making processes with regard to calendar of production and marketing, price discovery, risk management, training to develop managerial and technical skills.

The Finance for Food Security and Women Entrepreneurship (FFSWE) program in collaboration with FTF-MLTSP organized a workshop designed to enhance links between producers and the decentralized financial systems and the banks, in June 2017 at Sikasso. It was attended by more than 200 producers, representatives of the producer organizations, partner NGOs, decentralized financial systems and banks from several communities in Mali (Bamako, Sikasso, Koutiala, Bougouni, Yanfolila). The workshop was moderated by David Coulibaly of DC Consulting. The program included presentations by projects (the International Executive Service Corps (IESC), SNV Netherlands Development Organisation, MLTSP, ILRI, USD Cereal Value Chain (CVC) followed by those of banks (Bank of Africa, Banque malienne de solidarité [BMS-SA], Banque Internationale pour le Mali [BIM-SA]), which included information on their financial products. Participants also had opportunity to further interact and exchange information with the staff of the financial institutions in display booths. Direct links between participants and the financial institutions

were established. There were four participants from the FTF-MLTSP target communes covered by SNV. As a result, Baber Sanogo from Farakala had his business plan finalized and his loan application is being processed. In addition, MICROCRED, a local microfinance institution was linked to a cattle fattener (Robert Sanogo), and they visited his farm to assess his investment needs on 8 June 2017. The recipient has received a loan of XOF2,000,000.

The loan application of private veterinarians mandataire of Sikasso and that of a Farakala fattener have already been approved by the Bank of Africa. Those of the other veterinarians and fatteners in the Koutiala, Farakala and Koro barrage platforms are being established by the program officer based in Sikasso.

FTF MLTSP decided also to enter in a partnership with 4E CONFORM to facilitate access to financial institutions and improve the technical and managerial skills for all actors concerned: fatteners, private veterinarians and feeds production units. 4E-CONFORM is a Malian consulting firm specializing in facilitation, training and advisory services in the areas of entrepreneurship, environment and evaluation. Its creed is training, advice and monitoring of urban and rural micro and small enterprises using internationally recognized approaches such as: (1) Manage Your Business Better (GERME), an ILO program, (2) Create your Enterprise (CREE), an ILO program; (3) Economic Competences through Entrepreneurship Training (CEFE), a program developed by GTZ and (4) Simplified Management of Small Businesses (GESPE). The partnership with 4E CONFORM will address the following issues : (1) the lack of training and knowledge in the creation and management of companies and the lack of support and counsel for project beneficiaries, (2) difficulties in accessing bank credit, linked to requests for excessive personal contributions and guarantees, while access to financial services is essential to the development of the company, (3) the fear of banks, whose agents are not always trained in risk assessment of the livestock sector. To accomplish this, 4E CONFORM will work closely with MLTSP and the various NGO partners in the regions of Sikasso and Mopti and Tombouctou to:

- Make a summary diagnosis of the beneficiaries to accompany;
- Ensure the training of the beneficiaries according to the methodology of *Compétences Economiques et Formation Entrepreneuriale* and provide a complete kit of tools to all the participants;
- Install management tools for each beneficiary;
- Propose business plans with a disbursement plan;
- Organize the preparation session for the establishment of credit and ensure the use of funds disbursed;
- Follow and accompany beneficiaries for at least 6 months.

Gender related achievements and how gender is mainstreamed into the activities

As most vulnerable groups, women and youth are more exposed to poverty, disease and discrimination. In MLTSP target communes, there are key differences in the social fabric based ethnic and religious backgrounds with implications on the extent women are able to participate in and benefit from project activities. For equity reasons, the project has therefore strived to mainstream gender consideration in all projects activities to ensure women and youth benefit from such interventions. To further remedy this situation the project has first made efforts to raise awareness on the need to better involve women in all project activities. In that regard, IPs were particularly useful mechanisms that encourage women participation and to promote their development along with gender equality. Women were specially targeted to benefit from various training courses carried by the project to further their knowledge and technical and institutional capacities. Out of 2,098 individuals who have benefited from project training courses, 533 were women. Women were involved in all project interventions related forage and fodder production, feed manufacturing, and fattening of small ruminants. For instance, in Farakala, a group of 20 women is managing a feed processing unit producing and marketing multi-nutrient blocks. In Mopti, out 100 producers who participated in training of trainer's workshops, 33 were women. In Femaye, 14 out of 22 individuals engaged in forage production were women. In Timbuktu, the project targeted women Bourgou production groups. Of the nine producer associations supported by the project in Timbuktu and Douekire, four were exclusively composed of women

Synergic activities achieved with other partners (US and non-US including the government of Mali, other donors and local NGOs)

FTF MLTSP made significant strides to engage with other USAID FTF programs and the private sector in Mali to develop solid partnership required to achieve program goals.

Livestock for Growth. MLTSP and L4G held meetings to identify areas for collaboration and ways to create synergic activities through joint work plans and sharing of experiences and information. The main thematic areas that emerged to form the basis for the collaborative work between the two programs include: 1. Market access – revitalization and upgrading of the Mali Livestock Market Information System, development of contractual arrangements between fatteners and LAHAM Abattoirs; 2. Capacity strengthening on the livestock feeds and feeding and on animal health. The FTF-MLTSP and L4G teams met two times to prepare for the 2017 Tobaski operation to promote export of rams to neighbouring countries and in local markets. Drawing lessons from last years' experience, this year, Côte d'Ivoire and Guinea markets will be particularly targeted. The two programs are also combining efforts to improve on the Livestock Market Information System. Other key area of collaboration is about supporting IER to ensure that the NIRS feed evaluation equipment could run again. L4G has also solicited ILRI to establish two agricultural IPs in L4G target communes. This will be an opportunity for ILRI to upscale its best practices in the collective actions of value chain actors in the L4G target communes.

Finance for Food Security and Women Entrepreneurship program (FFSWE). FTF-MLTSP and FFSWE held regular meetings to find ways to facilitate access to bank credit for livestock value chain players (fatteners, breeders, groups of women, private veterinarians, and feed manufacturers). Candidates for bank credit have been identified among fatteners and private veterinarians who indicated the loan amounts they need. Financial intermediaries based at Sikasso are currently helping them prepare and submit their loan applications.

Food for Peace (Harande). ILRI has prepared a scope of work and associated budget and submitted them to the Feed for Peace (Harande) program. The two programs signed an agreement with a budget of USD290,000 that will enable ILRI to scale up livelihoods diversification and resilience best practices developed by ILRI into Harande zone of influence.

ICRISAT Groundnut program supplied FTF-MLTSP with groundnut seeds that were distributed in target communes. The groundnut program manager has also provided key inputs in the design of the project M&E system that is strengthening the capacity of implementing partners on M&E systems. In the project sites, implementing partners have also made specific collaborative agreements with other donor-funded programs such as the World Bank-funded WAPP program implemented by DRA, which has distributed seeds in Mopti. The CRS dissemination strategy was supported by the DRA manager who availed 350 kg of sorghum seed (Malisor92-1) for dissemination in Fakala, which filled a gap (dissemination to producer organizations) that the ILRI project could not fill. The SmAT-Scaling project also supplied Sankaranka seeds, which was in great demand.

Consultations with ICRISAT Groundnut upscaling program in Mali, explored ways for the two programs to complement each other. The two programs will work together to ensure that dual purposes improved groundnut cultivars promoted by the groundnut program will be used by MLTSP beneficiaries. In addition, groundnut based feeds will be integral parts of the work ILRI has planned to engage in boosting livestock feed value chains in MLTSP sites. A regional groundnut variety trial was already investigated to identify suitable superior food-feed-fodder cultivars for dissemination.

ILRI has also made the necessary contact with Texas A&M, the designer of the Mali LMIS, to explore ways to implement recommendations that came up from the system's assessment, namely ways to reduce the time delays,

and improving on information dissemination to reach out a greater number of users. At the same time, AECOM-L4G brought VIA Consulting Group, a private US based IT company, to help them integrate the OMA LMIS. Following various consultations among partners (L4G and MLTSP), the idea of establishing a consortium bringing together ILRI-MLTSP, AECOM-L4G, VIA Consulting and Texas A&M, emerged to join efforts in addressing various challenges towards a sustainable LMIS.

Consultations with the ICRISAT sorghum program were held to develop collaborative work plan among the two programs. To further inform farmer's choice on cultivars, ILRI will make feed samples for laboratory determinations of the feeding values of dual purposes sorghum cultivars being promoted by the sorghum program.

Indicator data table with target and actual results for the reporting period

Table 9. Indicators with target, actual results and comments

Activity	Results	Indicators	Year: 2017		Comments
			Target	Actual	
Objective 1. To promote innovative animal health delivery systems and facilitate the implementation of best health interventions to reduce disease burden in ruminant livestock					
	A PPR thermostable vaccine is available	PPR thermostable vaccine ready for use			219,000 doses of thermostable PPR vaccine have been produced. Quality and control tests are on-going.
1.1 Produce and deliver a thermostable vaccine against PPR	Reduction in costs of PPR eradication campaigns and vaccinations are more effective	# of doses of vaccines produced	400,000	390,000	These PPR vaccine doses are available at LCV. They will be used by vet agents operating in the project areas
1.2 Support the prevention of ruminant livestock major epidemic diseases	Reduced death and morbidity losses in cattle, sheep and goats	# of farmers who have vaccinated small ruminants against PPR using thermostable vaccine	22,300	17,876	80% execution rate. Vaccination rates of small ruminants was very low. With the project support, some change in farmers attitude with respect to vaccinating sheep and goats is being seen.
		# of farmers who have vaccinated small ruminants against pasteurellosis	11,700	5,362	45.8% execution rate.
		# of farmers who have vaccinated cattle against CBPP	11,000	4,636	41% execution rate
		# of farmers who have vaccinated cattle against pasteurellosis	11,000	2,593	23% execution rate. Efforts have been made in increasing vaccination coverage and significant results have been achieved. With the new planning approach of vaccination campaigns and support provided to private and public vets, significant improvement in vaccination coverages are expected.
1.3 Facilitate the formation and operation of community animal health platforms (CAHPs)	Improved business environment of animal health service delivery systems, Improved capacity of livestock producers, Improved access to vet inputs and services, Better organized vaccination campaigns	# of CAHP established	10	26	The rate of establishment of IPs has been faster than earlier planned thanks to the support of implementing partners.
		# of platform meetings	100	74	IP still lack financial resources to finance their meeting. FTF MLTSP is working with IPs for the development of sustainable IP funding mechanisms.

Activity	Results	Indicators	Year: 2017		Comments
			Target	Actual	
1.4 Improve producers and community animal health workers technical knowledge and skills to facilitate the uptake of selected animal health measures	Increased uptake of technologies that control endemic diseases	# farms of training of trainer's courses organized	4,000	2,406	The number of trainees on integrated packages with a large animal health component is not taken into account here.
		# of farmers trained on ways to control endemic diseases	4,000	2,406	
		# farmers trained on rational drug use	4,000	2,406	
		# of farmers trained on control of mastitis, milking hygiene, milk handling and pasteurization	4,000	2,406	
Objective 2. To increase availability of quality feed biomass, and to improve on farm feed utilization and husbandry practices to support ruminant livestock productivity gains					
2.2 Facilitate the up scaling of improved legume and cereal food feed crops cultivars (cowpea, sorghum, millet) and forage species (Bracharia and Bourgou)	Improved awareness on multipurpose crop varieties and forage species, Improved availability of quality feed biomass, Knowledge on feed market opportunities	# producers trained on fodder and forage production	6,000	5,896	The figure reflect extrapolation of results of the annual surveys. This was the first year when farmers hesitate and wait for results for mass adoption in subsequent years. As above
		# producers who adopted fodder	15,200	16,558	
		# ha under improved fodder varieties	4,000	1,493.5	
		# ha under forage production	1,000	407.55	
2.3 Promote the up scaling of integrated packages for improved cattle, sheep and goat productivity	Intensified cattle and sheep production models are promoted	# farmers trained on intensified cattle, sheep and production models	600	2,406	There was a great enthusiasm of farmers regarding integrated packages.
		# of farmers who have adopted cattle intensified production models	300	4,159	
		# of farmers who adopted sheep and goat intensified production models	1,500	4,192	
2.4 Develop capacity of producers and promote the consolidation or establishment of private small-scale feed manufacturers	Increased feed market opportunities, Improved feed transferability	# of youth and women trained on feed processing	200	1,713	
		# of small feed manufacturing enterprises that have received business development services	10	4	
Objective 3. To leverage existing USAID-led livestock market development and policy initiatives in support to the up scaling of productivity enhancing technologies					
3.1. Livestock market information system is revitalized to capture market incentives	Better access to real-time market information by a larger number of farmers and market agents	# of enumerators trained on LMIS	N/A	N/A	
		# of users of LMIS	N/A	N/A	
		# of professional using LMIS	60		
3.2. Facilitate the development a competitive cattle and sheep production and marketing model	Increased volume and value of marketed animals, Improved business and technical capacities of feedlot managers	# professionals that are trained on LMIS	1,000	1,500	
		# of cattle and sheep fattening platforms put in place	1,000	ND	
		# of fatteners in the platforms	60	ND	

Problems/challenges (technical, management, and financial) during the reporting period and anticipated solutions

Management, financial and logistical challenges

Lack of security and limited accessibility to some target communes. Some target communes such as Femaye and Fakala experienced security problems. Dihadists visited Djonke-Ouro village and left instructions that men and women should not be in the same training workshops and meetings and that separate men and women meetings should be facilitated by people of the same gender. Flooding problems were also reported in Mopti and Timbuktu and caused limited access to some plots and villages, negatively impacting on Bourgou production. It is worth noting here the sad event of the drowning of an extension agent from Prodis Consult working with one of our implementing partner (SNV).

Technical challenges

Animal health. The process of the production of the thermostable PPR vaccine by LCV with the support of Hester Biosciences Limited, using the protocol designed by ILRI was planned to last one year. The time taken to undertake due diligence analyses and to develop sub-awards adversely affected the original plan to complete the process by December 2016. Other LCV management challenges slowed also down the activities. ILRI had finally taken the responsibility to make the procurement of laboratory reagents as LCV could complete the process on time.

Innovation platforms. Main challenges resulted from lack of representativeness of value chain actors and stakeholders in the IPs of some communes such as Sincina. This stemmed from poor planning by the organizing local partner in some cases or the absence of these players at the commune level.

Forage and fodder production. Security concerns prevented frequent movement to high risk communes. In addition, flooding from the River Bani made communes such as Femaye inaccessible and resulted in damages to young Bourgou plants. The same flooding problems and negative impact on Bourgou production are also reported from Timbuktu. Proposed alternative solutions to these constraints were strict adherence to security instructions and transplanting Bourgou during the evacuation of flood waters, transplanting in June/July and making funds available on time.

Livestock market information system. The Mali LMIS is running again. Information collection on selected 17 markets is on-going and the server is accessible to all users both at the national and international levels. Nevertheless, it must be pointed out that the market information system needs support especially in terms of server management, the analysis of the data collected and the upgrading of the whole systems to ensure it is useful to end-users and its sustainability.

Success stories

Efad Mohamedoun, pastoralist at Assana, Timbuktu



Efad Mohamedoun is a 55-years-old chief of Assana, a Tuareg camp located 30 km from Timbuktu on the Timbuktu-Goundam-Bamako road. He is also the president of the Tamzizayat association, which has been supported by FTF-MLTSP to promote Bourgou production. The cooperative benefited from a motor-pump, Bourgou stem cuttings for propagation of the plant and training on Bourgou production and use techniques. The 40-member cooperative has established a 'Borgoutiere' of 10 ha which produced 17,000 Bourgou grass bundles weighing 3.5 kg per unit.

Mohamedoun produced 5,000 bundles in his own 1-ha 'bourgoutière' to feed his 33 cattle (including 20 dairy cows) and 40 sheep. As a pastoralist, his livestock assets are his main source of livelihood. In the past, his life has been marked by periods of movement to search for pastures and water to feed his animals. From June, he moves to the Gourma and returns in August. During the period April to May, Bourgou grass harvested from his Bourgou plot constitutes the main feed supply to his lactating cows and sheep. Milk is used primarily for home consumption and any surplus is marketed in Timbuktu.



Bourgou cuttings



Bourgou fields during flooding

This year, the Tamzizayat association has stored 3,000 Bourgou bundles to feed animals and sold 2,000 bundles at XOF200 / unit. This generated an income of XOF400,000 which was used to purchase 20 bags of feed concentrates to secure animal supplemental feeding during the dry season. The balance of the money was used to care for family members and pay school fees of three children including two girls in Timbuktu. Overall, the FTF-MLTSP support to the Tamzizayat association for the

promotion of Bourgou production and marketing in Assana in the commune of Alafia found real success. It has helped to diversify the livelihoods options of members and their including that of Mohamedounin.

Oumou Dicko, fattener and milk producer, Koumaga, Femaye

Oumou Dicko is a Fulani woman producer from the 'circle' of Djenné in Femaye commune in Koumaga village. She is a dairy farmer and sheep fattener. To increase her production and diversify her sources of income, she engaged, in 2016, in fodder production. Dicko received sweet sorghum seeds and guidance on how to cultivate it from the FTF-MLTSP. She harvested 1.2 tonnes of fodder and 1 tonne of grain of sweet sorghum which enabled her to feed her cows for 3-4 months during the dry season ensuring an increase in milk production. After grazing on poor natural pastures, cows received feed supplement in the form of sweet sorghum stover and concentrate. When fed the sweet sorghum fodder and grains harvested on-farm, the cows produced twice their daily milk yield during the dry season (3-4 litres/day instead of 1-1.5 litres/day). The additional milk ensured her children were no longer malnourished in the dry season. In addition, the reproductive performance of her cows also improved because of better feeding and she no longer loses her livestock assets due to feed shortages in the dry season. Furthermore, the sale of fresh milk is a source of additional income to household needs.

Fatié Sanogo, fattener from Farakala, Sikasso

Fatié Sanogo is a small ruminant fattener from the village of Farakala. In 2016 and 2017, he benefited from forage seeds and practical advice from FTF-MLTSP. During the 2017 campaign, he fattened and sold 60 cattle, in 3 rotations between January and June. In one operation, he spent an average of XOF125,000 for the purchase of the animal, XOF7,500 for his transport from Sofara to Farakala and XOF25,000 for his food and healthcare. After two months of fattening, he sells his animals at an average price of XOF207,500. He made an average profit of XOF50,000 or a total profit of XOF3,000,000 from January to June 2017. The income generated from this activity allowed him to meet the needs of his family but also to make investments to improve his production capacities. Thanks to this performance, and to the partnership with FTF-MLTSP which linked him to decentralized financial systems, he received a XOF2,500,000 loan from MICROCRED in June 2017 to expand his capacity of production.



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