

6-1-2014

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Recommended Citation

Coppock, David Layne; Tezera, Seyoum; Eba, Bedasa; Doyo, Jaldessa; Tadele, Demisachew; Teshome, Derege; Husein, Nizam; and Guru, Meiso, "Sustainable Pastoralism in Ethiopia: Preliminary Results from Participatory Community Assessments on the North-central Borana Plateau" (2014). *ENVS Faculty Publications*. Paper 902.
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RB-16-2014

June 2014

Research Brief

Feed the Future Innovation Lab for Collaborative Research on Adapting Livestock Systems to Climate Change

Abstract

The Borana Plateau is an important rangeland for Ethiopia. Livestock production has supported pastoralists here for many generations, and animals are now supplied to a variety of domestic and export markets. The aim of this Livestock Innovation Lab project is to find ways to improve the sustainable productivity of the pastoral system. This is a big challenge, as the rangelands have been badly degraded by decades of heavy pressure from growing human and livestock populations. As a result, there has been extensive bush encroachment on the grasslands and a recent acceleration of gully erosion. The research team used Participatory Rural Appraisal (PRA), a method that allows scientists to gather information on pastoral knowledge and opinions, to reveal the priority problems of four Pastoral Associations (PAs) located within 90 kilometers of the town of Yabelo. The most critical problem for all of the PAs is a shortage of drinking water for both people and animals. Water resources are under threat from growing populations, high rates of pond siltation from overgrazed catchments, and gradual deterioration of cisterns, hand pumps and infrastructure for deep wells. Other problems include a lack of feed resources for livestock and inadequate public services for people. Because of the very high value placed by the people on water, the project's next phase of work is focused on taking action where water and forage resources intersect, namely the protection of selected pond catchments with bush fencing. Bush fencing will also line pathways that will allow controlled access of livestock to the pond's edge with minimal effects on the environment. Researchers expect that grass recovery in the catchments will be rapid, therefore greatly reducing pond siltation as well as enhancing water quantity and quality. This is the first step in a comprehensive, long-term process to rehabilitate the rangelands in support of more sustainable livestock production. 🐄

Project aims to improve the sustainable productivity of an Ethiopian pastoral system

The Borana Plateau is an important rangeland for Ethiopia. Livestock production has supported pastoralists here for many generations, and animals are now supplied to a variety of domestic and export markets. The aim of this Livestock Innovation Lab project is to find ways to improve the sustainable productivity of the pastoral system, considering the rangeland, livestock and human components together. This is a big challenge, as the rangelands have been badly degraded by decades of heavy pressure from growing human and livestock populations. As a result, there has been extensive bush encroachment on the grasslands and a recent acceleration of gully erosion.

The project, therefore, aims to find interventions that the pastoralists are able and willing to adopt within an initial project lifespan of three years. The ultimate goal is to promote sustainable production practices that will improve the well being of the pastoral people. To accomplish this goal, a participatory research approach is required



PRA participants at Dikale Pastoral Association, April 2013. (Photo credit: Brien E. Norton)



because the pastoralists must be heavily involved from the beginning. This allows researchers to understand how pastoralists view their problems and where they see opportunities to improve their situation. And, if the pastoralists are going to adopt new technologies or ways of managing resources, they must have co-ownership of the research and development process. Project objectives in this first phase were thus to determine:

1. Priority problems for representative communities; and
2. Sustainable solutions that could address the priority problems.

Such objectives may appear simple, but pastoral systems are complicated. The pastoralists have long been affected by poverty, population pressure and lack of development investment. In addition, they now face climate change, a gradual warming and drying of the environment. All of these factors must be considered together when assessing the problems that affect pastoralists.

Researchers involve pastoralists to determine priority problems

For phase one of this project, the research team decided to use Participatory Rural Appraisal (PRA), a method that allows scientists to gather information on pastoral knowledge and opinions. By investing considerable time and effort in the PRAs, trust building occurs among researchers, development agents and communities.

The typical PRA process includes plenary sessions where problems and solutions are identified and Community Action Plans are drafted. For this specific project, the PRA process included: Social resource mapping, transect walks, farm sketches, disadvantaged group mapping, historical community timelines, gender daily calendars, seasonal farming calendars, institutional and stakeholder analyses, problem-identification and ranking matrices, solution-identification and ranking matrices, focus group discussions and drafting a Community Action Plan (CAP).

A core seven-member field team was assembled to conduct the PRAs; these were staff members of Managing Risk for Improved Livelihoods (MARIL) and the Oromia Agricultural Research Institute (OARI). Occasionally representatives of local GOs and NGOs joined the team as observers. The core team was thoroughly trained in PRA theory and application prior to conducting their work.

One PRA was completed at each of the four selected Pastoral Associations (PAs), units of resource allocation, located within 90 kilometers of the town of Yabelo. The PAs were selected on the basis of logistics and willingness of the people to participate in the program. The four PAs selected were: (1) Dikale; (2) Harweyu; (3) Medecho; and (4) Denbala Bedana. There were about 20 PAs for researchers to choose from.

An average of 50 participants were involved in each PRA, which took three to five days to complete. In addition, researchers followed up the PRAs with additional focus group sessions on water resources and grazing management; these involved about 8 to 10 people each. All participants were aged 18 or older and included men, women and representatives from each socioeconomic class.

It is sometimes assumed that PRA is only useful for development work, but the team has found it very useful in the diagnostic phase of a research project.

Selected research sites provide a diverse sample

The selected PAs are similar in some respects but different in others. All of the PAs have a vegetation mix of grassland, bushland and woodland, and although the proportions vary, the grassland in general has been in decline for decades. Each PA has from 9 to 13 kalo or traditional “fodder banks.” Each PA has water resources including ponds (large or small) and cisterns. Considered together, all four PAs have some degree of local service infrastructure, such as mud-walled school facilities, clinics and in-resident extension agents; however, they differ considerably on an individual basis. Each PA has had a presence from a development agency (GO or NGO), but these connections have been sporadic. All of the PAs have large numbers of cattle, camels, sheep, goats and equines, although the numbers change depending on forage base and water resources. The human populations vary from 3,067 (Harweyu) to 4,400 (Dikale). Dikale has the highest population density of people and livestock as well as relatively more rain-fed maize cultivation. Harweyu is notable because of its very high degree of bush encroachment. Medecho and Denbala Bedana are located further south and are drier with much less cultivation; these two PAs also host clusters of deep tula wells that provide dry-season water to pastoralists from many other locations. Denbala Bedana hosts a large livestock market at Dubluk town.

Lack of drinking water identified as the single greatest need

Pastoral Associations:				
RANK	<i>Dikale</i>	<i>Harweyu</i>	<i>Denbala Bedana</i>	<i>Medecho</i>
1	Water Shortage	Bush Encroachment	Water Shortage	Water Shortage
2	Poverty	Water Shortage	Human Health	Road Infrastructure
3	Human Health	Feed Shortage	Education	Education
4	Feed Shortage	Poverty	Bush Encroachment	Cooperative Function
5	Education	Human Health	Livestock Health	Natural Resource Management
6	Livestock Health	Predators	Poverty	Livestock Health

Table 1. The top six ranked problems faced by four Pastoral Associations during 2013, as revealed by PRA. Problems are color coded to better reveal patterns. Similar problems are lumped within the same color.

Overall, most of the PRAs revealed that human and livestock populations are continuing to grow, the general ecological trends in rangeland resources are negative (namely, more bush encroachment, extensive soil erosion, etc.) and the climate is perceived to be changing—drought frequency being on the increase.

Field reconnaissance conducted by the project’s lead scientists

confirmed the poor range conditions. It was also noted that there is a high degree of wealth stratification in each of the PAs—fewer households controlling more of the livestock population. Nearly half of all households own just a few head of livestock each, and human food needs are thus regularly met by widespread distribution of food aid.

The rankings of priority problems were somewhat irregular across the four PRA communities, but the same six issues tended to be mentioned repeatedly. The top-ranked problem overall was clearly a general shortage of drinking water for people and livestock. Most water-supply problems were attributed to high rates of pond siltation due to widespread denudation and erosion of catchments. In addition, cement cisterns, hand pumps, and infrastructure for the tula wells had fallen into disrepair.

Other priority needs included a general lack of forage (bundled together as feed shortages, bush encroachment, and natural resource management), alleviation of poverty, improvements in human and livestock health, and increases in access to education.

Although unranked in the top priority problems, other challenges mentioned included unreliable livestock markets, the appearance of new livestock diseases, accelerating resource-based conflicts, weakened customary institutions, limited livestock mobility, etc.

Positive trends however, were also noted. These included improved access to formal education, expanded human and animal health services in general, growing livestock markets, more non-pastoral investment options and improved communication via cell phones. Pastoralists have also shown more interest and involvement in rangeland rehabilitation, grazing management and watershed protection.

The Way Forward: Rehabilitate Pond Catchments as the First Step

Cattle are the critical livestock species in this region and improving grass forage for cattle is the main goal for this project. If grass forage is improved, soil erosion can be reduced. But, because the population is most concerned about the need to improve water resources, researchers have decided to begin their action-based efforts where water intersects with the forage resources, namely the pond catchments.

Each of the four PAs nominated one pond catchment for protection during December 2013. Each catchment was encircled with bush fencing by April 2014. This involved fencing areas ranging from 4 to



Typical denuded pond catchment at Dikale Pastoral Association. Such conditions result in high rates of pond siltation. (Photo credit: Brien E. Norton)

20 hectares each. Researchers hypothesize that by simply protecting these areas from grazing, enough grass will recover to the point that pond siltation will be greatly reduced. To allow continued access to the water by people and livestock, pathways bordered with more bush fencing are also part of the overall structures.

If the communities approve the end product, the research team will advocate for more ponds to be similarly protected as part of an overall landscape-management plan. Plans need to be developed by each community with new regulations for grazing management added to the traditional bylaws for each PA. Protection of catchments will need to continue indefinitely.

Gradually, rangeland in each PA will be rehabilitated through pond catchment protections, bush clearing, stocking rate adjustments and grazing rotations. Research will document each step of the way.

Ultimately, the project team wants to connect the wealthier herd-owning minority to more options that could provide incentives for them to invest in non-livestock assets and thus reduce their herd sizes in support of forage conservation. This seems to be the main avenue to reduce livestock pressure on the land. Ideally, a virtuous cycle could be created whereby capital otherwise lost in periodic livestock deaths during drought could be invested in the PAs to improve social services. Creative policymaking would be part of this process. 🐄

Pastoral Association Name	Size (km ²)	Households (No.)	Human Population			Livestock Population					Ponds (No.)		Cisterns (no.)	Other Water Points	Kalo (no.)
			Total	Male	Female	Cattle	Sheep	Goats	Camels	Equines	Large	Small			
<i>Dikale</i>	315	1,769	4,409	2,306	2,103	25,420	6,998	15,462	671	390	10	31	18	NA	10
<i>Harweyu</i>	567	639	3,067	1,508	1,559	8,700	5,200	6,200	900	256	10	31	14	1 water pump 1 tula well	10
<i>Denbala Bedana</i>	392	963	4,229	2,087	2,147	6,245	6,238	17,506	671	409	37		18	Many tula wells	9
<i>Medecho</i>	767	763	3,763	1,865	1,898	12,484	7,820	8,664	594	1,415	26	17	21	12 tula wells	13

Table 2: Statistics pertaining to four Pastoral Associations for 2013 on the North-central Borana Plateau. (Sources: Pastoral Association Offices and data from participatory rural appraisals).

Further Reading

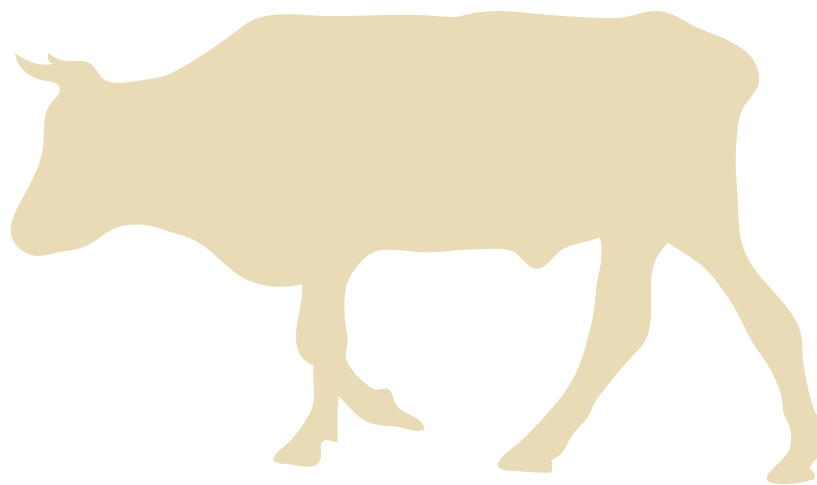
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Acknowledgements: The contributors thank the community members of Dikale, Harweyu, Denbala Bedana, and Medecho Pastoral Associations for participating in this work. Other stakeholders representing governmental and non-governmental organizations are also appreciated for their input at various stages of this process. This publication was made possible through support provided to the Feed the Future Innovation Lab: Adapting Livestock Systems to Climate Change by the Bureau for Economic Growth, Agriculture, and Trade, U.S. Agency for International Development, under the terms of Grant No. EEM-A-00-10-00001. The opinions expressed herein are those of the authors and do not necessarily reflect the views of the U.S. Agency for International Development or the U.S. government.



Sustainable Pastoralism on the Borana Plateau: An Innovation Systems Approach

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The Borana pastoral system has endured several decades of decline. The climate is drier, human populations have increased, rangelands are degraded, herders are poverty-stricken and food-insecure, and livestock productivity – typically based on cattle – has dropped. The old system is unsustainable. Many pastoralists recognize these trends and are responding with innovative coping strategies. This study will work to reveal the best-bet land and livestock interventions that will move the pastoral system back towards sustainability. The research team will do this primarily via a participatory framework that creates community action plans. An innovation system team of research and development stakeholders will be assembled to help pastoralists implement their action plans within a year of project initiation. A period of monitoring and evaluation will follow. Interventions will include pilot tests of promising innovations. Associated capacity building will involve local researchers and pastoralists, with the latter including a special focus on women and the poorest households. A review of system dynamics indicates that priority research will include: (1) how to diversify livestock holdings to include more browsing camels and small ruminants; (2) how to improve rangeland productivity via changes in common property regimes and forage innovations; and (3) how to promote livelihood diversification to reduce excessive stocking rates and encourage faster marketed turnover of livestock. Research approaches will include use of interdisciplinary methods, including public engagement, household surveys, and technical trials and studies. Linear programming will clarify policy relevant issues regarding land use and climate change. Research results will be important locally and throughout the Greater Horn of Africa.



Feed the Future Innovation Lab for Collaborative Research on Adapting Livestock Systems to Climate Change 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.

This publication was made possible through support provided by the Bureau for Economic Growth, Agriculture, and Trade, U.S. Agency for International Development, under the terms of Grant No. EEM-A-00-10-00001. The opinions expressed herein are those of the authors and do not necessarily reflect the views of the U.S. Agency for International Development or the U.S. government.

