6) Develop capacity and rapid assessment methods for monitoring livestock fodder and animal nutrition status. To meet and maintain production goals and maintain animal health, livestock require optimal nutrition. Livestock producers need information about various fodders and feeds, and the nutritional status and condition of their animals, in order to make the best choices before investing in supplemental feeds or veterinary care. Building on laboratory capabilities developed during MLPI-1, researchers are creating a database of the most utilized livestock feed supplements available in Mali and developing portable and bench-top near infrared reflectance spectroscopy scanning capabilities to rapidly predict the nutritional quality of these feeds.

Stephen Prince of Texas A&M University, Doug Tolleson of the University of Arizona, Hamidou Nantoume of IER, and Boubacar Dembele of IPR will lead this activity. The team is using rapid scans of livestock manure to predict the nutritional status of the livestock.

Prince will train students at IPR in the use of these technologies, creating a specialized labor force capable of supporting the use of these products in the field and at markets.



Woman display a variety of native fodder at a livestock market in Mali. Rapid scans of fecal samples and forage will give livestock keepers information about animal condition and the feed they are purchasing. Ultimately this work will improve livestock nutritional status and health. Photo courtesy of the MLPI-1 project.



The Adapting Livestock Systems to Climate Change Collaborative Research Support Program is dedicated to catalyzing and coordinating research that improves the livelihoods of livestock producers affected by climate change by reducing vulnerability and increasing adaptive capacity.

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Mali Livestock & Pastoralist Initiative (MLPI-2) Building on Success, Looking to the Future

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Improving the productivity and income of pastoralists and livestock keepers is a priority for the USAID bilateral mission in Mali. Pastoralists in the northern regions of the country are considered especially vulnerable to climate change impacts.

To facilitate greater research for development, the Mali Livestock and Pastoralists Initiative (MLPI) was started under the Global Livestock CRSP. Now under the umbrella of the Livestock-Climate Change CRSP, the MLPI-2 project is building on previous successes and expanding to meet emerging needs. The MLPI-2 project is addressing the needs identified by USAID through the integrated implementation of the following activities:

1) Expansion of the livestock market information system (LMIS) in Mali to bring state-of-the-art communication and information technologies to remaining areas of the country. Information on livestock prices and volume activity at markets in Mali are not generally available to pastoralists and other stakeholders in an easily accessible and transparent way. Using cell phones and SMS texting, the LMIS brings real-time market information to pastoralists and livestock buyers and sellers. The goal of this activity is to increase opportunities for buying and selling animals, and to provide pastoralists with additional income opportunities by taking advantage of increased prices for fattened animals or terminal markets, ultimately reducing market-risk. Under MLPI-2, the LIMS has expanded to all regions of Mali with 31 markets reporting.

For MLPI-2, the LMIS is expanding to the remaining Sikasso region secondary markets in other regions of northern Mali. Dr. Jay Angerer leads this activity in cooperation with Francis Keita, of the Observatoire du Marche Agricole, and Aly Diall, of the Direction Nationale des Productions et des Industries Animales (DNPIA).

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In the hands of a livestock market monitor, a common cell phone is transformed into an information superhighway, allowing pastoralists to vie for the best prices. Photo courtesty of the MLPI-2 Project.

2) Conduct market chain analyses and examine household marketing and migration decision making by pastoralists. Market chain analyses tracks the flow of livestock from the field to small, local markets and on to terminal and border markets. For MLPI-2, researchers are tracking decisions made by pastoralists and other market actors, transportation routes and methods, and the ultimate fate of animals that make it to the Malian border. This data will be compared to similar data collected during MLPI-1. Extension/outreach programs will begin to define solutions that address limitations in market access and risk-management decision making. The team will use this information to refine information delivery and tools for the other MLPI-2 activities so that extension messages are targeted and appropriate.

John McPeak, from Syracuse University, leads the team with Lassine Diarra, Aly Kouriba, and Alpha Kergna from the Institut d'Economie Rurale (IER) in Mali to implement this activity.

3) Develop methods and extension activities for nutritional analyses of supplemental feed in northern Mali. During MLPI-1, ruminant nutrition laboratories at IER and l'Institut Polytechnique Rural (IPR) de Katibougou were upgraded, allowing scientists

there to conduct standard laboratory analysis of supplemental livestock feeds. For MLPI-2, the capability for conducting rapid scans using near infrared reflectance spectroscopy technology is being developed, and portable instruments are being deployed to evaluate feedstocks in the field and in markets. In addition, researchers are evaluating how different storage techniques affect nutritional quality of supplemental feeds.

These new technologies, combined with education and training programs in the use of feed quality analysis, will help to overcome livestock production limitations by improving supplemental feeding practices, and thus animal condition and reproductive performance.

This activity is being led by John McPeak with support from Stephen Prince at Texas A&M University, Doug Tolleson of the University of Arizona, Hamidou Nantoume at IER, and Boubacar Dembele at IPR. Mr. Dembele, a Ph.D. student at the University of Bamako, is also funded by the LCC CRSP International Graduate Student Fellowship Program for West Africa to conduct research on livestock nutrition and feed and fodder quality.

4) Conduct risk management activities in northern Mali with a specific focus on communitybased conflict management and development of mapping tools. In a new effort for MLPI-2, researchers are conducting risk management studies along existing transhumance (seasonal movement of people with their livestock) corridors to identify how pastoralists decide when and where to move livestock, what information they use in making decisions, and what formalized institutions are facilitating these practices or creating barriers to them.

There are three components for this activity, which is being led by John McPeak; Matthew Turner, University of Wisconsin; and Lassine Diarra, Aly Kouriba, and Alpha Kergna from IER.

One component is to conduct a spatial analysis of livestock mobility and availability of forage resources in Mali. Maintaining livestock mobility in semi-arid Africa allows pastoralists to respond quickly to rapidly changing climate, sudden weather disasters, and unexpected fluctuations in resource availability. Utilizing widely available remotely-sensed data, researchers will evaluate the risks and benefits associated with typical seasonal (i.e., north-south) and within-season, regional (i.e., east-west) movements. This information will help to inform contemporary policy in the region and, where appropriate, foster the adoption of policies and agreements that sustain mobile pastoral practices.

For the second component, researchers aim to reduce and manage land use competition, manage conflict, and preserve livestock mobility in the Maasina region of the inland Niger delta. This region contains relatively rich natural resources, but also a high degree of farmer-herder conflict. Here, researchers are partnering with commune and village leaders in an effort to reduce competitive pressures. This process will leave communities better prepared to manage resources and negotiate land use needs into the future.

For the third component, researchers are mapping a sample of the major transhumance corridors and combining this with remotely-sensed information on land use, settlements, livestock markets, water points, and vegetation in a web-based, interactive map. The information contained in this interactive map will help decision makers coordinate with each other to maintain connectivity of transhumance corridors and reduce the potential for farmer-herder conflicts.

5) Develop early-warning capabilities for monitoring surface water used by livestock in northern Mali. Water holes are a critical resource for mobile pastoralists and their livestock. Near real-time information on water availability is generally lacking in Mali and, because of this, pastoralists and their livestock can become stranded in areas without water during migration.

In this activity, Gabriel Senay of South Dakota State University, Jay Angerer and Steve Huckett from Texas A&M University, and Nouh Sow from DNPIA, are creating a near real-time monitoring system for water holes that pastoralists and others can access via SMS on a cell phone. Pastoralists can use this information to make decisions about where and when to move livestock, thereby reducing risks and improving livestock productivity.