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GLOBAL LIVESTOCK CRSP

Linkages Among Community, Environmental, and Conflict Management: Experiences from Northern Kenya

Guyo O. Haro, Indigenous Vegetation Project, Marsabit, Kenya; Godana J. Doyo, Arid Lands Resource Management Project, Marsabit, Kenya; John G. McPeak, Syracuse University Pastoral Risk Management Project

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There has recently been an increase in the adoption of community-based approaches to the management of natural resources in Africa. This study describes some of the opportunities and challenges presented by taking such an approach in the pastoral areas of northern Kenya. The experience of the Marsabit Development Project of GTZ is described in detail. What began as a program to form environmental management committees evolved over time into a program that addressed both environmental management and conflict management. This occurred because reducing insecurity was identified by communities as a precondition for sustainable natural resource management.[1]

Background

Environmental degradation in pastoral areas has long been viewed as arising from the common property nature of land tenure in such areas. The basic logic of this argument is captured by Hardin's metaphor of a village commons. Each individual only considers private benefits and costs of placing livestock on common land and does not take into account the cost these animals impose on other herders. From a natural resource management perspective, the imposed cost takes the form of environmental degradation. This perspective influenced the design of what de Haan (1994) terms the "ranching phase" of pastoral development efforts. The objective of these efforts was to transform pastoral production into commercialized ranching. As has been noted elsewhere (Sandford, 1983; Scoones, 1995) the failure of this approach became evident by the mid 1980s. Frustration with this record of failure led to a new emphasis on involving pastoral producers in development project design (de Haan, 1994; Sylla, 1995). This approach reflects both the overall movement in development policy to increased participation by communities and a growing appreciation by researchers and practitioners of the logic of traditional management practices.

One difficulty in adopting this approach in the pastoral areas of northern Kenya is that specifying the relevant community to manage a given natural resource is a formidable task. There are multiple levels of social organization that can legitimately claim the right to make decisions about natural resource use. Decisions about natural resource use are made at the household level, at the camp level which is a collection of households, at the neighborhood level which is composed of multiple camps, and at the level of a grazing area which represents a collection of neighborhoods. In addition, strict definitions of geographic boundaries are not emphasized by pastoral groups. So not only can a given natural resource have multiple levels of social organization claim authority to manage it, but also multiple groups at a given level of social organization can claim authority to manage it as well.

These multiple claims can be particularly problematic when the multiple claimants are from hostile groups. Large areas of the rangelands of northern Kenya are unused due to the possibility that use of these areas will expose oneself and one's family to violent attack. In the northern Kenyan rangelands such attacks are an ever-present threat (Galaty 2002; Kenya Human Rights Commission 2000; Kratli and Swift 1999; Lind and Sheikh 2001).

Major Findings

The GTZ effort in this area built on efforts of the UNESCO-funded Integrated Project for Arid Lands (IPAL) that operated in Marsabit District from 1976-86. The IPAL work culminated in an integrated resource assessment and management plan produced in 1984. The plan did not have a major impact on natural resource management in the area, and only a few elements were implemented. GTZ began the project in this area in 1990, and one objective was to improve natural resource management. They began by commissioning a study of traditional grazing systems and using this study to develop

an extension and education plan to achieve the goal of improved natural resource management (Oba 1992).

Following completion of the study and development of the plan, the project began targeting local administrative and civic leaders, traditional leaders, and primary schools that would influence neighborhoods to form environmental caretaker committees. This approach was reassessed in 1995, as the targeted individuals were often unable to persuade communities of the need to form natural resource management plans because there were questions about who in the neighborhood had a legitimate right to make such management decisions and what resources belonged to a given neighborhood. From 1996-98 a new approach of project-supported environmental management committees formation was adopted where these neighborhood committees were explicitly designed for managing natural resources using traditional definitions of neighborhoods. While these groups met with some success, they faced problems due to ambiguity about which natural resources belonged to which neighborhood, and also due to the fact that different neighborhood committees developed rules so that rules were often inconsistent. In 1998-99 the project brought together representatives from the different neighborhood committees to harmonize management rules at the level of traditionally defined grazing areas.

When these representatives met, they were able to develop a harmonized management protocol that defined rules and sanctions. Notable elements of this protocol were measures to:

- Manage water resources
- Manage grazing land use by local residents
- Manage grazing land use by non-residents
- Manage use of tree species
- Establish rules over charcoal making
- Manage wild fires
- Manage movement of diseased livestock
- Develop communication mechanisms and dialogue with the local community
- Develop communication mechanisms and dialogue with neighboring communities
- Develop communication mechanisms and dialogue with formal administrative structures, and
- Protect wildlife.

However, participants in these meetings argued that this protocol left out measures to address one of the key factors leading to unsustainable resource use—that of insecurity. They argued that they were overusing some resources in the rangeland because vast areas in the rangeland were not used due to insecurity. While the rules and sanctions contained in the protocol would help, they argued that ultimately they would not work as rest and rehabilitation of currently overused areas would only be possible if currently underutilized areas were made accessible.

In response, from 1999-2002 the project supported consultative meetings that brought together representatives from different grazing areas together with governmental and non-governmental authorities. The representatives of the grazing areas were brought together regardless of ethnic identities and administrative boundaries. They were asked to describe the causes of conflict, define measures to reduce conflict, and develop rules to manage conflict when it occurred. These were each discussed, and after agreement was reached, the consensus view was translated into local languages and distributed to all relevant resource management units. Members from the environmental management committees were selected to oversee the implementation of the agreement.

Currently, the environmental management committees continue their work. Tree protection and regeneration have been particularly successful accomplishments in many areas. In addition, efforts at reserving dry-season grazing areas, protection of wildlife, and waste management have all been successfully implemented in certain communities. Coordination across communities and underlying questions about the legitimacy of these committees continue to be challenging.

Conflict management efforts have also met with some success. Inter-ethnic grazing cooperation has increased. Project workers estimate that up to 35% of the district that was formerly unused due to concerns about insecurity was in use after the conflict management meetings were held. Two murders across ethnic lines were dealt with through the agreed-upon protocols, thus preventing an escalation into the spiral of violence of attack and counterattack that such murders can trigger. While these accomplishments are important to note, it is also clear that the peace is fragile. Maintaining the peace will be a major challenge given the history of mistrust across groups, the inability to control individuals from one's own ethnic or language group who come from outside the area and attack neighbors, and the presence of local residents who, for various reasons, find benefits when conflict occurs.

Practical Implications

Improvement in the well-being of residents in pastoral areas is possible by working with pastoral communities and allowing them to define their own plans. This does not lead to a major transformation of pastoral society, but rather allows people to build on the existing structure of society to improve their lives. However, as the GTZ experience in Marsabit District illustrates, it is not easy. It requires coordination that can only come from working at multiple levels of social structure simultaneously as well as from working in multiple areas at once. This allows coordination across units when there is ambiguity about who has the legitimate right to make rules over a given

resource. It also requires adaptability by development agents, as what began as an environmental management program transformed into a conflict management program. And finally, it must be recognized that accomplishments can be fragile. Environmental management committees have had visible impact on the environment, but it remains to be seen how sustainable such efforts are. Likewise, while there has been some initial success in the conflict management efforts, it also remains to be seen how sustainable these efforts have been.

Footnote

[1]This brief summarizes the findings of a paper with the same title by the same authors published in *World Development* 33(2):285-299 (2005).

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About the authors: Mr. Guyo O. Haro is the project manager for the GTZ/GEF Indigenous Vegetation Project in Marsabit. He can be reached at IVP-GEF, Marsabit Community Support Unit, P.O. Box 204, Marsabit, Kenya. Tel: 069-2235, Fax: 069-2005, E-mail: mivp@africaonline.co.ke. Mr. Godana J. Doyo is the District Drought Management Officer for the Arid Lands Resource Management Project in Marsabit. He can be reached at ALRMP, P.O. Box 155, Marsabit, Kenya. E-mail: Gjdoyo@aridland.go.ke. Dr. John McPeak is an assistant professor in the Departments of Public Administration and Economics at Syracuse University. He can be reached at 336 Eggers Hall, Syracuse University, Syracuse, NY 13244, USA, or via e-mail at jomcpeak@maxwell.syr.edu.

The GL-CRSP Pastoral Risk Management Project (PARIMA) was established in 1997 and conducts research, training, and outreach in an effort to improve welfare of pastoral and agro-pastoral peoples with a focus on northern Kenya and southern Ethiopia. The project is led by Dr. D. Layne Coppock, Utah State University, Email contact: Lcoppock@cc.usu.edu.

The Global Livestock CRSP is comprised of multidisciplinary, collaborative projects focused on human nutrition, economic growth, environment and policy related to animal agriculture and linked by a global theme of risk in a changing environment. The program is active in East Africa, Central Asia and Latin America.

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Design by Susan L. Johnson

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Agro-Pastoralists' Wrath for the Prosopis Tree: The Case of the Il Chamus of Baringo District, Kenya

Abdillahi A. Aboud, Philip K. Kisoyan, Egerton University;
D. Layne Coppock, Utah State University
Pastoral Risk Management Project

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Indigenous to Peru, Chile, and Argentina, the woody plant called Prosopis juliflora *(also known by the American common name of "Honey Mesquite") has spread world-wide in recent decades, including rangelands throughout Latin America, North America, south and central Asia, Australia, and sub-Saharan Africa. A species known for rapid establishment, high adaptability, and fast rates of growth, its dispersal has primarily been a consequence of intentional introduction by well-meaning "technical experts" who wanted to provide a new source of fodder, fuel wood, or a means to combat desertification in arid and semi-arid lands. One problem, however, is that unless* Prosopis *receives careful management, it can invade and degrade ecosystems. Here we report on interviews conducted among rural residents of central Kenya where* Prosopis *was first introduced over 20 years ago. The respondents contend that* Prosopis *has greatly undermined their livelihoods, and they want to see it eradicated.*

Background

Prosopis juliflora, henceforth referred to here as *Prosopis,* is a moderately sized tree that also has a shrub-like form in some situations. It has root nodules that can absorb nitrogen from the atmosphere, and thus the species may supplement soil fertility in some instances. It has an extensive lateral root system that can help reduce soil erosion. It quickly establishes from seed and has a long taproot that enables the plant to access ground water deep below the surface when rainfall is scarce.

Prosopis was first introduced to eastern Africa in the 1970s through collaborative projects involving local governments and outside agencies. Initially, *Prosopis* was seen as an appropriate prescription for the environmental woes of dry lands. *Prosopis* could provide leafy fodder and pods for livestock feed, fuel wood, and erosion protection for denuded areas.

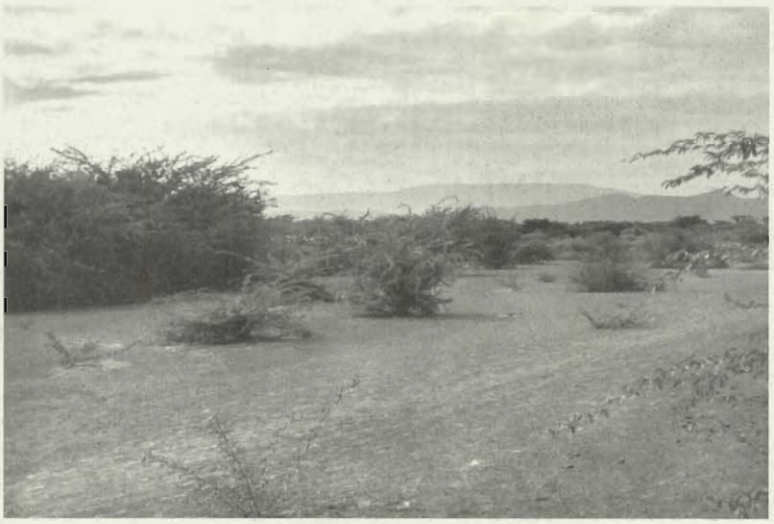
Prosopis, however, reportedly had some negative attributes. It was known to be a strong competitor with other plants for soil moisture. More recent research suggests it may also exude toxins that inhibit growth of under-story vegetation.

Here we examine the attitudes of some local residents from Baringo District concerning their experience with the ecology and management of *Prosopis.* We compare and contrast these views with other information about the species from literature and expert opinion. Our data are based on 73 interviews conducted among the Il Chamus people, who tend to practice agro-pastoralism in Baringo District.

Findings

The Il Chamus we interviewed were very familiar with the botanical and ecological features of *Prosopis.* On the positive side, the respondents confirmed that *Prosopis* provides nutritious fodder for small stock, the nectar is useful for making a white honey, and the quality of wood products is high. The latter includes wood used for construction and household items. The quality of fuel wood is good. The plant has an excellent ability to re-grow after stems are cut and harvested, and this is referred to as coppicing.

Our respondents, however, were much more adamant about the negative aspects of *Prosopis.* Overall, they regarded the species as highly aggressive and invasive, forming impenetrable thickets that choke out other plants. When it occurs near watercourses, it can clog irrigation schemes. It is considered to be resilient and very regenerative, out-competing and eliminating other plants. It is actually thought to encourage erosion because the under-story of herbaceous plants can be eliminated; impacts on reducing biodiversity can be severe. By



Prosopis in seasonal grazing area in Ngambo, Baringo District, Kenya. Photo by Peter Little, June 2004.

extensively drawing on ground water, dense stands of *Prosopis* are also thought to lower water tables. Although the seedpods are indeed palatable to livestock, the chemical content is thought to cause tooth problems for goats. A diet high in pods can reportedly cause mortality in sheep and goats due to digestive problems like impaction; even cattle can die if it feeds heavily on *Prosopis* leaves over a prolonged period of time—this is perceived to be due to toxicity. Finally, the pollen of *Prosopis* is speculated to cause human allergies, asthma, and lung inflammations.

Some of our results confirm earlier work by Lenachuru (2003). He found that Il Chamus people he surveyed thought that *Prosopis* had proven to be the "worst enemy" of the local people over the past 20 years. The Il Chamus have now decided to "wage war" against *Prosopis*, calling for its complete and unconditional eradication. The Il Chamus have even threatened to take legal action against the Kenya Government for environmental damages caused by the tree.

Practical Implications

The *Prosopis* dilemma in Baringo is only one example of the many problems brought about by the introduction of new species without proper scientific study concerning their long-term effects on the environment, preferred management, and optimal forms of utilization. Unfortunately, practical experiences from many parts of the world have now shown that complete eradication of established *Prosopis* is virtually impossible. It is clear from our interviews that the species is considered a major threat to rural society by the Il Chamus.

There is a need to find ways of better utilizing and managing *Prosopis* in Baringo, with an eye towards controlling its spread. Successful interventions would require extensive collaboration among government and non-government groups. These efforts require a multi-pronged approach involving policy and technical aspects.

The scope for addressing *Prosopis* problems via government policies and legislation is vast. Local enforcement of regulations is also vital. The legality of introducing alien species should be addressed. The process of land adjudication and promotion of appropriate land use needs urgent attention. Improved management and control of *Prosopis* requires organized efforts in terms of public education and public awareness-raising. This includes promotion of how *Prosopis* products could be best harvested and used. In other developing countries economic value has been added to some types of *Prosopis* products, and this involves comprehensive efforts incorporating product certification and marketing. Success stories revolving around wood prominently include firewood, charcoal, building materials, floor tiles, furniture, and handicrafts. Other opportunities involving non-wood products include processing for livestock feed, human food (toasted seeds), possible medicinal values, gum production, and tannin extraction.

Thinking about how to engage communities and build capacity in a process of ecological restoration of *Prosopis*-affected sites also merits attention. There are situations where the ability of the species to add nitrogen to the soil and protect badly eroded sites against further ecological damage still matter.

Mobilizing people to better deal with *Prosopis* is a large problem. It would require full appreciation of constraints and opportunities imposed by socio-economic features of local societies. These include attitudes and values

with respect to community participation in resource management issues, problems that poverty imposes on people's priorities, conflicts in land use, land tenure, the role of rural insecurity in resource use, and constraints in the availability of labour. We also advocate that research is needed to assist this process. This could include policy analysis and studies devoted to verifying attributes of *Prosopis* noted in our interviews. There is also a need to carefully document success stories and constraints in the harvest, processing, and marketing of promising *Prosopis* products.

Prosopis and other vegetation surround Il Chamus homestead, Sintaan, Baringo District, Kenya. Photo by Peter Little, June 2004.

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About the authors: Professor Abdillahi A. Aboud is a faculty member in the Department of Natural Resources at Egerton University, Kenya, and serves as a lead regional principal investigator for the PARIMA project. He can be reached c/o Egerton University at P.O. Box 536, Njoro, Kenya. His email address is eu-crsp@africaonline.co.ke. Mr. Philip K. Kisoyan, MSc., is a Lecturer in the Department of Natural Resources at Egerton University. He can be reached at the same mailing address and email as Prof. Aboud. Dr. D. Layne Coppock is a faculty member in the Department of Environment & Society in the College of Natural Resources at Utah State University. He can be reached at lcoppock@cc.usu.edu.

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GLOBAL LIVESTOCK CRSP

Cross-border Cattle Trade Along the Somalia/Kenya and Ethiopia/Kenya Borderlands

Peter D. Little, University of Kentucky;
Hussein A. Mahmoud, Egerton University
Pastoral Risk Management Project

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Cross-border livestock trade in the Horn of Africa has grown significantly in recent years and has met increased urban demands for meat and provided benefits for a range of actors, including herders, traders, and transporters. Most of the animals in the trade are procured from pastoral areas and are moved to terminal markets through complex market arrangements and channels that involve numerous actors.

Despite the positive benefits of this commerce, governments rarely acknowledge its importance and the activity remains subject to inconsistent policies, random order closures, and livestock confiscation. This paper addresses cross-border cattle trade in two of the region's most significant cross-border markets: the Ethiopia/Kenya (E/K) and the Somalia/Kenya (S/K) trade. We show that while there are important similarities between the two markets, there also are significant differences that relate to risk and institutional and social factors. In the face of significant security and market risks, the paper shows how cattle traders have developed innovative institutional responses to mitigate them.

Background

Trans-border cattle trade from pastoral areas has a long history in the Horn of Africa, but its scale and complexity have grown significantly in recent years, especially as the region's urban populations and meat consumption have grown. Currently the commerce accounts for approximately 26 percent of total beef consumption in Kenya (Aklilu, 2002). Unofficial imports from pastoral areas of Somalia and Ethiopia make up the bulk of this trade, with cattle imports from Tanzania also playing an important role. Little (2003) estimates that the cross-border trade with Somalia alone encompasses an estimated 16 percent of beef consumed in Nairobi, Kenya, the region's major urban market.

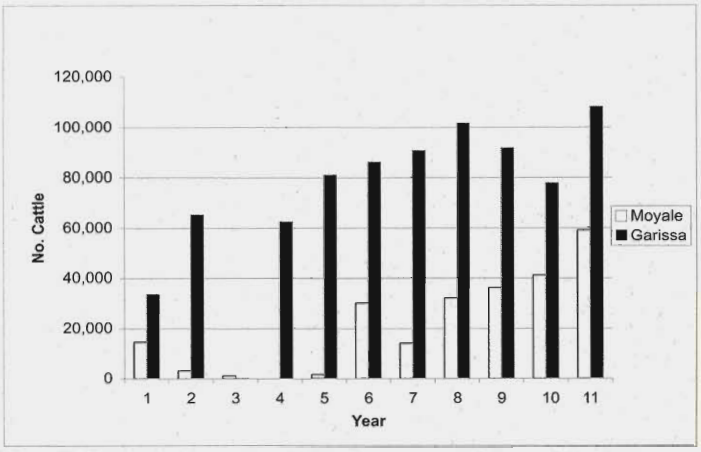
This research brief addresses cross-border cattle trade in the Ethiopia/Kenya (E/K) and the Somalia/Kenya (S/K) borderlands. It will be shown that while there are important similarities in the two markets and their inherent risks, there are significant differences that relate to institutional, production, and social variables. The paper also argues that trans-border trade and its significance remain poorly understood by policy makers, which results in ambivalent public actions and attitudes. The materials draw on research by the authors in northeastern Kenya during 1996-2002 (Little, 2003) and northern Kenya/southern Ethiopia during 2001-2002 (Mahmoud, 2003).

Major Findings

Unofficial cattle imports from Ethiopia and Somalia to Kenya rapidly rose in the 1990s and 2000s. The impetus for this growth stemmed from several factors, including the collapse of the Somalia state and political volatility in Ethiopia, cessation of overseas exports from southern Somalia, urban population growth, and a widening discrepancy between market prices in Kenya and in neighboring countries. Figure 1 shows increases in cattle sales/exports at two of Kenya's key border markets, Moyale (for the E/K trade) and Garissa (for the S/K trade). It should be noted that the Moyale market was closed for most of 1993-5 due to quarantine caused by Foot and Mouth Disease, which accounts for the minimal sales in those years. Nairobi is the destination for more than 75 percent of combined exports at the two markets.

Both the S/K and E/K markets entail long-distance transport of cattle and involve a combination of trekking on foot and trucking. In the case of the E/K border trade, the length of trekking routes range up to 150-200 km and take on average about four to five days to cover. Once cattle are sold at Moyale, they are moved on trucks along very poor roads approximately 730 km to Nairobi, which takes another two days. By contrast, in the S/K trade treks to the border market (Garissa) can be as long as 400-600 km with an average period of nine to 10 days. The motorized segment of the route from Garissa to Nairobi traverses 420 km on a paved road and requires only about six hours. Because trekking animals "on foot" is relatively

Figure 1. Cattle Exports from Moyale and Garissa, Kenya, 1991-2001



Source: Unpublished reports and data, Department of Livestock Production and District Veterinary Office Moyale and Garissa Districts, 1991-2002.

inexpensive, transport costs assume a higher percentage of total marketing costs in the E/K trade because of its reliance on motorized transport. Trucking can account for as much as 58 to 76 percent of marketing costs in the E/K trade, but only 34 percent in the S/K business.

Important differences occur in the institutional, social, and procurement arrangements of the two markets. Both businesses involve dyadic (buyer-to-seller) markets—often with the use of brokers as intermediaries—rather than open auctions. However, unlike the E/K commerce where there is considerable ethnic and social heterogeneity, actors at all levels of the S/K market chain are predominantly Somali. Consequently, the institutional arrangements and risks associated with the markets vary notably. Table 1 compares the ethnicity of traders in the two markets and reveals wide discrepancies in the social composition of the trade. While Somali traders dominate the S/K market, the E/K trade entails several different groups with the Burji representing the largest percentage of traders. National politics in the region have sharpened ethnic divisions in social and economic life, and exclusionary practices keep members of certain groups from assuming key roles in the cross-border trade.

Examination of suppliers and other actors in the two border markets also reveal critical differences. Virtually all of the suppliers, trekkers, and brokers in the S/K trade are Somalis, while the majority of the suppliers in the E/K trade are Boran and trekkers can be Gabra, Boran, or Garre. Market brokers are usually Burji or Boran in the E/K borderlands and Somali in the S/K area. Although the Boran only represent 22 percent of traders who sell to Nairobi in the E/K market chain, they comprise more than 80 percent of those who sell to Moyale itself. Contrary to this, the Burji occupy minimal roles as suppliers to the Moyale market but are dominant in buying at Moyale and supplying the Nairobi market.

What do these social differences imply for the cross-border trade? As would be expected, Kenyan-based Somali traders are buying from Somali herders or middlemen in the S/K cross-border commerce and can draw heavily on social relations based on kinship, marriage, and clan affiliation to enforce market contracts. Kenyan-based Burji and other traders in the E/K market, however, are mainly buying from Boran or, in some cases, Gabra or Garre herders and traders with whom they have minimal social ties. Unlike the S/K commerce, there is a strong ethnic division between producers and traders in the E/K trade and buyers rarely have partnerships with neighboring suppliers/producers. In fact, because of local politics there often are strained relationships between the different groups in the E/K commerce and the dominant Kenyan-based trading group, the Burji, are especially vulnerable to political pressures because of their minority status in the area. They deal with their Ethiopian-based counterparts (often Boran) who supply the Moyale market on a strictly cash basis. By contrast, the majority of Kenyan-based traders in the S/K business have strong market relationships with middlemen and herders on the other side of the border and use these ties to procure animals for the Kenyan market. Thus, the supply chain in the S/K trade tends to involve more complex buyer/seller relationships than the Ethiopian commerce, and these are reinforced by trust relationships based on common ethnicity and clan affiliations (Little 2003).

The market risks associated with the S/K and E/K trade also reveal important and surprising differences (Table 2). When traders were asked to identify their major problems with the cross-border trade, insecurity showed up as a major concern in both markets, but for different reasons. It was identified as more of a problem in the E/K than the S/K commerce. In the S/K trade most risks occur between supply areas and the border market (Garissa), while in the E/K exchange they are concentrated between the border venue (Moyale) and terminal market (Nairobi) and not in the supply catchments. These risks include violence and theft along the Moyale/

Table 1. Ethnicity of traders[1] at the Moyale and Garissa border markets, Kenya

ETHNICITY	MOYALE (%)	GARISSA (%)
Somali (including Garre)	8	92
Burji	50	--
Boran	22	--
Gabra	17	--
Other	3	8
Total	**100**	**100**

[1] *N = 84 traders for Garissa and N = 62 traders for Moyale*

Table 2. Occurence (%) of major problems associated with cross-border cattle trade[1]

PROBLEM	SOMALIA/KENYA BORDER TRADERS	ETHIOPIA/ KENYA BORDER TRADERS
Insecurity	20.0	32.5
Transport-related	12.0	25.0
Pasture/water	17.0	13.5
Market-related (low prices, excessive competition, etc.)	24.0	7.0
Animal Disease	6.0	0.0
Loan/credit problems	7.0	12.5
Fees/taxes (incl. bribes)	4.0	9.5
Other	10.0	0.0
Total	**100.0**	**100.0**

[1] *N = 84 for S/K traders; 71 for E/K traders*

Isiolo road, cash losses at the Nairobi market, and insecurity on the trekking routes between the E/K border and Kenya's interior markets. Few traders in the S/K commerce identified either thefts or Nairobi-based credit fraud or violence en route to Nairobi as major problems.

Other important risk differences in the two markets center on transport, price/market issues, and credit. Not surprisingly, with the poorly maintained and lengthy road between Moyale and Nairobi, transport was more of a concern for E/K than S/K merchants. As for the market itself, S/K traders voiced greater concerns than their counterparts over excessive supply, low prices, and 'cut throat' competition. With the collapse of Somalia's state in 1991 and the subsequent loss of export and domestic markets in southern Somalia, there are few market opportunities other than Kenya for Somalia-based traders. As a result, there are numerous Somali traders seeking opportunities in the cross-border business, resulting in a competitive and occasionally 'oversupplied' market. Trade possibilities, in turn, are better in southern Ethiopia, where there is the option of selling on the Addis Ababa market or to a small, but growing, export trade.

Credit/loan problems are issues in both market chains, but assume greater magnitude in the E/K than S/K trade. Virtually all traders from northern and northeastern Kenya sell their animals on credit/consignment to the large meat wholesalers in Nairobi. Most of these meat businesses are owned by members of other ethnic groups, although there are a few owned by wealthy, urban-based Somali. While less than 5 percent of S/K traders experienced losses of cash to wholesalers through loan default, more than 25 percent of E/K traders had this happen to them. In a survey of 35 E/K traders in 2001-2002, the average amount of credit owed to them from Nairobi wholesalers was US $2,992, an exorbitant amount for the scale of their operations (Mahmoud 2003: 201). Unlike S/K traders who have many personal and business contacts in Nairobi because of its sizable Somali population, E/K traders are from groups who are poorly represented in Nairobi and can draw on few enforcement mechanisms, including the legal system. Consequently, northern Kenyan merchants are easily exploited in Nairobi.

The institutional response to these risks in the E/K commerce has been the emergence of partnerships to facilitate the collection of Nairobi debts, the flow of market information between Nairobi and Moyale, and theft reduction along the Moyale-Nairobi road. Currently more than 90 percent of E/K traders are in partnerships with another trader, who is usually from the same ethnic group. One of the merchants stays in Moyale to buy Ethiopian animals and the other is based in Nairobi to sell and collect on payments. The Nairobi-based associate sells animals and relays market information back to Moyale via land-line telecommunications and, recently (2005) cell phones, as well as to collect on consigned animals. Without a person based in Nairobi, it is very difficult and expensive for a Moyale trader to wait around Nairobi to collect on debts. Mahmoud (2003:201) shows that E/K traders with a partner in Nairobi have about a 60 percent lesser chance of experiencing credit/payment defaults than those without partners.

Importantly, the Nairobi partner also arranges for the cash to be transported back to Moyale, usually by selling it to a Moyale businessman who may be in Nairobi buying supplies to transport back to Moyale. A quick phone call to Moyale confirms the transaction and the Moyale-based partner collects the cash from the wholesaler's business at the border town. This financial innovation minimizes the risk of having cash stolen to/from Moyale and Nairobi (Mahmoud 2003). Both the cattle trader and the Moyale-based wholesaler benefit from this arrangement, since the latter also does not have to travel with large amounts of money on the Moyale-Nairobi road.

With a different set of market risks, S/K traders build strong market relationships with suppliers based in southern Somalia rather than forge partnerships in Nairobi (Little 2003). In most cases these are not true partnerships as in the E/K example above, but an arrangement whereby the S/K trader regularly procures animals from one or more established middlemen and pays them a per animal fee or the market price when the animal is sold. In a few cases cash advances are made by the Kenyan-based businessman to facilitate procurement from Somalia. More than 80 percent of traders in the S/K commerce work under these institutional arrangements and usually deal with no more than two or three middlemen.

Practical Implications

Cross-border trade assists Kenya in meeting its national demand for animal products, while providing incomes and livelihoods for thousands of neighboring herders and traders. As this paper has shown, the trade itself confronts a range of risks and problems and traders and herders have developed a range of institutional mechanisms to respond to these. Policies that might mitigate risks associated with the trade involve both regional and national actions. At the regional level, considerable progress has been made, especially between Ethiopia and Kenya, in forming local border committees that address critical issues like cross-border trade. Nonetheless, at national levels there is still a lack of understanding of the critical role the trade plays in meeting local and national beef demand and in raising local incomes and business activities. Additionally there is a failure by officials of member states to acknowledge cross-border trade as a form of international commerce that brings value added to exporting countries similar as happens in the overseas export trade. Because of this lack of recognition and adequate information, trans-border commerce often is still portrayed as smuggling and illegal and, consequently, remains subject to disruptive border closures and animal confiscations.

The lack of adequate public infrastructure and security limits the benefits of cross-border trade both to individual countries and to local producers and merchants. As we have shown, most of these markets entail long-distance transport across sparsely populated, dangerous areas and over poorly maintained roads. Improvements to roads and public safety and the legal prosecution of unscrupulous wholesalers and merchants would go a long way toward increasing the gains from cross-border trade.

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About the authors: Dr. Peter D. Little is professor and Chair of Anthropology, University of Kentucky, and a principal investigator of the PARIMA project; e-mail: pdLitt1@uky.edu. Dr. Hussein A. Mahmoud is a lecturer in Geography at Egerton University, Kenya, and previously conducted his doctoral research with partial support from the PARIMA project; e-mail: hamahm2@yahoo.com.

The GL-CRSP Pastoral Risk Management (PARIMA) project was established in 1997 and conducts research, training, and outreach in an effort to improve welfare of pastoral and agro-pastoral peoples with a focus on northern Kenya and southern Ethiopia. The project is led by Dr. Layne Coppock, Utah State University; e-mail: Lcoppock@cc.usu.edu.

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Design by Susan L. Johnson

GLOBAL LIVESTOCK CRSP

Decentralization and its' Effects on Pastoral Resource Management in Northern Kenya

Kioko Munyao, World Vision Canada;
Chris Barrett, Cornell University
Pastoral Risk Management Project

Research Brief 05-04-PARIMA December 2005

Decentralization is commonly advocated as a means to improve democratic involvement in local governance systems, leading to more effective allocation and management of natural resources. However, devolving decision-making authority to lower levels of government and new community institutions does not guarantee progress in public participation, natural resource management, or equity. Our study of changing land use in the Hurri Hills of Marsabit District, Kenya, illustrates how decentralization can promote the interests of settled cultivators and negatively affect the interests of pastoralists.

Background

The Kenyan government's policy focus on rural development, initiated in the mid 1980's, as well as the advent of multiparty democracy in the early 1990's, created an impetus for devolving decision making to local levels. Discussions about and initiatives towards decentralization of governance at the district, division, and location levels have significantly progressed during the past decade. Simultaneously, governmental and non-governmental organizations have often targeted community-based groups to implement development projects and promote transparency and accountability. This has spawned a multitude of community groups, some of whose existence depends on donor funding. In pastoral areas this decentralization process does not automatically foster well informed, equitable, and representative decision-making. Such alternative institutions sometimes displace traditional bodies that derive their legitimacy from local people. This problem can be especially acute when new forms of governance give more power to settled residents and diminish the influence of important, but transient, traditional resource users such as pastoralists. This research explored these issues in the Hurri Hills area of Marsabit District where externally imposed changes in governance have combined with a World Bank Global Environmental Facility project to alter local patterns of natural resource management. We used a combination of research approaches including focus group methods and key informant interviews. Seven community groups were involved, including two women's groups, two environmental management committees, one youth group, and two groups of traditional elders. In addition, some staff members of various governmental and non-governmental organizations were interviewed.

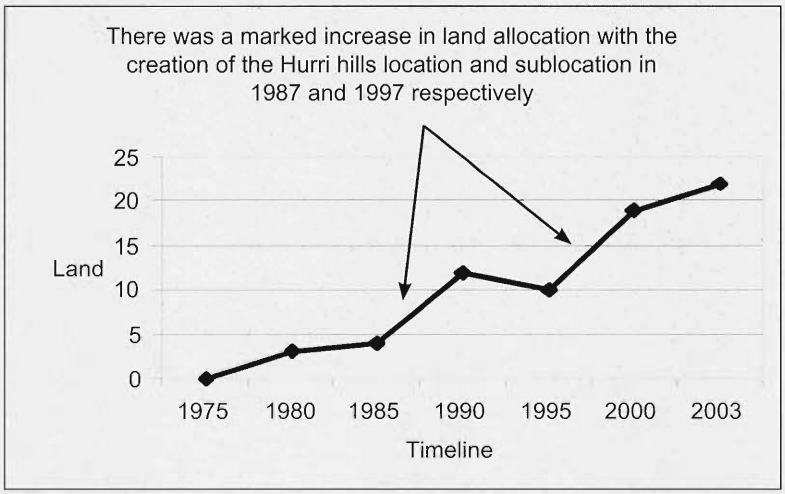
Preliminary Findings

The Hurri Hills of northern Kenya provides an example of how the effects of decentralization can unfold. Traditionally, the Hurri Hills were used by nomadic Gabra pastoralists and their herds who only visited the area at certain times of the year. Desitute Borana and Gabra households could settle in the Hurri Hills, but this was typically on a temporary basis and land allocation had to be negotiated with the Gabra nomads.

The Kenya government established the Hurri Hills "location" in 1987, and a "sub-location" was designated in 1997. These administrative units were intended to bring governmental decision making closer to the people. One major outcome was the establishment of a new Land Allocation Committee at the location level. This Committee provided a new mechanism to provide plots to individual applicants and the rate of land disbursement rapidly increased (Figure 1). Over 60% of our survey respondents had been allocated land via the Land Allocation Committee, compared to less than 30% who had been allocated land by the traditional system.

People who received plots from the Land Allocation Committee were also given permanent and legally defensible rights to the land. In contrast, allocation under the traditional system always remains subject to periodic review. This process has therefore given greater legitimacy to the settled people in the Hurri Hills and has been associated with dramatic increases in the area under cultivation (Figure 2). While there may be dual causality in this relationship—in other words, pressure to increase cultivation could help increase demand for legal empowerment of the Land Allocation Committee—the

Figure 1. Land allocation trend in the Hurri Hills, 1975-2003. Note the increase in numbers of people allocated land in 1987 and 1997.



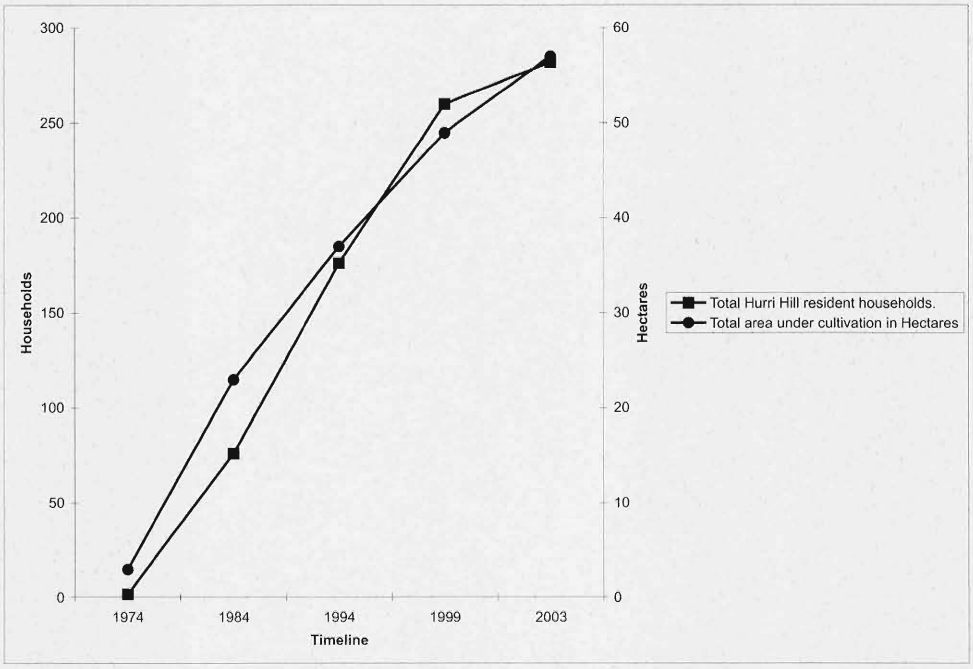
impacts of this process have negatively impacted resource use and land-use planning influence of the traditional Gabra pastoralists. Permanent settlement has compromised the access of Gabra herds to seasonally important forage resources. In this case decentralization has not taken into account the spatial and temporal variability of rangeland resources.

Decentralization has created artificial resource-use boundaries that have complicated administrative processes and fueled conflict among local people. Decentralization has enabled government to extend its control over local communities while at the same time gaining political mileage through the rhetoric of bringing government services and development closer to the people. Natural resources in the Hurri Hills have traditionally been managed in a communal fashion; decentralization has created new decision-making bodies officially sanctioned by government and endowed with legal authority to wield extensive power.

The creation of entities such as Land Allocation Committees has occurred within a wider framework where more and more community-based groups are emerging. For example, the number of community groups officially registered in the Hurri Hills has increased from virtually nil in 1975 to 25 by 2003. On the positive side, some groups have provided a voice for otherwise voiceless groups—especially women and young people—in an otherwise highly paternalistic pastoral community. But some groups have also created alternative centers of power within communities, thereby eroding the effectiveness of traditional community institutions. The recent emergence of a better educated, more politically aware class of elites among local communities on one hand, and the weakening of traditional institutions on the other, has been a source of conflict and ambiguity in most community-based resource management efforts in the Hurri Hills. This is because most initiatives in decentralization and community empowerment treat these two categories of people as a single entity, and this disregards their varied sources of legitimacy. In such cases, enforcement of community sanctions fails to achieve very much because the two groups differ in terms of cultural norms and legal status despite overlaps in resource-management mandates.

Another example from the Hurri Hills is the formation of an Environmental Management Committee (EMC) intended to spearhead environmental management and biodiversity conservation efforts. The EMC concept, introduced in the area three years ago, drew inspiration from experiences of GTZ working with the pastoral Rendille in southwest Marsabit District. Through the Marsabit Development Program (MDP), GTZ pushed for the establishment of EMCs to deal with problems of natural resource management and localized environmental degradation caused by overstocking and settlement at water points and trading centers (Haro et al., 2005). Ideally, the EMC membership is comprised of traditional leaders, women, and youths within an identifiable neighborhood based on shared resources. The EMC is charged with mobilizing and raising environmental awareness for user groups. It does this by helping organize meetings to elaborate and disseminate environmental management protocols aimed at minimizing natural-resource related conflicts and facilitating participatory assessment of implemented actions and measures. In most other parts of Marsabit District where this model is used, the EMC mainly deals with pastoralists and settled communities near water points and trading centers that comprise only one ethnic group. In the case of the Hurri Hills, however, the presence of ethnically diverse resident cultivators (Boran) and non-resident pastoralists (Gabra) greatly complicates the EMC's work and undermines its perceived legitimacy. In addition, as noted by Haro et al. (2005), the limited cultural precedence for a body such as an EMC to define new rules for resource use has led some community members to refuse to accept the final authority of the EMC. The EMC's dependency on elders or the authority of a local chief to enforce sanctions for non-compliance with conservation by-laws has also been a problem. In addition,

Figure 2. Trend of population and area under cultivation in the Hurri Hills, 1974-2003.



its inability to offer incentives for compliance has seriously compromised its effectiveness. Traditional enforcement of resource use restrictions has relied on community elders, and compliance may occur as a result of fear of being ostracized or cursed. Thus, in cases such as that of the Hurri Hills where support of the elders is not assured, the effectiveness of community-based efforts becomes doubtful.

Overall, decentralization in the Hurri Hills seems to have had several unintended and undesirable consequences. Increased settlement and cultivation has impeded traditional pastoralists' access to customary livestock migration routes and displaced them from critical wet-season grazing areas, thereby increasing the vulnerability of pastoral herds to drought. Conflicts over water and crop damage by livestock have also occurred. Increased settlement has accelerated localized environmental degradation due to greater demand for fuel wood and building timber as well as increased soil erosion due to cultivation.

Conclusions and Recommendations

Case studies from around the world indicate that decentralization intended to improve poor peoples' livelihoods and better conserve critical natural resources is often inadequately implemented. Many such reforms result in resource privatization, dilution of traditional authority, and a transfer of local power to central government (Ribot, 2004). The creation of new, powerful institutions thus can complicate resource management, much as they did in the colonial era.

In the Hurri Hills the presence of traditional pastoral elders in new resource management organizations has been a compromise aimed at building community consensus in natural resource management. But in reality the influence of the elders in these settings is minimal. Rather, the interests of the settled residents have proven decisive in determining the outcomes of resource management decisions.

The capacity of local communities to self-govern their natural resources in ways that promote conservation and equity cannot always be assumed (Barrett et al., 2001). Community-based approaches normally work best when there are strong local systems of social control to enforce access restrictions. The persistence of the Gabra traditional institutions, such as the Yaa Council of Elders, despite years of government-sanctioned competition, attests to their resilience. The overarching influence of entities such as the Yaa Council of Elders in the socio-political and economic life of the Gabra community is a testament to their credibility. Linking political and development decentralization strategies to existing community institutions will not only strengthen these institutions, but will also enhance the legitimacy of such strategies.

In the case of northern Kenya in general, and the Gabra in particular, the on-going national constitutional review process can be used to advocate for proper implementation of the devolution of state authority to local peoples. The experience of pastoral communities elsewhere has shown that when critical decisions are made at the local level the needs of pastoralists can be addressed promptly and meaningfully. Yet governments and development agencies must pay closer

attention to the array of local interests and the prospect for competing centers of power within local jurisdictions and what this could imply for changing land use patterns, equity, and security. Support for decentralized resource management will require a re-conceptualization of the role of the state and other local institutions in resource management. In many cases traditional or grass-roots institutions may be more successful than those imposed by the state (Finke, 2000). In some cases, however, state intervention is necessary to address the needs of otherwise marginalized groups in local communities. Creating bottom-up processes from existing top-down initiatives is difficult as communities are socially heterogeneous and prone to domination by local elites. Decentralizing governance of natural resources requires central government support and positive action in terms of policy and institutional reforms.

Influencing the policy environment is complex and highly dependent on the willingness of government to listen to its citizens (IIED, 2003). The highly disenfranchised nature of many pastoral communities makes this even more critical. In addition, a deeply ingrained bias against pastoral communities and pastoral regions militates against the ability of pastoral advocates to effectively lobby for policy change.

While there are many examples of successful decentralization strategies at the local level, the challenge remains how to disseminate and scale-up these successes in a sustainable manner. Wider appreciation of pastoralism as a viable livelihood system that is very well-suited to the ecology of rangelands may better inform attempts to decentralize natural resource management in arid and semi-arid lands.

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About the authors: Kioko Munyao previously worked for ITDG-Eastern Africa and FARM-Africa in northern Kenya and recently completed his M.P.S. in International Agriculture and Rural Development at Cornell University. He is now a Food Security Adviser for World Vision Canada. He can be contacted at e-mail Kioko_Munyao@worldvision.ca. Chris Barrett is International Professor of Applied Economics and Management, Cornell University, Ithaca, NY 14853-7801, email: cbb2@cornell.edu.

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GLOBAL LIVESTOCK CRSP

Bridging the Gap between Agricultural Technology Development and Adoption in Northern Kenya

George A. Keya, Michael Ngutu, Amos Adongo,
Isako Tura, National Arid Lands Research Center, KARI
Pastoral Risk Management Project

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Starting in 1998, the Kenya Agricultural Research Institute (KARI), through its National Arid Lands Research Center (NALRC), initiated and tested new research and outreach approaches with the aim of improving the acceptability and adoption of technology among pastoralists and agro-pastoralists in northern Kenya. These approaches included participatory research and technology development, local capacity building, catalyzing the adoption process, formation of partnerships among researchers and community members, giving priority attention to the gender dimensions of rural development, and actively disseminating research results among local people. Our results indicate that these approaches can be very effective in bridging the traditionally weak linkages between research and extension in Kenya and can improve the access of local people to technology and enhance rates of technology adoption. This philosophy seems likely to yield major benefits in terms of helping achieve positive impact on the rural poor and thus helps justify major research investments in arid areas.

Background

The challenge of improving technology adoption by farmers and pastoralists in Africa is immense. It is an important issue in the international donor community as well as developing country governments that must justify large investments in research. Likewise, national research institutions like KARI are coming under increasing pressure to achieve tangible impacts in the form of deliverables that enhance the productivity and welfare of rural producers and hence help justify research investments. The problem is therefore one of creating impact. In the arid areas where alternative livelihood options for local communities are limited, the technical and logistical constraints are formidable. Donors have queried research investments in these areas, in particular. Efforts to improve productivity are often hampered by the low adoption rates of technologies. This is linked to—among other factors—non-participation of stakeholders in the research process, weak linkages between research and extension, and lack of access to suitable technologies in risk-prone environments. Some of the factors that limit the access of rural producers to technology include poverty, inadequate information, illiteracy, and the often high cost and high risks of technology implementation.

From 1998, KARI, through its National Arid Lands Research Centre, initiated and tested new research approaches with the aim of improving acceptability and use of agricultural technologies among pastoralists and agro-pastoralists of northern Kenya. These approaches were implemented within the framework of the European Union supported Agricultural/Livestock Support Programme and the World Bank supported Agricultural Technology and Information Response Initiative (ATIRI). Intervention areas included natural resource management, improved crop production through water harvesting, livestock husbandry and health, and development and marketing of livestock products. Work was conducted in the Marsabit, Samburu, Turkana, Moyale, and Wajir Districts of northern Kenya. These are predominantly arid areas with a few arable sites. This research brief summarizes some of our experiences and lessons learned.

Findings

The diagnostic and constraint identification phase of the research cycle included participatory methods, rapid rural appraisals, and detailed exploratory and diagnostic surveys where 5,000 pastoralists and agro-pastoralists from 38 target areas throughout the region were involved in rigorous "self-evaluation" exercises. Identification, development, testing, and dissemination of technologies aimed at solving identified production constraints was carried out on site using Farming Systems Research (FSR) and Participatory Learning and Action Research (PLAR) approaches. Some of the tools used included community-based planning workshops, feedback workshops, and participatory monitoring. Producers were included in research planning process and invited to participate in institutional workshops and research advisory committee meetings, both at the local (NALRC) and national levels.

Capacity building involved providing adult literacy

Table 1. Profile of five groups supported through the Agricultural Technology and Information Response Initiative (ATIRI) in northern Kenya.

GROUP	MEN	WOMEN	TOTAL	OBJECTIVES	ACTIVITIES
Malakino	0	21	21	Integrate small-scale farming with income diversification and improve human nutrition	Tree nurseries and horticulture
Goro Ruksha	0	38	38	Increase productivity of small farms via use of labor-saving technology	Farming and Water harvesting
Songa	9	6	15	Increase milk production, enhance nutrient cycling, and increase incomes	Zero grazing
Mwangaza	0	26	26	Diversify income and improve food security	Loan scheme and drip irrigation
Robaf Nage	0	22	22	Income generation	Poultry keeping
Total	**9**	**113**	**122**		

classes for participating groups, technical training and demonstrations, and exposure of producers to novel concepts and practices through study tours. Participants were debriefed immediately after the tours through discussions on what had been learned and the actions they planned to take.

The process of catalyzing technology adoption involved empowering producers to access technologies through ATIRI. In this approach producers began the process by submitting competitive proposals to KARI. The proposals were evaluated for their merit and once approved, seed funds were allocated to participating Community Based Organizations (CBOs) to access demanded technologies. The scientists and other subject-matter specialists from select government line ministries and non-governmental organizations provided the necessary backstopping. The first phase of ATIRI support commenced in July, 2002, and was implemented through December, 2003. Table 1 shows a sample of groups that benefited from ATIRI support during this period.

To ensure a sustained process, partnerships were developed with relevant and willing stakeholders underpinned by clear Memoranda of Understanding (MoU). There were several purposes for developing partnerships: (1) Mobilize communities where the presence of a development partner was strong; (2) more efficiently utilize financial and human resources from partners to support activities of common interest to achieve greater impact; (3) increase outreach coverage in areas far removed from KARI's main circuit of operations, but where collaborating partners had activities and strong presence on the ground to ensure greater potential for up-scaling of successful technologies and management practices.

Using participatory rural appraisal tools, it was possible to elucidate gender roles with regard to various activities at the household level and therefore appropriately target the participants for different types of interventions. For example, where it was learned that women and children are the managers of goats and sheep, then these groups were targeted with small-stock interventions. In cases where milk technologies are concerned, women were targeted since they are the group that has primary access and control over dairy resources.

Local dissemination of research results was achieved through field days and agricultural shows. The major intervention areas included natural resource management, improved crop production through water harvesting technologies, livestock husbandry and health, and development and marketing of livestock products. During these events producers participating in different research activities were taken as resource persons to demonstrate and explain various technologies and management practices. In this way these "adopters" felt more appreciated and this increased their motivation. Overall, compared to the staff of government agencies or NGOs, the innovative producers were the superior facilitators of change within their peer groups. The main benefit of this new approach was the increase in the number of pastoralists, agro-pastoralists, and farmers adopting technologies and improved management practices and an increased awareness by rural people as to the importance of research and how research results can positively affect their daily lives. This was demonstrated by the relatively high adoption rates reported from among the different projects being implemented. For example, 100% adoption rates were recorded within three years for the following activities among target populations of several hundred people: (1)

Demarcation of protected tree-recruitment sites using red paint; (2) water harvesting and water saving technologies; and (3) use of movable housing for young livestock. Figure 1 depicts the adoption pattern for water harvesting and water saving technologies over three years.

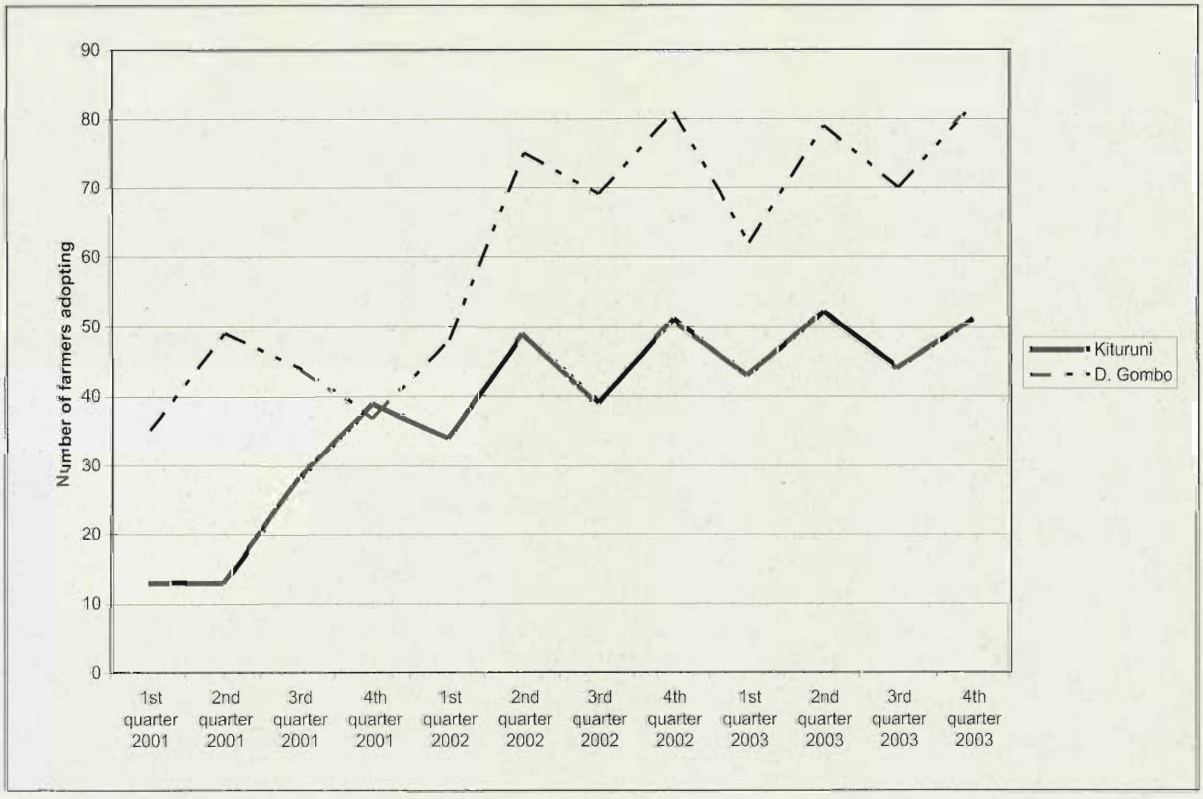
The process of catalyzing adoption has also been employed with various forms of producer groups. Three mini-dairies have been established. These mini-dairies have been managed by people trained in the management of micro-enterprises and group dynamics. Reliable markets have been established for about 400 producers who supply raw milk to dairy collection centers and this has resulted in higher household incomes. In wet seasons milk prices have stabilized at higher levels than were previously offered by brokers. Improved milk handling, processing, and marketing has reduced rates of milk spoilage. The dairies have created direct employment for about 10 non-group members with a total monthly income of over USD $200. This income supports more than 60 other relatives. Partnership with a collaborating local NGO resulted in the building of three additional small-scale milk-processing units. Through capacity building, formally illiterate people are now maintaining records of their sales transactions. This has increased their understanding of technology and has enhanced their decision-making processes. Training and demonstrations have assisted groups to take better charge of activities themselves.

It has also been noted that the new approaches have some negative attributes. These include difficulties in the verification of impact from technology tested with "on-farm trials" because strict compliance of participants with agreed experimental protocols could not be guaranteed. Issues related to education level and cultural beliefs also hampered full participation by some community members. The Rendille community, for example, restricted women from participating in some community gatherings related to our work, meaning that female perspectives were not readily accessible. Some of our scientists have proposed that a mixture of participatory and formal research methodology needs to be employed to ensure that strengths of each are achieved.

Practical Implications

To better bridge the gap between research and development, and to enhance the ability of producers to adopt beneficial research technologies, the agenda of the NALRC of KARI has embraced stakeholder participation, capacity building, development of partnerships, catalysing adoption processes, increased effort to locally disseminate research results, and gender mainstreaming. These tenets should be institutionalized if research in Africa is to be seen as an engine of development.

Figure 1. Adoption of water harvesting and water saving technologies by small farmers around Marsabit Mountain, 2001-2003.



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About the authors: All of the authors are staff members of the National Arid Lands Research Center (NALRC) for the Kenya Agricultural Research Institute (KARI) in Marsabit. Dr. George Keya is the Center Director; he has spent 22 years working on natural resource management issues in the arid zones of Kenya. Mr. Michael Ngutu, Mr. A. Adongo, and Mr. Isako Tura are all Research Officers. All can be contacted via the post at P.O. Box 147, Marsabit, Kenya, or by email at karimar@africaonline.co.ke.
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The GL-CRSP Pastoral Risk Management Project (PARIMA) was established in 1997 and conducts research, training, and outreach in an effort to improve welfare of pastoral and agro-pastoral peoples with a focus on northern Kenya and southern Ethiopia. The project is led by Dr. D. Layne Coppock, Utah State University, Email contact: Lcoppock@cc.usu.edu.

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Design by Susan L. Johnson

GLOBAL LIVESTOCK CRSP

Linking Pastoralists and Exporters in a Livestock Marketing Chain: Recent Experiences from Ethiopia

Solomon Desta, Getachew Gebru, Seyoum Tezera,
D. Layne Coppock, Utah State University
Pastoral Risk Management Project

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The Boran of southern Ethiopia have been traditionally viewed as unwilling or unable to engage in large scale, commercialized livestock trade. Here we report on the creation of a new livestock marketing chain from the Borana Plateau to export outlets largely serving the Gulf States. Since 2003 various meetings and exchange tours were organized by collaborating agencies and PARIMA to directly link pastoral producers with livestock exporters and policy makers. This occurred against a backdrop of growing export demand for small ruminants, rapid development of private export industry, formation of well-trained pastoral marketing groups (often dominated by women), and provision of external funds to initially capitalize on trading. We document that a positive market response has occurred. Eleven pastoral marketing groups sold 25,640 head of goats and sheep to export firms during 2004-5, just part of a much larger surge throughout the region. The pastoral groups have been moderately profitable and income-generation opportunities have been created, although marketing involvement has proven to be very risky in some situations. The groups procured animals from a 57,000-km² catchment across northern Kenya and southern Ethiopia, resulting in a novel, northbound flow of stock in a cross-border region previously thought to be exclusively dominated by southbound flows of stock to terminal markets in Nairobi. Overall, our observations suggest that given high demand and careful investment in capacity building as well as reduction of marketing risks, pastoralists can move aggressively to market small ruminants here.

Background

Traditionally, the Borana pastoralists of southern Ethiopia have strived to build-up their livestock herds. Livestock serve multiple purposes in Borana society, including milk production, meat production, a form of investment, and provide cultural values. Occasionally, cattle or small ruminants could be sold to buy food grain, clothing, and other commodities. The need to buy food is most apparent during dry periods when milk production from cows—the key component of human diets—is in decline. Accordingly, off-take rates for livestock have been low. The accumulated evidence suggests that the Boran in decades past have been very reluctant to engage in commercial livestock marketing, and for good reasons. Many social, economic, ecological, and policy factors have been cited as contributing to this behavior. As human populations grow in rangeland areas, however, others have suggested that pastoralists like the Boran will be forced to engage in more commercial livestock activity simply to increase human carrying capacity—exchanging animals for more calories as grain could be one means to this end. Human population pressure and a declining per capita supply of milk (because herds cannot grow beyond ecological limits) is also postulated to encourage more grain cultivation and spur an increasing interest in the diversification of livestock holdings (Desta and Coppock, 2004).

In the last few years several factors have altered the livestock marketing landscape in Ethiopia. There has been considerable development in the private livestock export industry. There has also been a growing demand for livestock products from Middle East and Gulf State nations. Evidence for this trend is especially evident for goat meat (Table 1).

Starting in 2000, the outreach arm of the PARIMA project in Ethiopia started to use participatory methods and strategic injection of development funds to identify sustainable, community-based interventions to improve pastoral risk management and mitigate poverty. Several years have been invested in the careful training and mentoring of 59 pastoral community groups, founded on concepts of non-formal education, micro-finance, and micro-enterprise development. As an outcome of these efforts, pastoral groups soon expressed an interest in livestock marketing. The PARIMA project, in partnership with communities and a variety of governmental and non-governmental agencies, embarked on a process to help build a new livestock marketing chain starting from the southern rangelands that would take advantage of national and international opportunities mentioned above.

Table 1. Volume (MT) of small ruminant meat exports from Ethiopia, 1993-2004[1]

YEAR	SMALL RUMINANT MEAT EXPORTS		
	Mutton, Lamb	Goat Meat	Total
1993	33	0	33
1994	124	69	193
1995	259	243	502
1996	259	243	502
1997	312	1,490	1,802
1998	155	2,302	2,457
1999	87	1,818	1,905
2000	13	1,149	1,162
2001	20	222	242
2002	184	879	1,063
2003	1,501	2,094	3,595
2004	354	6,024	6,378
Avg.	**275**	**1,378**	**1,653**

Notes:
[1] Data for 1993-2003 are from FAO statistics. Data for 2004 are unpublished statistics from the Ethiopian Livestock and Fisheries Marketing Department.

Leaders of pastoral groups, policy makers, and leaders of the livestock export industry were thus linked together in a series of exchange tours, workshops, and seminars starting in 2003. The exchange tours allowed pastoral leaders to learn about the size and quality (health) requirements for a new export market involving small ruminants. They also learned about what an export marketing chain entails. Policy makers and leaders of export firms also learned about the pastoral production potential of the rangeland areas. Initial purchase agreements were forged among buyers and sellers, and four exporting firms quickly began to operate in the southern rangelands. One key constraint discovered early on was a lack of capital for pastoral groups to procure small ruminants to sell to the exporters. Therefore, the African Union/Inter-African Bureau for Animal Resources (AU/IBAR) provided a total of USD $36,000 in interest-free loans to 10 of the pastoral groups and one new pastoral livestock marketing cooperative as test cases.

Here we report preliminary results of these aggregated activities, summarized more fully elsewhere in Desta et al. (forthcoming). Overall, the core concept is human capacity building. Four years ago members of our pastoral groups had little or no rudimentary reading ability, could not do simple arithmetic, had no training in managing grass-roots savings and credit operations, and had no formal knowledge of how to run a small business. We wanted to document what would happen after these pieces of the puzzle were put together. It was fortuitous that the training of pastoral groups coincided with major change and development in the Ethiopian livestock export industry.

Major Findings

Once things were set in motion, it did not take long for the market supply of small ruminants to dramatically surge in response to high export demand. For example, over 25,000 sheep and goats were sold by the 11 pastoral groups over 18 months to two of the exporters (Table 2). The marketing activity is on-going and the AU/IBAR loans are still in the process of being repaid. Three of the groups managed by women have been among the top performers overall. The cooperative has been the outstanding performer in terms of sales volume and profit, but the cooperative has had the longest period of marketing activity. Trading was a major factor in animal accumulation by the groups when compared to animal holdings. These pastoral households actually didn't own many sheep and goats themselves, as they tended to be poorer than average. The pastoral groups therefore searched extensively for suitable stock to sell to the exporters. Animals were collected from across the Borana Plateau and Guji lowlands in Ethiopia. They were also collected from deep into northern Kenya. We have estimated the size of the catchment overall to be at least 57,000 km^2.

The supply provided by the 11 pastoral marketing groups is only part of a larger picture for southern Ethiopia during the observation period. Statistics from the export firm called LUNA illustrate the situation—LUNA exported 49,800 dressed carcasses in 2003, growing to 241,209 dressed carcasses for 2004 and another 77,662 for the first quarter of 2005. The grand total for 27 months was 368,671 dressed carcasses. Importantly, from 85-90% of this supply was collected from the Borana Plateau, Guji lowlands, and northern Kenya. Prices in various markets in the area rose from Ethiopian Birr 3.50 to 5.50/kg live weight during this purchasing period. Buyers eventually collaborated and limited buying prices to Birr 4.00-4.50/kg live weight.

This large surge in marketed supply was also unusual in that the flow of stock headed northwards. Traditionally, Nairobi has been the southern destination for cattle, and to a lesser extent small ruminants, from southern Ethiopia. This observation of a northward market flow indicates that new market chains can form quickly under the right conditions. It has also been thought that the new flow of animals northwards must simply be subtracted from those that used to head south, and thus the overall market supply of animals has not increased. We recently interviewed traders at Kariobangi market in Nairobi to initially address this issue. The traders generally felt that the small ruminant market in the region was expanding; the new chain in Ethiopia was not thought to be affecting supply to Nairobi. In addition, the new export market for Ethiopia is demanding smaller, younger stock compared to that for Kenyan markets.

Table 2. Summary statistics for small ruminant marketing by pastoralists as performed by 10 savings and credit groups and one cooperative in the southern Ethiopian rangelands for 2004-5[1]

PROJECT	NUMBER OF MEMBERS	AMOUNT OF LOAN[2] (BIRR)	HEAD SOLD BY MARCH 2005	PURCHASING ENTERPRISE	PROFIT OBTAINED (BIRR)[3]	MONTH ACTIVITY STARTED
Groups A-E[4]	107	172,500	1,247	LUNA	NA[5]	October 2003
Group F	36	23,000	500	ELFORA	3,000	March 2004
Group G	35	23,000	3,761	LUNA	3,000	February 2004
Group H	20	23,000	931	LUNA	NA[5]	February 2004
Group I	36	23,000	4,631	ELFORA	8,900	February 2004
Group J	20	23,000	2,360	ELFORA	6,500	February 2004
Cooperative	40	23,000	12,210	LUNA	10,000	September 2003
Total	**289**	**310,500**	**25,640**	---	---	--

Notes:

[1]Names of groups and the cooperative have been withheld to promote confidentiality.

[2]Loans from AU-IBAR are interest-free and used to establish revolving funds. The exchange rate is 8.65 Ethiopian Birr per US dollar.

[3]Figures are only estimates because written records are probably incomplete. Some groups were also reluctant to provide exact figures. Loans have not yet been repaid. Marketing activity is on-going.

[4]Five groups merged activities at one site.

[5]Figures unavailable.

Despite successes achieved in building the new marketing chain, there have been some significant problems. The problems have mostly occurred in the local transfers of animals and money between pastoral producers and field agents who buy stock for the exporters. Failures of local transactions undermine trust on both sides. More problems seem to occur when flocks collected by pastoral groups are not picked up on time by the buyers and this can contribute to animal deaths and losses of condition. Delays in processing payments through local banks have occurred. Buying price can suddenly drop, turning profit into loss. In some cases local traders have disrupted marketing activity by newly formed pastoral groups. Other blockages have occurred when animals procured in Kenya were intercepted at the border and prohibited from entering into Ethiopia. The risks of marketing for pastoral groups are therefore high, and our groups have learned many valuable, but painful, lessons. Contracts are being developed between pastoral groups and buyers to help alleviate such problems. The process requires continual surveillance and pastoral groups still need mentoring. Conditions are now being created where market information and animal quality have heightened value. This can open the door for the application of new technology related to market information and animal heath.

Practical Implications

Helping pastoralists enter a new marketing chain is difficult and time-consuming. It requires perseverance, planning, and provision of long-term, high-quality technical support. Many pastoralists have deep-rooted suspicions towards outsiders and this inhibits formation of marketing partnerships. Some long-standing negative attitudes among livestock buyers towards pastoral areas and pastoralists are other hurdles to be overcome.

The results observed so far from this initiative with small ruminants have been encouraging. Pastoral marketing groups have responded to increased market demand for small ruminants. A new market chain has been created. Opportunities for income generation have spread in southern Ethiopia, and this prominently includes women as beneficiaries. Efforts to build human capital through education and mentoring are vital. Connecting buyers and sellers in forums to build trust and provide information to reduce market risks is fruitful, but contracts with legal protections for all parties are needed. Encouraging stakeholders to fully participate from the start enhances empowerment and shared ownership of a process.

The livestock export industry should help reduce business risks for pastoral producers, at least initially. Windows may be opening for information technology and animal health interventions to suddenly have greater applicability and value in the eyes of pastoral producers; more investment in these areas is essential. There is also a need to liberalize cross-border livestock trade and the movement of people between southern Ethiopia and northern Kenya. This would allow for more opportunistic market participation. Graduation of pastoral community groups into legally

recognized cooperatives, and later scaling these up into cooperative unions, is essential to gain bargaining power for pastoral livestock suppliers.

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About the authors: Drs. Solomon Desta and Getachew Gebru are research associates with the Dept. of Environment & Society (EnvS) at Utah State University (USU). They are based at the International Livestock Research Institute (ILRI) in Nairobi and Addis Ababa, respectively. They can be reached at S.Desta@cgiar.org and G.Gebru@cgiar.org. Mr. Seyoum Tezera is the outreach field coordinator for PARIMA in Ethiopia. He is also based at ILRI Ethiopia and can be contacted at S.Tezerra@cgiar.org . Dr. Layne Coppock is an Associate Professor in EnvS at USU, Logan, Utah, USA: lcoppock@cc.usu.edu.

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GLOBAL LIVESTOCK CRSP

Herd Dynamics, Social Networks, and Informal Transfers Among Southern Ethiopian Pastoralists

Paulo Santos, Christopher Barrett, Cornell University
Pastoral Risk Management Project

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Previous empirical work by the PARIMA project found evidence of highly nonlinear cattle accumulation dynamics among the Borana pastoralists of southern Ethiopia, consistent with the hypothesis of poverty traps. We explore two critical, logically subsequent questions: (1) Do Borana pastoralists understand these dynamics?; and (2) If they do, what are the consequences for informal inter-household gifts and loans of cattle? Using original primary data collected among the same population, we find that Borana pastoralists accurately perceive observed herd dynamics and that these patterns appear to result from adverse weather shocks affecting primarily households of intermediate or better herding ability. This underscores the importance of asset protection in the face of unanticipated shocks and has consequences on the design of transfer arrangements. In particular, we find that cattle transfers respond to recipients' cattle losses, but only so long as the recipient's herd does not fall too far below the critical asset threshold at which herd dynamics bifurcate. Those who are or become destitute disappear from social networks and do not receive transfers in response to shocks, so that public safety nets are required for the poorest households as complements to, rather than substitutes for, informal private social safety nets.

Background

Pastoralism is a risky activity. Climatic shocks, in particular, drive a cycle in which drought typically leads to a sharp decrease in herd size that is followed by a process of slow accumulation as better climatic conditions return. Recent research shows that individuals face different prospects for recovery from shocks—and different long-run steady state herd sizes—depending on their initial livestock holdings. Pastoralists who start either relatively wealthy (with herd sizes at around 40 cattle) or poor (with herds of one cow) are near their steady state herd sizes and, so long as the herds of wealthier individuals do not suffer severe shocks, their cattle holdings recover relatively quickly after droughts. Those who are shocked below the estimated critical herd size of roughly 2 cattle/person (or 12-15 head per household), however, tend not to recover but, instead, to collapse towards the lower-level equilibrium herd size of one cow.

These dynamics suggest the existence of a poverty trap. Those in the low-level equilibrium are, on average, unable to grow their herds, mainly because they become involuntarily sedentarized and cannot easily accumulate cattle when they are unable to take advantage of spatio-temporal variability in forage and water availability through opportunistic migration.

Related work in northern Kenya (Barrett et al., forthcoming), as well as recent theoretical work (Zimmerman and Carter, 2003), suggests that the existence of poverty traps and critical asset thresholds affects household risk-management behavior. For example, those near the critical threshold tend to increase savings (and reduce short-term consumption) in an effort to escape a collapse towards poverty.

Do poverty traps also affect the way people assist each other through gifts and loans that may attenuate the impact of a negative shock? Using detailed data on household characteristics, livelihood choices, and asset dynamics collected in four sites comprised of Borana residents in southern Ethiopia—the same ethnic group and area that Lybbert et al.(2004) studied--over 2000-2003 and including data from 2004 on social networks and transfers of cattle as gifts among these same households, we explore whether pastoralists perceive the cattle accumulation dynamics evident in herd history data and whether this affects social aspects of risk management.

Major Findings

Using data on pastoralists' expectations of herd size transitions under different rainfall states—data and methods are described in detail in Santos and Barrett (2006a)—we establish that Borana pastoralists indeed appear to understand the cattle accumulation dynamics that characterize their system. Moreover, their responses suggest that multiple dynamic equilibria arise due to adverse shocks associated with low rainfall years, but

Table 1. Knowing and giving--a hierarchical relation for Borana pastoralists in the southern Ethiopian rangelands[1]

		Give gift to match		
		No	Yes	Total
Know match	No	65	3	68
	Yes	370	123	493
	Total	435	126	561

[1] *Based on survey of residents in four locations. The entry "65" indicates that 65 of 68 respondents (96%) would not gift cattle to a person they did not personally know. The entry "123" indicates that 123 out of 493 respondents (25%) would gift cattle to a person they knew.*

this is only for pastoralists of intermediate or better herding ability. Mainstream pastoralists therefore commonly need safety nets to help avoid a collapse into destitution when severe droughts hit.

Social transfers—gifts between households—are a longstanding means of managing shocks after the fact. But not all herders have equal access to such transfers. Table 1 displays data related to who knows whom (social network structure) and who helps whom (social transfer patterns). Three key facts emerge. First, not everyone knows everyone else, even in an ethnically homogeneous setting in which virtually everyone pursues the same livelihood. Second, social acquaintance is clearly a necessary condition for one's willingness to make a transfer. People don't give livestock to those they don't know. Finally, mere acquaintance, although necessary, is clearly insufficient for mobilizing support. In just one quarter of the cases where the respondent knew the match was he or she willing to give an animal to the person. Plainly, the romantic image of homogeneous communities in which everyone knows everyone else and is willing to help everyone else is a fiction, at least in this setting.

Econometric analysis of the social transfers that do occur exhibit an interesting pattern that seems to reflect behavior in response to the existence of a poverty trap. Transfers flow in response to herd losses, but this effect depends heavily on the wealth of the prospective recipient household. If his or her wealth is too low—more precisely, below five cattle and thus in the vicinity of the low level equilibrium, signaling limited expected capacity to reciprocate in the future—then there is no expected transfer in reponse to herd loss. Only losses that leave an individual near the critical threshold, i.e., at a point where a modest transfer from another household can nudge the recipient back onto a recovery and growth path, trigger social transfers. The social safety net seems to operate only for those households of moderate or greater livestock wealth and not for the poorest.

Wealth dynamics affect social transfers largely by conditioning a herder's social network. Destitution (owning a herd that is persistently below 5 cattle) has a strongly negative and statistically significant impact on the probability of being known within the community. Since the possibility of receiving any assistance from others depends fundamentally on being known by others, as shown in Table 1, the social invisibility of the destitute explains much of their exclusion from social transfer networks. This is corroborated by other social science accounts that report exclusion from one's community is a traditional way of responding to persistent destitution among east Africa pastoralists (Illife 1987, Anderson and Broch-Due 1999). As we argue, at length, elsewhere (Santos and Barrett 2006b), the triage that results from these two effects (transfers conditioned by ex-post wealth and social exclusion as a function of wealth) leads to a social safety net system appropriate to an environment characterized by poverty traps.

Practical Implications

Wealth dynamics have a profound impact upon the structure of the informal institutions east African pastoralists use to manage risk. In particular, the existence of asset thresholds at which wealth and welfare dynamics bifurcate highlights the criticality of safety nets designed to catch people suffering shocks so as to enable them to recover and to keep them from falling into long-term destitution. Borana pastoralists recognize these patterns in their own descriptions of herd

dynamics and act in such a way that marginalizes those who are trapped in persistent poverty, concentrating transfers on those who are below, but sufficiently near, the unstable threshold for asset transfers to make a difference in terms of the recipient's viability as a pastoralist. The apparent social invisibility of the persistently poor appears to be the corollary of a safety net approach that necessarily involves triage.

This result clearly opens a window for public intervention in attacking persistent poverty, as it squarely addresses one common criticism of outside interventions: that they "crowd out" private transfers, disrupting extant social transfer systems and failing to produce net positive transfers to the poor since those from outside the system merely offset those that would otherwise emerge within the system. While that may be true, up to a point, for some wealthier herders—although transfer volumes are quite limited, so the extent of any such displacement is questionable (Lybbert et al., 2004)—it seems untrue for poorer households.

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About the authors: Paulo Santos is a doctoral candidate in the Department of Applied Economics and Management, Cornell University, Ithaca, NY 14853-7801, USA. He can be contacted at e-mail ps253@cornell.edu. Chris Barrett is International Professor of Applied Economics and Management, Cornell University, Ithaca, NY 14853-7801, email: cbb2@cornell.edu.

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GLOBAL LIVESTOCK CRSP

Degree of Sedentarization Affects Risks and Conflicts for the Waso Boran in Northern Kenya

Abdullahi D. Jillo, Mark N. Mutinda, Abdillahi A. Aboud,
Egerton University; D. Layne Coppock, Utah State University
Pastoral Risk Management Project

Research Brief 05-08-PARIMA December 2005

The Waso Borana have lived for over a century in northern Kenya. In the last few decades, however, their ability to maintain their traditions has been severely challenged. Here we report survey results from 540 households in Isiolo District, stratified among three groups differing in terms of lifestyle: sedentary, semi-sedentary, and mobile. In some cases these groups vary with respect to important perceived risks, causes of natural-resource related conflict, and possible solutions to conflict. For example, sedentary respondents often noted concerns over land tenure problems, human diseases, and political incitement. Mobile respondents, in contrast, often noted primary concerns over drought, shortages of human food, and inappropriate water developments. Semi-sedentary households could reportedly evade some risks and conflicts better than the other groups by using short, opportunistic movements of people or livestock. Despite variation among groups in their perceptions of problems, it was generally agreed that control of weapons proliferation, promotion of appropriate resource-use policies, control over political incitement, and (in some cases) reduction of livestock numbers are important partial solutions. In conclusion, we feel that government has failed the Waso Boran in several respects. These include failures to provide external livelihood options to reduce local population pressure, a safe and secure production environment, and an appropriate and enforceable land use policy for the area. International coordination is also needed to address local problems that originate outside of Kenya.

Background

The once productive rangelands of northern Kenya, traditionally dominated by a mix of woody species (*Acacia, Commiphora, Cordia spp.*) and graminoids (*Tetrapogon, Aristida, Chrysopogon and Sporobolus spp.*), have gradually deteriorated in ecological condition over recent decades (Herlocker, 1999). A major factor blamed for this trend is the disintegration of traditional systems of land stewardship. Traditional authority has waned in northern Kenya and has often been replaced by open-access tenure that is overseen by ineffectual government administrators. Couple this with frequent droughts that typify this zone, as well as expanding populations of people and livestock, and the net result is increasing resource competition and conflicts. Local people throughout northern Kenya have reportedly entered a survival mode where the incidence of armed conflict has increased because resource-based disputes have intensified (Smith et al., 2000). An objective of this research was to investigate, quantify, and rank the views of the Waso Borana people, one of many ethnic groups in the northern Kenyan rangelands, concerning the risks they face and the causes and possible solutions to conflicts that revolve around natural resources.

Data reported here represent just one small portion of the information collected from a larger household survey conducted for doctoral research by A. D. Jillo among the Waso Borana. A questionnaire was administered to 540 households in Isiolo District during the past year, with the head of the household or his representative responding. The three lifestyles practiced among the Waso Boran in Isiolo District include sedentary, semi-sedentary, and fully mobile pastoralism. Sedentary means that the family members live in one place throughout the year, usually in proximity to a permanent village or town. The livestock of sedentary households may sometimes roam widely, but the animals tend to remain in the same general area all year. The semi-sedentary lifestyle means that both the family members and livestock can occasionally move during the year. This primarily occurs according to seasonal changes in availability of forage or water. The mobile lifestyle, in contrast, is when both people and livestock can opportunistically move all year as needed.

Our sample sizes for these three lifestyle groups varied from 120 (semi-sedentary) to 180 (sedentary) and 240 (mobile). Results documented here were obtained using open-ended questions as follow: (1) what risks do you encounter?; (2) what are the main causes of conflicts that you experience?; and (3) what solutions do you recommend to reduce these conflicts? Respondents provided as many answers as they could to each question.

Table 1. Frequency of important risks perceived by household heads representing three types of pastoral lifestyles among the Waso Boran of Isiolo District, Kenya.[1]

Important Risks as Perceived by Household Heads	Types of Lifestyles							
	Sedentary Households		Semi-Sedentary Households		Mobile Households		Total Households	
	No.	%	No.	%	No.	%	No.	%
Drought	109	(28%)	58	(15%)	221	(57%)	388	(72%)
Grazing shortage	115	(30%)	62	(16%)	209	(54%)	386	(72%)
Water shortage	112	(29%)	58	(15%)	214	(56%)	384	(71%)
Insecurity	112	(30%)	60	(16%)	206	(54%)	378	(70%)
Food shortage	101	(27%)	59	(16%)	217	(57%)	377	(70%)
Resource-use conflict	106	(30%)	60	(17%)	188	(53%)	354	(66%)
Resource tenure problems	105	(44%)	75	(32%)	58	(24%)	238	(44%)
Human diseases	109	(49%)	54	(24%)	60	(27%)	223	(41%)
Poor market access	36	(22%)	60	(37%)	66	(41%)	162	(30%)
Livestock diseases	6	(16%)	2	(5%)	30	(79%)	38	(7%)

[1] *Entries are based on sample sizes that varied from 120 households (semi-sedentary), to 180 (sedentary), and 240 (mobile).*
Source: A.D. Jillo (in preparation).

Table 2. Frequency of important causes of natural-resource related conflicts as perceived by household heads representing three types of pastoral lifestyles among the Waso Borana of Isiolo District, Kenya. See text for description of various causes of conflict. [1]

Important Causes of Conflicts as Perceived by Household Heads	Types of Livelihoods							
	Sedentary Households		Semi-Sedentary Households		Mobile Households		Total Households	
	No.	%	No.	%	No.	%	No.	%
Ethnic differences	162	(35%)	118	(26%)	178	(39%)	458	(85%)
Influx of weapons	173	(38%)	110	(24%)	175	(38%)	458	(85%)
Water shortage	157	(41%)	42	(11%)	187	(48%)	386	(72%)
Predatory wildlife	129	(33%)	102	(27%)	156	(40%)	387	(72%)
Shortage of grazing land	157	(44%)	43	(12%)	155	(44%)	355	(66%)
Resource tenure	108	(49%)	58	(26%)	55	(25%)	221	(51%)
Encroachment of Cultivation	70	(49%)	67	(47%)	6	(4%)	143	(27%)
Development interventions	79	(57%)	1	(<1%)	58	(42%)	138	(26%)
Livestock numbers	57	(55%)	7	(7%)	40	(38%)	104	(19%)
Political incitement	60	(90%)	0	(0%)	7	(10%)	67	(12%)

[1] *Entries are based on sample sizes that varied from 120 households (semi-sedentary), to 180 (sedentary), and 240 (mobile).*
Source: A.D. Jillo (in preparation).

Findings

The most common risks perceived by the respondents are shown in Table 1. Across all three types of lifestyles, the household heads were most concerned about drought and shortages of forage, water, and human food. Prevalence of resource-related conflict was also seen as a significant problem. In contrast, market access and livestock diseases were viewed as less important risks overall. There was important variation due to lifestyle, however. For example, the mobile households considered drought, shortage of grazing and water, insecurity, human food shortages, and resource-use conflicts as the most significant, while the sedentary and semi-sedentary households considered land-tenure problems, human diseases, and poor market access as more important (Table 1).

The most common perceived causes of resource-related conflicts are shown in Table 2. Across all three types of lifestyles the household heads most commonly mentioned basic ethnic differences, influx of weapons, and shortages of forage and water. At the bottom of the list were things like numbers of livestock and political incitement. Again, there was important variation due to lifestyle, however. For example, while encroachment of cultivation on seasonal grazing lands was considered as a very important cause of conflict for the semi-sedentary households, the sedentary households more commonly listed a broader array of causes, prominently including political incitement, inappropriate development interventions (such as establishment of permanent settlements and wildlife sanctuaries in dry-season grazing areas), encroachment of cultivation on grazing lands, and new (competitive) forms of resource tenure. The political incitement factor was often reported by sedentary respondents for several reasons and we clarify these points here. The elites who incite political problems live in towns or villages. Political incitement occurs during election campaigns and ethnic, land-use, or development issues are commonly used as the "fuel for the fire." Sedentary pastoral households are accessible to such politicians and can be easily mobilized into violence. Sedentary pastoralists are also most vulnerable to loss of assets and livelihoods from political violence.

The mobile respondents prioritized shortages of water and forage, high livestock numbers, and other development interventions (such as boreholes in wet season grazing areas, lack of water use regulations for government-constructed water points, establishment of irrigation schemes and wildlife sanctuaries, and implementation of projects that restrict mobility such as grazing blocks that concentrate people and stock in small areas). In general, the semi-sedentary households were reportedly most able to evade conflicts based on water shortages, political incitement, etc., compared to the sedentary and mobile groups (Table 2). This is because the semi-sedentary households are better able to employ short, opportunistic movements of people and stock to less-risky situations.

The most commonly mentioned solutions to conflicts are

Table 3. Ranked order of possible solutions to natural-resource related conflicts as perceived by household heads representing three types of pastoral lifestyles among the Waso Boran of Isiolo District, Kenya.[1]

Important Potential Solutions to Conflicts as Perceived by Household Heads	Types of Livelihoods							
	Sedentary Households		Semi-Sedentary Households		Mobile Households		Total Households	
	No.	%	No.	%	No.	%	No.	%
Control of weapons influx	174	(34%)	101	(20%)	233	(46%)	508	(94%)
Enforce ethnic boundaries	102	(20%)	167	(33%)	235	(47%)	504	(93%)
Pastoral land control	113	(28%)	76	(19%)	216	(53%)	405	(75%)
Improve water facilities	172	(42%)	51	(13%)	183	(45%)	406	(75%)
Enforce appropriate land tenure regulations	112	(49%)	53	(23%)	65	(28%)	230	(43%)
Control predatory wildlife and encroaching agriculture	91	(40%)	60	(27%)	74	(33%)	225	(42%)
Reduce livestock numbers	113	(51%)	76	(34%)	32	(15%)	221	(41%)
Stop political incitement	56	(95%)	1	(2%)	2	(3%)	59	(11%)

[1]*Entries are based on sample sizes that varied from 120 households (semi-sedentary), to 180 (sedentary), and 240 (mobile)*
Source: A.D. Jillo (in preparation)

shown in Table 3. Across all three lifestyles, the most common responses concerned control of weapons and enforcing ethnic boundaries, securing pastoral legal control over the rangelands, and improvement of water facilities. Again, there was important variation due to lifestyle, however. For example, the mobile pastoralists more clearly supported the ideas of having pastoral interests fully control the rangelands, enforcing ethnic boundaries, controlling the influx of weapons, and improving water facilities. The sedentary group, in contrast, strongly advocated stopping political incitement, with some attention to reducing livestock numbers and enforcing appropriate land tenure regimes. The semi-sedentary group considered reducing livestock numbers and enforcing ethnic boundaries as most important.

Practical Implications

Fear of violent conflict is reportedly pervasive in the Waso Borana region of northern Kenya. Although increased populations of people and livestock are likely to be the root causes of conflict related to scarcity of natural resources, the respondents tended to identify symptoms of over-population problems. There has been a systematic failure of government to provide choices and options for people who may desire to exit the pastoral sector, thereby releasing more resources to those that remain behind. Government has also failed to provide an environment secure from fear and violence, and a major dimension of this is a chaotic pattern of natural resource use and access that promotes insecurity. Until commitments are made by government to reduce conflict and restore confidence of local people in a predictable form of natural resource access and governance, technical intervention to enhance forage and water supplies, for example, will be irrelevant. Relief, rather than development, will continue to dominate the social agenda.

The control of weapons proliferation appears to be the most clearly defined short-term objective that would be helpful to achieve. Associated efforts by policy makers to protect the rights of local people with respect to land access and use are also vital. Some of the local problems in Isiolo District have international roots, however. Unrest within neighboring countries such as Ethiopia and Somalia occasionally spills over into northern Kenya, and weapons may originate from these sources. International coordination is therefore required in any long-term, viable solution to reduce crises in Isiolo District.

Finally, to be technically effective interventions to reduce conflict must be location and lifestyle-specific and address the diverse needs of each of the three groups described here. Blanket application of corrective measures may not be productive.

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About the authors: Abdullahi Dima Jillo and Mark Mutinda are both doctoral students, and Prof. Abdillahi A. Aboud is a senior faculty member, in the Department of Natural Resources at Egerton University, Kenya. They can all be reached at P.O. Box 536, Njoro, Kenya. Jillo and Aboud can be contacted at the following email address: eu-crsp @africaonline.ke.co. Mark Mutinda can be contacted at lnmutinda@yahoo.com. Dr. Layne Coppock is an Associate Professor in the Department of Environment & Society at Utah State University, Logan, USA: lcoppock@cc.usu.edu

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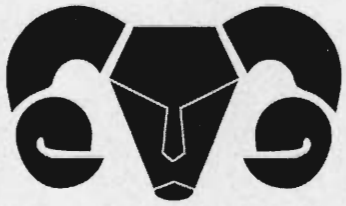


Do Livestock Transfers Among Gabra Herders Insure Against Herd Loss?

John G. McPeak, Syracuse University
Pastoral Risk Management Project

Research Brief 05-09-PARIMA December 2005

In pastoral societies, the transfer of animals from one household to another as gifts or loans is commonly observed. Three main interpretations of these livestock transfers have been advanced in the anthropological literature. First, transfers serve as a risk coping mechanisms—following livestock losses due to droughts, raids, or other adverse events, livestock flow into the impacted household's herd from herds belonging to other herders to avoid a food security crisis and help begin the herd rebuilding process. Second, transfers serve as risk management mechanisms—herders build a network of claims on other herders by strategically selecting transfer partners so that should they need animals in the future, they can call on pre-established relationships. Third, livestock transfers serve as a form of taxation that prevents excessive inequality—transfers flow from the wealthy to the poor in order to prevent poverty and increase equality. This study contrasts these three explanations using data on livestock transfers among Gabra herders in northern Kenya. Econometric analysis of transfers in and out of 88 household herds over a four year period (1993-1997) was performed. Findings have implications for both research on risk-sharing institutions and for the design of development policies in pastoral areas.[1]

Background

In many low-income, high-risk environments, formal sector risk-management institutions are not available. In the absence of formal sector alternatives, households must rely on a combination of self-insurance and informal risk-sharing institutions. The cultural practice of giving or loaning animals among pastoral households has been described in the anthropological literature as an informal risk-sharing arrangement.

Recent economic investigations of informal risk sharing mechanisms focus on how groups deal with the possibility that some individuals will not honor their obligation to help others in the group once the outcome of an event is known. In economics, this is called the "commitment problem." A variety of studies have shown that one way that is frequently used to address the commitment problem is to condition current period transfers on a record of past transfer behavior. That is, people are more likely to help you if you helped them or others in the past and less likely to help you if you did not provide such assistance in the past.

Another discovery made by researchers is that risk-sharing networks often are composed of groups within a community rather than as networks that encompass a whole geographically defined community. What is more, it appears that individuals have some ability to select which group they will be members of, and also are able to opt out of one group if they are unhappy with how it is performing. This means understanding informal risk sharing requires understanding the incentive structure influencing who enters into or opts out of a particular risk sharing group.

A key element to understanding the incentive structure facing herd owners in pastoral societies is related to recent research on asset dynamics and poverty traps. Current period asset holdings, in this case livestock, can significantly influence a household's future income and asset levels. Those with herd sizes below a critical threshold are unlikely to have their herd grow to a level that will take them out of poverty and thus enable them to reciprocate help given to them now by loaning out livestock to others who find themselves in need in the future. This implies that transfers may go to herders not just based on their observed need of help, but also may be influenced by estimates of the recipient's expected capacity to reciprocate in the future.

Thus, this study was undertaken to investigate how livestock transfers operate, and to assess how effective they are in helping herders deal with the risk of livestock loss. As livestock loss is an ever-present possibility for pastoralists, a relevant policy question is how formal development interventions should be designed to be compatible with this informal mechanism, or if the informal mechanism obviates the need for a formal development intervention.

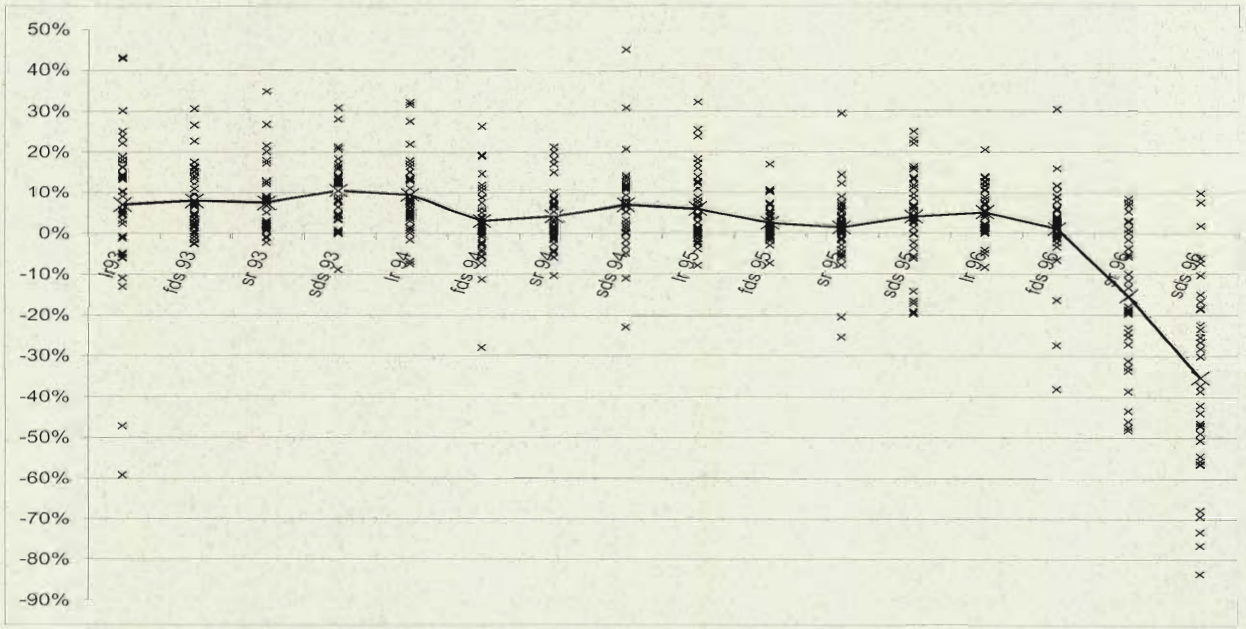
Major Findings

The first major finding to report concerns the nature of herd loss in this area. One issue that needs to be investigated is the nature of herd loss. Clearly, if all households experience good times at the same time, and bad times during others, transfers between households will be of limited assistance. In economic terms, to what degree is risk idiosyncratic, thus affecting households differently at a given time, and to what degree is it covariate, effecting households in a common fashion at a given time? Figure one presents information on seasonal growth rates for household herds for half of the sample that are located in the Chalbi area. Each household is represented by an 'x' and a solid line representing the time period specific average of these household specific growth rates reflecting the net impact of births and deaths. Figure one illustrates that while herd loss on average follows a 'boom and bust' pattern, there is clearly a high degree of variability in how households experience growth. In every period, there are some households experiencing positive growth while others experience negative growth. This illustrates that the risk of herd loss is an ever-present reality. Given this pattern, it would seem transfers would serve as an effective means to confront herd loss, as there are in every period some 'winners' who can help out the 'losers', or more technically, there appears to be a significant idiosyncratic element to herd loss.

There are multiple types of transfers in Gabra society. In most cases of transfers recorded in the data set (92%), full ownership rights are transferred. For the remaining 8% rights to the transferred animal or future offspring are retained in some form by the donor. Most transfers were of goats and sheep (87%) and most involved female animals (57%). Transfers take place largely among people who are related in some sense (93% were described as moving animals between households that had some kind of family link) and who have transferred to each other in the past (72% to transfers were said to go to an individual to whom one had given in the past, 61% to individuals from whom one had received in the past). All 88 households surveyed engaged in livestock transfers at least once between 1993 and 1997.

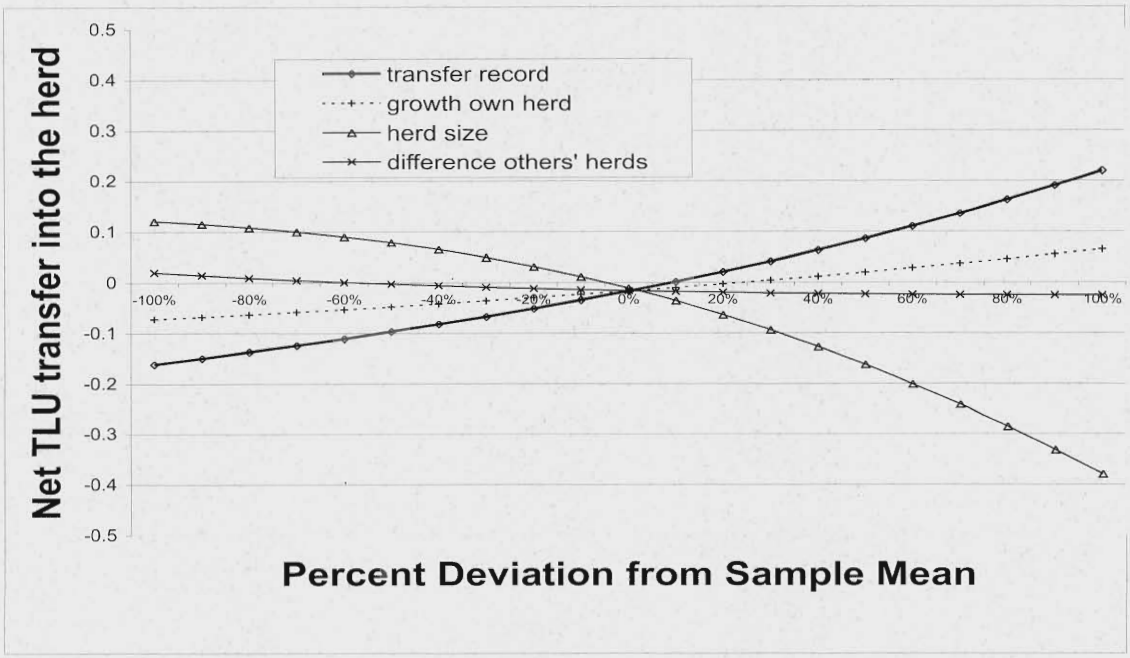
The data set was structured around the bi-modal rainfall pattern in the study area (in figure one fr is first rains, fds is first dry season, sr is second rains, sdr is second dry season), so each observation corresponds roughly to a three-month period for a given household. For the majority of observations (61%), herders did not transfer animals into or out of their herd. For 29% of observations they either transferred in or transferred out, and for the remaining 10% of observations they both transferred in and out of their herd in a given period. The average size of a transfer in or out of the herd when a transfer did happen is around 0.6 TLU's, or roughly 6 sheep or goats.[2] The overall average transfer level for all observations (including those when none are transferred) is 0.14 TLU out of the herd and 0.13 TLU into the herd, or just over one goat or sheep per period.[3]

Figure 1. Household Specific and Time Period Average for Chalbi Three Month Herd Growth Rates, early 1993-early 1997



The solid line represents the average for all households. Household specific observations per time period are denoted by an x. fr = first rains; fds = first dry season; sr = second rains; and sdr = second dry season.

Figure 2. Simulation of estimation results to predict net transfer.



To put this in context, consider that the average herd size in surveyed households over all time periods was 29 TLUs (equivalent to 290 goats or sheep), herd losses during a drought in late 1996 averaged 12.2 TLUs per household (122 goats or sheep), and of the 8% of herders who reported herd losses to raiders from 1993-1997, the average household loss was 14 TLU per raid (140 goats or sheep). Alternatively, we can contrast the magnitude of transfers to that of herd growth, as the average herd increased by 0.5 TLU per three month period (5 goats or sheep) due to births and deaths in the household herd.

Econometric analysis of livestock transfer behavior reveals that transfers are conditioned on past transfer behavior. Those with a record of being net donors of livestock in the past are more likely to obtain transfers into their herd—all else equal—than herders with records of being past recipients. This is represented by the dark line labeled 'transfer record' in figure two. It is also the case that transfers into the herd are positively correlated with herd growth due to births and deaths in the household herd over the past year. That is, transfers do not appear to flow to herders after they suffer losses, but rather are obtained after recovery is already underway in the household herd. This is illustrated by the dashed line labeled 'growth own herd'. Household herd size does have a significant impact on transfer behavior, as herders transfer animals out of the herd when it is bigger and transfer animals into the herd when it is smaller as represented by the solid line with a triangle labeled 'herd size'. However, it does not appear that transfers are directly redistributive, as there is little evidence that transfers go from herders with larger than average herds to herders with smaller than average herds within a given period as noted by the solid line with an x labeled 'difference others' herds'.

Practical Implications

Livestock transfers in this area are found to be limited in the help they give to households attempting to escape poverty or avoid poverty due to livestock losses. The existing informal practice of livestock transfers between households helps some, but the size of the transfers are extremely small compared to the size of the losses households suffer. In addition, help is not provided solely on the basis of need. Transfers flow to those who have helped others more in the past than they have been helped, and also to those whose herds are growing. The decision to transfer animals out of the herd seems most consistent with a risk management strategy—as a herd becomes large enough, a herd owner establishes or reinforces relationships with those most likely to be able to return the favor if the current period donor suffers a change in fortune in the future. Overall, herders don't seem to seek out those most in need of help, but rather they target those who have small but growing herds and a history of giving animals to others in the past.

One policy alternative is to target livestock transfers at those also targeted by informal assistance, under the assumption that the evaluation of other herders in the area about who is most likely to make good use of the transfer is correct. This would make sense if herders understand there is some kind of threshold in herd size above which one is drawn toward sustainable production and below which one is driven out of

livestock raising, and they target those at or slightly below this threshold. Another alternative would be to specifically target those excluded from the informal transfer mechanism directly with a long-term program of restocking, training, and support to help them escape poverty. The specific context would help determine which was more desired by the community, financially viable, and otherwise appropriate. In either case, it is clear that current transfers do not address food security crises, as they come at least a year after recovery has begun within the household herd.

Footnotes

[1] This brief summarizes the findings of a paper forthcoming in the Journal of Development Economics entitled "Confronting the Risk of Asset Loss: What Role do Livestock Transfers in Northern Kenya Play?" by the author of this brief.
[2] A TLU is a tropical livestock unit, corresponding to 1 TLU = 0.7 camels = 1 head of cattle = 10 sheep = 11 goats.
[3] The net transfer average is essentially zero.

Further Reading

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About the author: Dr. John McPeak is an assistant professor in the Departments of Public Administration and Economics at Syracuse University. He can be reached at 336 Eggers Hall, Syracuse University, Syracuse, NY 13244, USA, or via e-mail at jomcpeak@maxwell.syr.edu.

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Design by Susan L. Johnson

GLOBAL LIVESTOCK CRSP

Collective Action by Women's Groups to Combat Drought and Poverty in Northern Kenya

D. Layne Coppock, Solomon Desta, and Getachew Gebru, Utah State University; Adan Wako, Ibrahim Aden, and Chachu Tadecha, CIFA-Kenya; and Seyoum Tezera, PARIMA Pastoral Risk Management Project

Research Brief 06-01-PARIMA December 2006

Collective action can be an effective means of local development and risk reduction among rural people, but few examples have been documented in pastoral areas. We conducted extensive interviews for 16 women's groups residing in northern Kenya. Our objectives were to understand how groups were formed, governed, and sustained and what activities they have pursued. The groups we interviewed were 10 years old, on average. Charter memberships averaged about 24 women, 20 of whom were illiterate. Half of the groups formed after facilitation by a development partner and half formed spontaneously. Groups are governed under detailed constitutional frameworks with elected leaders. Groups primarily form to improve living standards of the members and undertake a wide variety of activities founded on savings and credit schemes, income diversification, small business development, education, health service delivery, and natural resource management. Groups have evolved means to buffer members from drought and poverty. The greatest threats to the sustainability of the groups come from internal factors such as unfavorable group dynamics and illiteracy, while external challenges include drought, poverty, and political incitement. Principles of good group governance and wisdom in business are reportedly the key ingredients for long-term success.

Background

Collective action is well known as a positive community-development force. Group formation can build social capital and enhance income generation among the poor (Grootaert, 2001). Place et al. (2004) describe a variety of self-help groups recently emerging in the Kenyan highlands. These groups, often dominated by women, undertake many social and economic activities. There is far less evidence, however, of similar collective behavior occurring among rangeland inhabitants. In 1999, a routine reconnaissance conducted by the PARIMA project in north-central Kenya revealed the existence of very dynamic women's groups living in some settlements. Preliminary interviews suggested that these women, though largely illiterate, were highly organized and engaged in a wide variety of innovative activities. Our main objective for this work was to explore attributes of a broader selection of women's groups across northern Kenya. We wanted to know how groups were formed and governed, as well as what activities they successfully pursue. Can such groups cope with drought and reduce poverty? Are the groups sustainable, and what most threatens their survival?

A large (i.e., 70-question), semi-structured questionnaire was administered to representatives of 16 women's groups in Moyale and Marsabit Districts in northern Kenya in early 2005. Interviews were conducted in Kiswahili and took about one day per group. At the conclusion of each interview, group administrative and financial records were inspected and physical assets inventoried to confirm interview claims. While the women we interviewed represented dominant pastoral ethnic groups in the region (i.e., Boran, Rendille, etc.) they all currently pursued sedentary lifestyles.

Major Findings

Group Formation and Governance. Here we report a brief overview of major findings. The 16 groups we interviewed were an average of 9.7 years old (range: 2 to 19 years). The number of charter members per group averaged 24 (range: 7 to 42), with 100 percent females. About 85 percent of charter members were illiterate (range: 60 to 100 percent). On average, the distribution among "wealthier," "intermediate," and "poorer" charter members was 17, 31, and 52 percent, respectively. Most groups were formed to improve livelihoods of the members (80 percent of responses). About half the time groups were formed after people got the idea from a government organization (GO) or non-governmental organization (NGO); these could provide guidance on how to create effective groups as well as give material or financial support. The other half of the time people largely decided to form a group from observing the success of existing groups. Charter members for groups were often selected following public meetings with minimal

screening criteria. In other situations, however, charter members had well-defined, common goals—such as a desire to engage in dairy marketing, for example—or were bonded by specific religious affiliations.

Most groups have gradually restricted their recruitment of new members over time. Applicants are carefully screened based on trustworthiness and aptitude for teamwork. The ability to bring new skills to a group can be important for an applicant. Applicants are interviewed and a vote of the membership is often taken for final admittance; there may also be a probationary period. Entry fees are common and range from KSh 500 to 6,000 (e.g., USD 6 to 80) per person. There are formal procedures if a person dies or wants to leave a group.

All groups are self-governed with reference to a constitution and by-laws. In most cases groups received assistance from GO or NGO partners to help draft such documents. Despite a high rate of illiteracy among members, groups take pride in having detailed memorized knowledge of their constitutions and by-laws that outline leadership structures, personal rights and responsibilities of members, the philosophy in serving the community at-large, and administrative and operational procedures. Group officers typically include a chairperson, secretary, treasurer, and a management committee. Responsibilities of members focus on attending meetings, contributing labor to regular group activities (i.e., operating a farm, lodge, grain mill, dairy, shop, etc.) and any other irregularly assigned duties, making monthly payments to group accounts, and actively supporting important community functions. Less commonly mentioned responsibilities include assisting the poor or infirm and helping with group record keeping.

Members have a duty to be informed voters with respect to the election of leaders and their participation in group decision-making processes. Privileges of members focus on their participation in profit sharing and savings and credit (micro-finance) activities. Members acquire loans at negotiated repayment terms and can have reliable access to supplemental funds to help cover costs for child education, medicines, hospitalization, child birth, funerals, weddings, and restocking animals. Group membership allows for assistance with home construction and access to group-owned technology as well as employment at group-owned businesses. Group members have priority access to training and other capacity-building events.

Activities, Sustainability, and Future Plans of Groups. Major objectives of groups included reduction of poverty by increasing incomes via micro-enterprise development and livelihood diversification. Initial activities often focused on group involvement in farming; respondents noted that farm produce could be sold quickly and was profitable. Dairy marketing, poultry marketing, and a variety of micro-enterprises (butchery, hides and skins, honey, bakery, handicrafts, etc.) were also pursued as initial income-earners. Profits from all of these activities were then deposited into the group accounts or invested in livestock production or purchase of key technologies like grain milling equipment. Sums in group accounts were also increased via regular personal contributions and accrued interest from group members. After a few months pooled funds could start to yield loans for more and larger spin-off activities.

Group members also coordinate public fund raisers *(Harambee)* to accumulate larger sums of money to support emergency needs of orphans, the elderly, and infirm; such funds could also be used to construct group meeting halls, lodges, and school facilities. Groups are indeed able to accumulate large sums of money over several years of careful planning and investment. Group efforts to mitigate drought impacts have also evolved over time; these have included provision of water and food for the neediest members, goat restocking, and extending low-interest loans (Table 1). Group characteristics that promote sustainability reportedly include unity of purpose, transparency and accountability of leadership, and making good business decisions that lead to diversified micro-enterprises. The ability of a group to secure external funding, training, or technical support from development partners was also regarded as important for sustainability.

The factors that most readily lead to failure of a group include negative internal dynamics such as poor leadership, uncooperative members lacking shared vision, and mismanagement of group funds. One negative external factor of note was political incitement or interference.

Future plans of groups are diverse but ambitious. Aspirations are dominated by hopes to create more physical structures, be they improved houses for members, meeting halls, shops, schools, training centers, health centers, or water tanks. Entrepreneurial actions are prominent, and include plans to purchase vehicles, draught oxen, electric generators, and even a photocopy machine. There were several instances where groups seek to expand savings and credit operations. Our groups noted that good group governance is the key to success.

Practical Implications

We have been impressed by the achievements of these women's groups. Groups are very similar despite great distances that separate them. The important roles of collective action, micro-finance, micro-enterprise, and income diversification were repeatedly observed. Although the economic impact of building social capital via these groups was not quantified, we would speculate that it seems to be enormous. A synergism exists among efforts to build social, human, and economic capital in these groups.

Such collective action has important roles in community risk management, especially when government is unable to provide safety nets or insurance. We believe that development agents should support these group efforts whenever possible. Groups need small grants and technology as well as capacity building in leadership, group dynamics, micro-finance, and micro-enterprise. Policies that promote investment in rural development—prominently including improvements to physical infrastructure, reducing insecurity, increasing access to education, improving governance, and promoting cross-border trade, would also benefit groups at the local level by expanding economic opportunity.

Table 1. Summary of the most important collective actions taken by women's groups in northern Kenya to mitigate effects of the 1999-2000 drought.

GROUP NO.	GROUP AGE IN 1999	MOST IMPORTANT COLLECTIVE ACTIONS DURING 1999-2000 DROUGHT
1	2 years old	Provision of water for members. Gave KSh 20 for the poorest members of the group to buy water.
2	Newly formed	No group support was provided.
3	5 years old	No group support was provided.
4	8 years old	Provision of loans to members to enable them to buy household commodities
5	4 years old	Provision of water for members. Saved KSh 20 for members who would otherwise have to buy water.
6	Did not exist yet	Not applicable
7	2 years old	No group support was provided
8	11 years old	Members were each given loans of KSh 2000 for small business activity
9	8 years old	Members were assisted in the harvest of standing hay for their animals. Most needy members were assisted in provision of water for domestic use. Financial support was provided for the neediest members and loans were given out with repayment delayed until after the drought was over.
10	5 years old	Only the most needy members were assisted by provision of cereal grains.
11	3 years old	No information provided
12	14 years old	Thirty members were restocked with female goats to assist in drought recovery
13	3 years old	No formal group support was provided, but on an informal basis the most needy members were assisted whenever there was a problem. Harambee were also conducted.
14	Newly formed	The group did not take formal action during this drought, but the group formation benefited members since many had improved their income.
15	7 years old	Members assisted each other by harvesting standing hay, managing milking herds, and supporting each other's children with milk. Revenue from milk sales were used to purchase grains and sugar for the neediest households.
16	4 years old	The group bought one member a donkey to assist her family by selling charcoal and firewood. Five other members were assisted in paying their child's school fees after they had lost their livestock.

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About the Authors. Dr. D. Layne Coppock is an associate professor with Utah State University. Email: lcoppock@cc.usu.edu. Dr. Solomon Desta is a research associate with PARIMA through Utah State University and is based in Nairobi. Email: S. Desta@cgiar.org. Dr. Getachew Gebru is a research associate with PARIMA through Utah State University and is based in Addis Ababa. Email: G. Gebru@cgiar.org. Mr. Adan Wako, Mr. Ibrahim Aden, and Mr. Chachu Tadecha are Livestock Officer, Deputy Director, and Director, respectively, for the NGO Community Initiatives Facilitation and Assistance (CIFA-Kenya), based in Marsabit, Kenya. Email: cifa@africaonline.co.ke. Mr. Seyoum Tezera is an outreach field assistant for the PARIMA project based in Addis Ababa. Email: s.tezerra@cgiar.org.

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Design by Susan L. Johnson

GLOBAL LIVESTOCK CRSP

Do Pastoral Husbands and Wives in Northern Kenya View Milk Markets Differently?

John McPeak, Syracuse University;
Cheryl Doss, Yale University
Pastoral Risk Managment Project

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Efforts to develop market opportunities are a key element of the current USAID agricultural strategy. In this study, we illustrate how milk marketing in two pastoral towns in northern Kenya is influenced by patterns in intra-household decision making. In this pastoral study area, men make migration decisions and women market milk. Since milk markets are in town and households change location frequently, the husband's decision about where to settle the household has obvious implications for the distance his wife will have to walk to the milk market in town. We find that all else equal, husbands do not locate the household to facilitate milk sales—if anything they are locating the household to make it harder for wives to market milk. This study illustrates how efforts to link producers to markets may need to be designed with an understanding of the intra-household decision making process.

Background

The Gabra are nomadic pastoralists that reside in the Kenya-Ethiopia borderlands. They raise mixed herds of camels, cattle, goats, and sheep in an arid environment. They obtain most of their calories as milk from their animals, but they are increasingly meeting some of their caloric requirements by consuming grains purchased from the proceeds of livestock and milk sales.

Gabra culture distinguishes clear rights, roles, and responsibilities for men and women. The symbolic distinction is between that which is outside of the household dwelling, which is the men's domain, and that which is inside the dwelling, which is women's domain. Each evening, men milk the animals after they return from grazing. The husband is handed containers full of milk as he sits outside the door of the hut. He inspects the milk, takes a sip, and then passes it through the door to the wife. Once it enters the hut, management of the milk becomes the responsibility of the wife. Traditionally, this meant that women are responsible for the decisions about how much milk will be consumed fresh, how much will be conserved as ghee (dehydrated butter) or fermented milk, and how much will be shared with other households. Over the past 40 years or so, as small towns have grown in the Gabra area, women now have the opportunity to walk to the nearest town and sell the milk in exchange for cash.

The development of milk markets in this area is an example of the changes that are occurring throughout Africa. Milk is a traditional product, produced and consumed within a clear set of cultural rules. The creation of markets challenges these social norms and provides new opportunities. These norms surrounding milk are being renegotiated, both implicitly and explicitly, as households weigh the costs and benefits of these new opportunities.

Development policies usually assume that households will respond cooperatively to new market opportunities. However, if this is not the case, then realized outcomes may be much less promising than the anticipated ones. Efforts to use improved access to markets as a development strategy may need to be designed with explicit mechanisms to reduce the potential for intra-household contestation.

Major Findings

The data analyzed are from a survey of 88 households in the areas around Dukana and Chalbi in northern Kenya. Data are available for each of the four seasons (rainfall is bimodal in this area, with two rainy seasons separated by dry seasons) for the years 1993-1997.

If total income is defined to include the cash value of all goods produced and consumed within the household together with cash income, milk sales account for a relatively minor portion of total household income. In Chalbi milk sales account for 3% of total income and in Dukana the corresponding figure is 1%. But milk sales are a much larger portion of cash income: milk sales account for 11% of cash income in Chalbi and 14% in Dukana. The majority of households, 67% in Chalbi and 86% in Dukana, sold milk in one or more of seasons analyzed.

Milk prices of 20 Kenyan shillings per liter were constant

Figure 1. Herders in northern Kenya have seen a rapid growth of milk marketing opportunities. As market institutions develop, new rules associated with the market must be reconciled with existing cultural institutions. Amongst Gabra nomadic pastoralists in northern Kenya, traditionally the management of milk is the wife's domain. Buyo, pictured here with her child, sometimes sells milk but her ability to market milk depends on her households proximity to town. Traditional cultural rules allocates the responsibility to decide where to locate the household to her husband. Photo by John McPeak.

over the four years studied (around $0.30). Maize prices averaged 20 shillings per kilogram. Thus, the exchange rate is one liter milk to one kilogram of maize. However, when expressed in caloric terms (1 liter of milk valued at 750 calories, 1 kilogram of maize valued at 3650 calories), we find what has been called the "caloric terms of trade" (Degen et al., 2001). In this area, the sale of one liter of milk generates almost five times as many calories from the maize that can be purchased with the proceeds than would have been generated by direct consumption of the milk.

On average, it took five hours to walk to the nearest town from the household in Chalbi and eight hours in Dukana. Milk production per day from the household herd averaged 4.5 liters per day in Chalbi and 3.5 liters per day in Dukana. The trips taken by wives to towns typically involve waking up pre-dawn, carrying some share of the milk collected the prior evening from the household herd in a small plastic or traditional woven container, and walking to town where they sell the milk themselves. They then use the income generated by these milk sales to make purchases before returning on foot to the household before night falls.

In our theoretical analysis, we developed the implication that if households behave according to a "cooperative model," husbands and wives would jointly decide where to locate the household in order to reap the benefits from milk sales, while taking other factors into consideration. If households act according to what we call the "traditional model," based on what people described as a possible outcome in our fieldwork, husbands make the location decision without considering its impact on milk sales. The men make the decisions based only on the needs of the herd. Finally, following what we describe as the "contested model," husbands view wives marketing milk with trepidation, and use migration decisions to limit their wives' milk marketing activity. We identified the sign of a specific coefficient in our empirical model that could discern between these three models.

The statistical analysis allowed us to investigate patterns in decision making. In particular, it allowed us to identify how the relationship between the decisions of where to locate the household and how much milk to sell. To conduct this analysis, we also used information on the household such as the age of the husband, the age of the wife, household size, herd size, and presence of pack animals. Information was also collected on time period characteristics, such as rainfall levels, what season it was, whether food aid was being delivered, and whether there were any livestock raids in that period.

Our findings were consistent with this third model, suggesting that household decisions about migration and milk marketing were best viewed as contested. Why might husbands and wives contest decisions about milk marketing? A variety of explanations were proposed when we returned to the field with our findings. A leading explanation was that husbands are not comfortable with their wives gaining control over income. While some husbands claimed that milk sales were a good opportunity to generate cash to buy food for the household so that they did not have to sell livestock, we frequently encountered husbands who were concerned about what their wives did with money from milk sales. Another explanation that was given was that men did not like the fact that sales reduced milk available for consumption by the household, as milk is the main component of the diet as noted above. A third interpretation advanced was that husbands were uncomfortable with their wives being alone in town, largely centering on the concern that they might develop relationships with men in town. Our data did not allow us to distinguish among these different explanations which we leave as a topic for further research.

Practical Implications

Improving market opportunities is an important part of development policy. As noted above, markets – through forces such as the caloric terms of trade described above – can play a crucial role in food security. It is natural that efforts to improve the well being of people in pastoral areas should identify markets as a key intervention.

In addition, the status of pastoral women merits special concern. Women's traditional roles are very circumscribed. Milk marketing is one of few activities which is both consistent with women's traditional roles and provides opportunities for income generation.

However, this study indicates that one can not directly proceed to the conclusion that improved milk marketing opportunities will automatically improve women's, or pastoral households,' well-being. One practical implication of this study is that it illustrates how intra household contestation can provide an example of why a promising development intervention has less impact than expected, and cites examples where these intrahousehold dynamics even led to project failure (Waters–Bayer, 1985). From a design standpoint, it illustrates how it is critical to understand the gender dynamics inside households to design programs that reduce the potential for intrahousehold contestation. With further research, the underlying reasons for resistance to milk marketing by some husbands could be clarified. Armed with this information, a development project aimed at improving milk marketing could also facilitate dialog about these concerns with men and women within the community. Such a dialog could simply "clear the air" and bring out into the open for discussion issues that may not have been recognized, or could serve as a foundation for developing institutional responses that design mechanisms to address these concerns.

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About the Authors. Dr. John McPeak is an Assistant Professor in the Department of Public Administration, Syracuse University. E-mail: jomcpeak@maxwell.syr.edu. Dr. Cheryl Doss is director of MA international relations graduate studies and a lecturer at Yale University. E-mail: cheryl.doss@yale.edu.

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GLOBAL LIVESTOCK CRSP

Public Engagement to Prioritize the Pastoral Research Agenda at the Pastoral and Agro-pastoral Research Center of OARI in Ethiopia

Getachew Gebru, Utah State University;
Lemma Gizachew, Sintayehu Mesele, and Mohammed Hassena OARI;
Solomon Desta and D. Layne Coppock, Utah State University
Pastoral Risk Management Project

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The Oromia Agricultural Research Institute (OARI) has a mandate to conduct agricultural and livestock research throughout the Regional State of Oromia in Ethiopia. OARI has recently opened a facility near Yabello town on the Borana Plateau called the Pastoral and Agro-Pastoral Research Center. A meeting was held in August 2006 at Yabello that involved representatives from pastoral communities, the private sector, government, and non-governmental organizations. The aim was to engage stakeholders in a process of problem prioritization and set the stage to create new partnerships to better address pressing problems. The final priorities included: addressing a general decline in forage availability; improving water-harvesting methods; reducing effects of Foot-and-Mouth Disease (FMD); improving pastoral livestock marketing; and intervening to help mitigate problems associated with increased competition for land between maize cultivation and dry-season grazing. Researchers, pastoral community members, development actors, and policy makers all play varied roles in dealing with each of the five priority issues. The implementation of a new prescribed fire program to restore bush-encroached rangelands in southern Ethiopia, and hence increase forage supplies, is given as an example of integrated action to address problems. The results of this prioritization meeting were encouraging—the key is the focus on process and new partnerships. OARI plans to use the same approach in planning activities at other research centers in different agro-ecological zones.

Background

Applied researchers are approaching their role in the rural development process in new ways. In the past the process has mainly been "research and development" where researchers often worked independently from the target populations of beneficiaries. The researchers designed trials and studies in isolation of public input and wholly controlled a pipeline for producing innovation in technology or management practices. Once generated, such innovations can often fail to be implemented, however, because local knowledge or production circumstances were not effectively considered in the process. The failure of much research to achieve impact among rural populations in Africa is due, at least in part, to such problems (Ashby, 2003.)

In contrast, a recent emphasis on "Research for Development" focuses more on the iterative, adaptive nature of innovation in complex systems. Impact is acheived through systematic enquiry combined with power-sharing and participatory learning of stakeholders (Ashby, 2003.) The new Yabello Pastoral and Agro-Pastoral Research Center of the Oromia Agricutural Research Institute (OARI) took a major step towards "Research for Development" by organizing a meeting with various stakeholders during two days in August 2006 to prioritise a dryland research agenda. This brief will outline the approach used and highlight the outcomes of that meeting.

Since being established in 1978, the livestock collaborative research support programs (CRSPs) of USAID have been leaders in conducting applied research at the cutting edge of development needs (Demment, 1994.) The Yabelo meeting was therefore seen as a major opportunity to further this agenda, especially given the meeting coincided with the creation of a new institution with a mandate to urgently address problems of rural people. The participants were drawn from among pastoral and agro-pastoral communities, women's cooperatives, livestock trader groups, and governmental and non-governmental organizations operating in Borana Zone (Figure 1.)

The springboard was the commitment from OARI and the Oromia Pastoral Area Development Commission (OPADC) to create an authentic, demand-driven research agenda with a focus on applied and adaptive work. To help meet this goal a proposal for such an approach was developed. The proposal was approved with OARI, OPDC, and PARIMA as partners. The main components of the proposal included the following:

- Identification of priority felt-needs for targeted communities;
- Identification of research and outreach priorities, i.e. matching gaps with the priority felt-needs. Research was to be categorized according to applied and/or adaptive aspects; disciplinary or multi-disciplinary

Figure 1. Participants at a stakeholder meeting organized by the new Yabello Pastoral and Agro-Pastoral Research Center of the Oromia Agricutural Research Institute (OARI) are pictured. Representatives from pastoral and agro-pastoral communities, women's cooperatives, livestock trader groups, and governmental and non-governmental organizations operating in Borana Zone attended the meeting. Photo by Getachew Gebru.

nature; long, medium, or short term; quantitative or qualitative, etc. It is a creative process because some research may directly or indirectly bear on major problems that are raised by stakeholders, and the critical nature of certain research needs to be accurately identified given that resources for research are scarce. The "wheel should not be re-invented;"

- Identify special training needs that support priority research and/or outreach. This includes degree or non-degree options;
- Develop and review specific proposals that deal most effectively with priority problems. Proposals must have scientific merit and yet also link research and development perspectives. This process is to be mediated, in part, by new Research and Extension Advisory Councils at the district level; and
- Implement both the research and development aspects of priority proposals.

In this report only the component on problem prioritization is discussed. The subsequent components of the process are underway at OARI. Fifty stakeholders were convened for the two days and facilitated to develop problem prioritization. A modified PRA-type approach was employed (Lelo et al., 2000) where participants in break-out groups were asked to list problems and priorities based on pair-wise ranking. Important observers included woreda (district) and zonal administrators, and regional government office representatives. Each break-out group included members of the various stakeholder organizations.

Results

Table 1 summarizes the main issues raised by participants as they pertained to the mandate of OARI, namely production-system research. Five priority problems were identified along with associated variables and issues. These are summarized as follows.

Scarcity of Forage. The scarcity of livestock forage was considered as the most important problem. Availability of forage for livestock has increasingly become a serious concern

Table 1. Ranking of priority research problems in the pastoral production systems.

Top Researchable Problems Ranked from Higher (1) to Lower (5)	Remarks
1. Improve availability of livestock forage (grazing)	Forage losses directly related to bush encroachment, expansion of termites, and other types of land degradation; indirectly related to heavy livestock pressure on natural resources that is related to an increasing human population
2. Improve and expand water harvesting methods	Need to develop appropriate techniques to better capture run-off and improve management of water points
3. Reduce effects of common livestock diseases like Foot-and-Mouth (FMD)	FMD especially affects cattle and sheep. Causes high rates of lamb mortality
4. Improve pastoral livestock marketing	Risks associated with live-animal trade are most important; cattle market in particular is struggling; other constraints for local marketing and processing of dairy products; poor availability of disaggregated price data for livestock.
5. Reduce negative effects of crop cultivation on loss of dry-season grazing	Expansion of cultivation is reducing access to key dry-season grazing

in recent years. Bush encroachment is regarded as the single most serious threat to herbaceous forage productivity in the southern Ethiopian rangelands. Some woody species compete with grasses for water and light and physically obstruct the mobility of livestock. Some woody species have thorns that cause skin and teat damage among livestock. Termites are also noted to be expanding and can markedly reduce livestock forage, although the impacts of termites vary greatly depending on soil type and the local ecology. Soil erosion was mentioned as another problem reducing herbaceous forage productivity. Soil erosion is related to heavy grazing and other forms of resource pressure. It was noted that there are no known traditional practices to promote soil conservation in the area. Heavy rains at higher elevations create run-off that leads to extensive gullies, especially at Finchawa, Surupa, and Dida Hara. There is no organized effort to understand or better contain soil erosion.

Scarcity of Water. Water remains the most limiting resource for the pastoral and agro-pastoral communities of Borana. Grazing animals have to be trekked a long distance for watering. This is the most daunting task for the pastoral community. Pastoralists realize that a very large amount of runoff is lost in the rainy season that could be otherwise used. Developing effective water-harvesting techniques to capture rainfall and minimizing after-effects of heavy run-off was pointed out as an important area of research. Improving access to key water points on the Borana Plateau is another topic that could benefit from some engineering interventions. These could reduce losses of weakened animals on steep pathways during drought.

Livestock Disease. Disease remains as a major challenge for all classes of pastoral livestock. Foot-and-mouth disease (FMD) for cattle and small ruminants was reported at the meeting as the single most important disease in the area.

Livestock Marketing. Among issues raised with respect to marketing, the risks associated with the live-animal market were regarded as the most important. The pastoralists said that the level of risk is particularly high for cattle, as market prices for these classes of animals are unpredictable. They indicated that the availability of market information that is disaggregated by sex, age and condition prior to their arrival in the market places is important to minimize risk. Dairy marketing and processing constraints came in second to market risk for live animals.

Land-Use Problems. The expansion of cultivated crops was regarded by the participants as putting the pastoral character of life at great risk. Crops such as maize have rapidly spread along depressions and drainages where soil moisture remains higher throughout the year. This landscape position is also where some of the most productive grasslands *(Pennisetum spp.)* are found. There is a danger that dry-season grazing areas will be lost to cereal production. It was suggested that the rangelands need to have a land use policy to reduce competition between dry-season grazing and maize cultivation. Coming in next for land use issues was the growing concern for the proliferation of private exclosures (kalo) for marking off cultivation sites or saving fodder for calves and weakened stock. The tendency is for local villages to fence off parcels of grazing land in the pretext of crop production, while in reality this fenced land is for "private grazing." The expansion of private kalo has barred pastoralists' access to range resources that traditionally belonged to the community. There are even cases where individuals with no livestock have started to enclose grazing land for commercial livestock production purposes.

Practical Implications

The most important aspect of the meeting was the participatory process that was set in motion. No single problem would be solved by research alone. Research, outreach, development investment, and policy have different roles in every solution. An iterative approach that includes taking action and working together to solve problems must become the norm. More development resources are being pushed from the federal to district levels in a process of decentralization, and this is a favorable trend as well.

The call for using "bottom-up" knowledge from stakeholders in prioritizing research, outreach, and development strategies is gaining momentum. However, in practice, involving rural people in decision-making is generally limited to having them participate in surveys. Such an approach misses much of the deeper understanding developed by pastoral and agro-pastoral communities as managers of their production systems. Engaging communities in discussions and gaining an understanding of their needs and forms of resource use allows a framework for posing better informed research questions, generating more appropriate technologies, and obtaining stakeholder buy-in. The next step is to tackle each of the five priority issues.

Example of Combining Research, Outreach, Development, and Policy into Action. The top priority revealed at the meeting was loss of forage supplies. One way to deal with loss of forage grasses in particular is to reinstate controlled fire into this system. Lack of controlled fire has been a major factor in the transformation of large areas of the Borana Plateau from mixed, grass-dominated savanna to situations dominated by woody vegetation. Controlled fire can be used in some cases to help restore grass cover when combined with improved grazing management; fire can also help reduce noxious tick populations. An apparent, blanket national ban on the use of fire in the 1970s compelled the Borana pastoralists to stop the traditional practice of burning the rangelands (Coppock, 1994.) In January of 2005 a joint workshop involving OARI, OPADC, and PARIMA was held that brought together pastoral communities, administrators,

regional policy makers, government experts, NGOs, and friends of pastoralists to discuss the fire ban, its implications so far, and the policy gaps. After a thorough review of past proclamations this workshop ended by recommending that resumption of controlled fire occur on the Borana Plateau, but underlined the need for a capacity building/training component on the application and control of prescribed fire. Training of researchers, development agents, and pastoralists in using controlled fire was therefore initiated by PARIMA two years ago. There were also simultaneous attempts to educate decision makers about the beneficial aspects of controlled burns. Policy constraints now relaxed, OARI is taking the lead on the applied/adaptive research side in 2007 by selecting, mapping, and monitoring burn sites across the Borana Plateau in consultation with pastoralists. Key inputs have also been recently provided by the United States Forest Service under the auspices of the Pastoral Livelihoods Initiative (PLI) and coordinated by the USAID Mission in Ethiopia. Sustaining the positive impacts of the rangeland restoration effort will require buy-in from pastoralists in terms of improved grazing management. The ability to manage grazing is related, in part, to the ability to sell livestock at certain times for fair prices. Livestock marketing is thus linked to the success of the fire program in the bigger picture.

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About the Authors. Dr. Getachew Gebru is a research associate with PARIMA through Utah State University and is based in Addis Ababa. Email: G. Gebru@cgiar.org. Dr. Lemma Gizachew is Director of Livestock Research, OARI, Addis Ababa, Ethiopia. Email Lemmag61@yahoo.com. Mr. Sintayehu Mesele is a member of the research staff at the Yabello Pastoral and Agro-pastoral Research Center, OARI, Yabello. Email Sintayehu_Mesele@yahoo.com. Mr. Mohammed Hassena is the director of socioeconomics and extension, OARI, Addis Ababa, Ethiopia. Email mhassena@yahoo.co.uk. Dr. Solomon Desta is a research associate with PARIMA through Utah State University and is based in Nairobi. Email: S. Desta@cgiar.org. Dr. Layne Coppock is an associate professor with Utah State University. Email: lcoppock@cc.usu.edu.

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GLOBAL LIVESTOCK CRSP

Informal Institutions and Cross-border Livestock Trade in The Horn of Africa

Peter D. Little, University of Kentucky
Pastoral Risk Management Project

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Trans-border trade in livestock in sub-Saharan Africa plays critical roles in meeting regional food security needs and generating incomes for thousands of herders and traders. This brief addresses the institutional aspects of cross-border livestock trade in the Horn of Africa, especially in the Kenya/Ethiopia/Somalia borderlands. It will be argued that while informal exports and imports of animals are illegal in Kenya and Ethiopia, local institutions and agreements often allow the trade to function 'on the ground' in the absence of official recognition. For policy makers what is particularly challenging is that cross-border trade thrives in the absence of government interventions and policies, while punitive controls against it usually redirect the trade along unofficial channels. In the conclusion, different policy scenarios are briefly discussed that can allow cross-border trade to continue to play a major role in meeting regional consumption demands and providing livelihoods for large numbers of people.

Background

Trans-border trade in the Horn of Africa represents a particularly important and challenging activity for policy makers. On the one hand, it epitomizes the essence of informal or 'shadow' trade, operating along remote borders in a vast region where government presence is particularly weak, as well as generates large amounts of revenue. Illustrative of this reality is the fact that official annual exports of cattle from Ethiopia, the most populous country in the region, often are less than 2,000, when in fact more than 25 times this amount are unofficially exported across borders (Teka et al., 1999). On the other hand, most governments in the Horn of Africa rely on official exports of primary commodities to earn foreign exchange and, thus, view informal cross-border trade as lost public revenue. Unfortunately, politically-charged arguments for controlling borders dictate that trade in agricultural and other benign products usually are neglected or constrained by government policy. For the livestock herders or pastoralists who dominate the area's border regions, market alternatives to unofficial cross-border trade are minimal.

Major Findings

The informal nature of trans-border trade determines that traders rely on a range of local institutions and practices to facilitate their businesses. Most of the important innovations are centered around financial services, broker services, and transport.

Informal Financial Services. Trans-border livestock trade relies on a range of different informal finance institutions in support of their businesses. When credit is used in cross-border commerce, more than 95 percent of it is obtained informally from kinsmen, friends, and associates. Very few livestock traders (less than 10 percent of the total) have access to formal sources of finance. In the case of the Somalia border areas, informal finance services minimize risks associated with carrying large amounts of cash in an unstable environment. Somali border traders can take their earnings to Nairobi, convert them to dollars, and then 'wire' them back to money houses in Somalia, where they can be picked up by associates. This informal practice, called the hawala or hawilaad system (meaning 'transfer' in Arabic), avoids the need to carry large amounts of cash across the border. In other cases the livestock trader will convert part of his earnings in Kenya into tradable goods, which he will arrange with a wholesaler to be picked up at the border to avoid the risk of traveling in northeastern Kenya with excess money (Mahmoud, 2003). These transfer services are mediated through informal money houses and middlemen, who assume special importance in most forms of long-distance trade, including livestock. While much of the cross-border livestock trade is calculated in local currencies, final payments often are made in US dollars and the actual handling of cash in large transactions is minimal.

In the region many of the important informal finance businesses that livestock traders use are based in Nairobi. The enterprises usually charge fees of 3 to 6 percent to 'wire' funds from Kenya to locations in Somalia; formal banks usually charge 10 to 12 percent or more for the same service. Different forms of wire transfer and credit minimize risk and reduce the physical handling of worn Somali notes, which slows their deterioration and helps to

Figure 1. Traders and brokers at the Negelle Market, southern Ethiopia. Photo by Peter Little.

keep them in circulation. The system sometimes functions in the idiom of the clan system, where knowledge of sub-clan and family relations are used as cross-checks on identity.

Market Brokers (Dilaal). Since official price information is poor in the border areas, traders rely on informal means of obtaining market information. This complicates the search for markets by individual traders and herders, who often rely on local brokers (dilaal) for assistance. The broker's role is to match the buyer with a seller, the latter often has traveled 100 km or more to market, and to insure the legitimacy of the sale (including the assurance that the animal(s) are not stolen). It is a common institution throughout the Middle East and Islamic regions of West and East Africa.

In all of the key regional markets, including Nairobi, there are dilaal to match sellers and buyers and negotiate prices on their behalf. A dilaal works in the market on behalf of both buyers and sellers. The broker can be compensated by both the buyer and seller. The fee is usually around one to two percent of the price of the animal, anywhere between US$ 1.25 to US$ 2.50 per animal. In some cases, the fee is cut in half with both the buyer and seller paying part of the fee; in others the buyer and sellers may be working with different brokers and will pay them separately. For the seller these arrangements remove the burden of finding a buyer and negotiating a price. An older, trustworthy broker may work for several parties simultaneously.

Brokers show an uncanny ability to accurately gauge animal weights, quality, and prices. This is where an experienced trader holds an advantage over younger merchants and explains why many of the major cattle brokers in the region have been in the business for several years. Early attempts by both the Kenyan and the Somali governments to 'rationalize' the system by introducing scales for weighing animals proved futile, as brokers had little use for such expensive devices. In the Nairobi marketplace, for example, Somali traders almost always deal with Somali rather than non-Somali brokers. In Kenya dilaal recently have organized themselves into associations in important border markets and have been registered with the local administration. Dilaal can reduce stubborn market bottlenecks that hurt sellers, whether they are herders or traders. By finding buyers in a timely fashion, brokers can help sellers to avoid the added costs of maintaining the animals until they are sold. In most cases sellers have transported their animals to market over very long distances and, therefore, want to sell them in a timely manner. At the key border market of Garissa, Kenya, merchants must buy fodder and water for their animals when they cannot find a buyer and the herd must remain in the area. A quick sale through a broker minimizes outlays on fodder, water, and hired labor. However, even dilaal have little control over external events that can greatly affect the market and the demand for animals. For example, when there is an unexpected glut of animals on the Nairobi market from neighboring countries, such as Tanzania and Ethiopia, Somalia-based traders may have to wait several days in Garissa, Kenya before transporting cattle down country. When this happens, the trader often has little recourse but to purchase fodder or to move animals into surrounding range lands.

Transporters. A third informal practice that facilitates cross-border livestock trade is long-distance trekking. Indeed, one of the most significant and intriguing aspects of the cross-border trade involves the trekking by foot of cattle over several hundred kilometers, which can take up to several weeks. Trekking is an age-old profession that dates back to the 1800s and the early caravan trade. It takes place along most of the Kenyan/Somali border areas and throughout the Horn of Africa generally. In most cases, cattle are moved overland with three trekkers and an armed security person for every approximately 100 cattle. There is a designated 'head trekker' who is directly responsible to the trader and who may be employed on a fairly regular basis. In southern Somalia, the individual must make payments to pass through territories controlled by different factions and sub-clans and like the position of Abbaan (protector) in the days of the caravan trade (Lewis 1994: 115), he is responsible for the safe passage of the herd. The head trekker or protector usually comes from one of the main lineages or sub-clans whose territory the market animals must traverse.

The trader is likely to have a young relative accompany the animals on the trek, because of the physical rigor involved and to safe guard his property. In some cases it can take almost one month to reach a key market from interior locations in Somalia and substantial animal weight loss can occur. One of the trekkers usually is responsible for procuring rice, flour, sugar, and tea for the trip and serving as the cook. The trader normally covers the cost of food and on long treks an entire sack of flour or rice (50 kg or more) will be purchased and transported on a pack animal (donkey).

There appears to be a functioning market for trekking services in the livestock trade. As would be expected, transport costs per animal generally correspond with distance to market and type of transportation involved (on the Kenyan side, there is some movement by trucks to terminal markets), except where insecurity is particularly problematic. The Baidoa (Somalia)-Garissa and Dinsoor (Somalia)-Garissa routes are examples of the latter and they experience relatively high transport costs. It was assumed that transport costs in the region would have risen exorbitantly throughout the past decade because of insecurity, but this has not been the case for many of the key routes. Movement costs per animal rarely exceed US$ 0.01 to US$ 0.18/kilometer and only modest increases have taken place since the Somalia government's collapse in 1991. There also were minor differences in transport costs between the Kenyan- and Somalia-based circuits.

Practical Implications

To address the concerns of policy makers about cross-border trade, the first tactic should be educational; that is, to instruct (convince?) policy makers about the activity's scale and importance to local and national economies. Only recently has the significant contribution that trans-border livestock trade plays in meeting the consumption needs of the region's large cities received official recognition--albeit modest. As a start, policy discussions of cross-border trade and its importance should be encouraged at the border sites themselves (among customs and government officials of relevant countries), national ministries, and in regional bodies such as the Inter-Governmental Authority for Development (IGAD) in the case of the Horn of Africa. Governments in the region should recognize this and take positive steps to support trans-border activities for the benefit of their economies and citizens. The policy dialogue must occur at these three levels because: (1) the local officials are 'on the ground' in these border sites can play a key role in encouraging/discouraging policies—the isolation of many of these sites means that local officials have a large degree of autonomy; (2) national officials and diplomats must be involved because it requires international agreements and dialogue with other states, and because domestic policies have a direct effect on cross-border trade; and (3) IGAD's involvement is required because it is one of the few organizations in the region with a cross-border mandate and with priorities focused on trade and improved transport links between member states. These three different levels of institutions need to be involved in policy discussions about cross-border trade. Currently there is a local government border committee at Moyale along the Kenya/Ethiopia border that has encouraged local policy discussions about trade and assisted livestock trade when it has been threatened by bans.

Policies that acknowledge and encourage regional trade across borders—rather than discourage it—would capitalize on comparative advantage for different local and national economies; strengthen local food security; increase collection of state revenues and investments in key market and transport infrastructure; and reduce price volatility and market imperfections. With public resources so scarce and incomes so low in the Horn of Africa, governments should avoid wasting valued resources trying to police a commerce, trans-border trade, that at best they can only very partially control. For at least the foreseeable future, trans-border trade will continue to play a major role in meeting consumption demands in the region and providing livelihoods for large numbers of people.

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About the Author. Dr. Peter D. Little is Professor and Chair of the Department of Anthropology at the University of Kentucky. E-mail: pdLitt1@uky.edu.

The GL-CRSP Pastoral Risk Management Project (PARIMA) was established in 1997 and conducts research, training, and outreach in an effort to improve welfare of pastoral and agro-pastoral peoples with a focus on northern Kenya and southern Ethiopia. The project is led by Dr. D. Layne Coppock, Utah State University, Email contact: Lcoppock@cc.usu.edu.

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Design by Susan L. Johnson

GLOBAL LIVESTOCK CRSP

From Herd Diversification to Livelihood Diversification as a Response to Poverty: The Case of the Waso Boran of Northern Kenya

Abdullahi D. Jillo and Abdillahi A. Aboud, Egerton University;
D. Layne Coppock, Utah State University;
Pastoral Risk Management Project

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The Waso Boran of northern Kenya used to have large, mobile, and diverse herds of livestock that exploited equally large and diverse rangelands. Forty years of human population growth, drought, environmental change, and lack of relevant policies have altered this situation, however, with the majority of Waso Boran today being livestock poor and engaged in a variety of non-pastoral activities to diversify their livelihoods. One-third of 540 households we surveyed in Isiolo District now have ten head of cattle or less, and a larger census suggests that only 15 percent of households can currently be categorized as mobile pastoralists. The largest category, in contrast, is represented by urban dwellers (51 percent of households) that raise livestock in more sedentary production systems. To cope with livestock poverty many people pursue endeavors such as petty trade, wage employment, and farming, as well as the collection and sale of firewood and wild products. These activities heavily involve women. Dealing with such large changes is difficult, but it is recommended that policy makers focus on land use policy to help protect remaining grazing lands from encroachment by cultivators, and that women be a focus of capacity building by development agents to increase the scope for livelihood diversification efforts.

Background

The Waso Borana pastoralists have persisted in northern Kenya for over a century. Their traditional economy has been based on extensive livestock production, and livestock species managed have included cattle, camels, sheep, goats, and donkeys. In addition to providing food for human consumption, these livestock have also been important to establish networks for social security and wealth accumulation. Before and during the colonial era, the Waso Boran reportedly owned large numbers of all species of livestock. According to scholars, herd diversification was a basic strategy for wealth accumulation and risk management for the Waso Boran. Herd diversification was made possible by the existence of productive, diverse rangelands that had a robust mixture of herbaceous and woody forage species. The Waso Boran primarily relied upon two ecological systems, namely the Chari and the Waso. The Chari is a scrubland found to the north and south of the Euaso Ngiro River and has been traditionally used by browsing goats and camels. The Waso, on the other hand, is a flood plain of the same river that stretches to the Lorian Swamp. The Waso has been traditionally used for grazing by cattle and sheep. Over the last four decades the Waso Borana pastoral system has undergone a tremendous socio-economic transformation. Key events included the "shifta" war of the 1960s, drought in the 1970s that killed large numbers of stock, and a gradual process of land degradation that altered the mix of vegetation. One end result has been the transformation of Waso Borana livelihoods from a primary dependence on diverse livestock holdings to a primary dependence on diverse livelihoods. This has been postulated as a response to increasing poverty. Some scholars have estimated the cumulative losses of cattle over these 40 years at 75% of initial holdings, while losses for camels and goats have been estimated at 95% of initial holdings.

Here we report on results from a recent socio-ecological investigation that involved a sample of 540 Waso Boran households residing in nine locations (Dhedas) in north-central Kenya. Data collection also included a census of over 5,000 households. Examples have been drawn from this research to document causes and consequences of the transformation of Waso Borana households described above.

Key Findings

Table 1 shows the structure of livestock ownership in the study area, and this provides confirmatory evidence of the dramatically reduced livestock numbers compared to historical benchmarks; holdings of 60 cattle per household were noted to be "typical" in the area during the 1950s and 1960s. Our data also reveal the inequitable distribution of animals among households today. More than 251 households out of 540 surveyed owned only six head of cattle, while only five households owned most of the livestock (i.e., 19 percent of the cattle, 15 percent of the sheep, 18 percent of the goats, six percent of the camels, and 49 percent of the donkeys.)

Table 1. Livestock ownership structure for the Waso Boran of Isiolo District, northern Kenya, based on a sample survey of 516 households.

NUMBER OF HOUSEHOLDS	AVERAGE NUMBER OF LIVESTOCK OWNED PER HOUSEHOLD				
	Cattle No. (%)	Sheep No. (%)	Goats No. (%)	Camels No. (%)	Donkeys No. (%)
<5	102 (18.9)	79 (14.8)	97 (18.0)	33 (6.2)	265 (49.1)
6 to 10	73 (13.5)	58 (10.8)	88 (16.3)	4 (0.8)	6 (1.2)
11 to 20	72 (13.5)	78 (14.5)	54 (10.1)	3 (0.6)	--
21 to 50	77 (14.4)	93 (9.1)	33 (6.7)	2 (0.4)	--
51 to 100	44 (8.5)	48 (4.5)	15 (3.0)	--	--
101 to 150	9 (1.7)	28 (5.1)	11 (2.2)	--	--
151 to 200	14 (2.7)	23 (4.4)	21 (4.1)	--	--
201 to 250	1 (0.2)	2 (0.4)	14 (2.7)	--	--
>251	6 (1.2)	2 (0.4)	22 (5.2)	--	--

Table 2. Categorization of production systems among the Waso Boran in Isiolo District, northern Kenya, based on a census of 5,126 households.

	STUDY UNIT	PRODUCTION SYSTEMS	NUMBER OF HOUSEHOLDS	HOUSEHOLD CHARACTERISTICS	
				Degree of Mobility	Enterprises
1	Kulamawe	Chari pastoral	420	Mobile	Trade, cattle, shoats[1], camels.
2	Kinna	Urban Pastoral	906	Sedentary	Trade, agriculture, cattle, shoats
3	Garba Tulla	Urban pastoral	842	Sedentary	Trade, shoats, camels
4	Rapsu	Agro-pastoral	231	Semi-sedentary	Agriculture, trade, shoats.
5	Malkadaka	Chari pastoral	324	Mobile	Trade, shoats, cattle, camels
6	Gafarsa	Agro-pastoral	502	Semi-sedentary	Agriculture, shoats, cattle, trade.
7	Eres-Aboru	Waso pastoral	396	Semi-sedentary	Cattle, sheep, trade
8	Sericho	Waso pastoral	663	Semi-sedentary	Cattle, sheep, trade
9	Mado-Gashe	Urban-pastoral	842	Sedentary	Trade, shoats, cattle
Total	**9**	**4**	**5,126**	------	------

[1] *Shoats is a term for goats and sheep combined.*

Table 2 illustrates that four livelihood diversification systems have emerged among the Waso Boran. We primarily defined these with respect to variation in livestock mobility. These include the: (1) "sedentary urban pastoral system;" (2) "semi-sedentary agro-pastoral system;" (3) "semi-sedentary Waso pastoral system;" and (4) "mobile Chari pastoral system." The sedentary systems are now the most common in our study area, and the mobile systems are the rarest. This is in contrast to the historical pattern where mobile systems were the norm. For example, the sedentary urban pastoral system is located in three of our study units—namely Kinna, Garba Tulla and Mado-Gashe—and comprised 51 percent of total households in our study area. The semi-sedentary agro-pastoral and Waso systems are located in four study units—namely Rapsu, Gafarsa, Eres-Aboru and Sericho—and constituted 35 percent of the total households in our study area. The mobile Chari pastoral system is located in two study units—Kulamawe and Malkadaka—and comprised only 15 percent of total households. We feel the emergence of the urban and agro-pastoral production systems in particular reflect attempts at livelihood diversification.

Table 3. Contribution of livestock in the annual household cash economy for the Waso Boran in Isiolo District, northern Kenya, based on a sample survey of 516 households.

LEVEL OF LIVESTOCK CONTRIBUTION	FREQUENCY (%)
Nil/Trace	21 (4.0)
Over 50%	256 (49.6)
Less than 50%	239 (46.4)

Livelihoods of surveyed households included both pastoral and non-pastoral activities, and for many these tended to be co-dominant (Table 3.) Common non-pastoral activities were petty trade, wage employment, farming (rain-fed and irrigated), collection and sale of firewood, charcoal production, and the gathering, processing, and selling of wild products such as Gum Arabic *(Acacia spp.)* and miraa *(Catha edulis)*. Women tended to be more involved in non-pastoral activities than the men. Non-pastoral income-generation activities can be lucrative in some cases, but they are often only sufficient for survival. Our data suggest that the wealthier herders having larger numbers of animals pursue livelihood diversification as a strategy for economic expansion. The poorest households, in contrast, appear to diversify into survival options such as sales of firewood, charcoal production, and petty trade. We have also observed that diversification options vary according to gender and proximity to towns and settlements. For instance, options for women tend to lie mainly in petty trade and are undertaken closer to their home settlements. Options for men lie mainly in wage employment and livestock trade, which usually occur far from their home settlements.

Practical Implications

Herd diversification was a traditional coping mechanism to help the Waso Boran protect themselves against food insecurity and drought. This process was supported by access to a diversity of rangelands across northern Kenya. Currently, the foraging resources for the Waso Borana production systems are degraded and this limits the potential for livestock diversity. Livestock mobility is further limited by human population growth and encroachment of cultivation into key grazing areas. These processes underlie the current trend of heightened, resource-based conflict in the region. Inappropriate government policies have been major contributors to these problems. A review of policy should focus on issues such as the legalization of pastoral tenure over rangelands. Development priorities could focus more on training and provision of other support for capacity building to assist people in livelihood diversification. Attention to re-stocking measures could be considered in some cases as well. Women need much greater attention in the development process, since the transformation observed in Waso Borana pastoralism has an especially large impact on women. The role of women has changed in particular because they have become the main contributors to diversified pastoral livelihoods. Therefore, women should be a special focus of capacity-building efforts.

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About the Authors. Abdullahi Dima Jillo is a doctoral student, and Prof. Abdillahi A. Aboud is a senior faculty member, in the Department of Natural Resources at Egerton University, Kenya. They can both be reached at E-mail: eu-crsp@africaonline.ke.co. Dr. Layne Coppock is an Associate Professor in the Department of Environment & Society at Utah State University, Logan, USA. E-mail: lcoppock@cc.usu.edu.

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Design by Susan L. Johnson

GLOBAL LIVESTOCK CRSP

Changes in Land Cover and Soil Conditions for the Yabelo District of the Borana Plateau, 1973-2003

Sintayehu Mesele, Oromia Agricultural Research Institute;
Heluf Gebrekidan, Alemaya University;
Lemma Gizachew, Oromia Agricultural Research Institute;
D. Layne Coppock, Utah State University;
Pastoral Risk Management Project

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It has been proposed that the Borana Plateau has markedly changed in terms of land cover and land use in recent decades, but no hard data have been available to critically assess this claim. In addition, systematic analysis of soil properties has been limited. Research was designed to measure changes in land cover/land use over 30 years in the 400-km² Yabelo District of southern Ethiopia using three satellite images taken at an average interval of 15 years. Samples were also collected to assess variation in the physical and chemical properties of dominant soils. Results indicated that Yabelo District has indeed changed greatly in terms of land use and land cover; dramatic declines were noted in the extent of grasslands, while croplands increased five-fold, and bushed-grasslands and bushlands both increased substantially. Bushland soils had less organic matter and were more compacted than grassland soils. These results all support the idea that the productive capacity of this landscape for grazing has been markedly reduced in 2003 as compared to that for 1973. Rehabilitating the grazing system would be difficult and require a comprehensive, inter-disciplinary approach. Central to such an approach would be devising a well-informed land use plan.

Background

It has been proposed that the livelihoods of pastoral people on the Borana Plateau have changed considerably in recent decades (Desta and Coppock, 2004.) The Boran pastoralists, in particular, have probably gradually shifted from a heavier dependence on livestock products to more dependence on crop cultivation in some locations. For example, maize has reportedly spread in recent decades along drainages on the plateau, and some investigators suspect that it may expand even more as the Boran try to cope with population pressure and food insecurity. Some published evidence suggests that cultivation may have increased on the Borana Plateau from five to 16 percent of the land area over the past 15 years, and this is based on simple calculations from previous rates of spread as limited by suitable farming sites. Other changes in land use or land cover are also reportedly occurring. These include privatization of formerly open-access grazing sites (kalo), bush encroachment, and general ecological degradation of the rangelands. These trends can all have a negative impact on the overall grazing capacity of the ecosystem and hence would be detrimental to traditional use of the resource such as livestock grazing. The Borana pastoralists will be less able to support themselves via livestock production, and be less able to supply livestock and livestock products to markets, if such trends continue. It is therefore important to document land use and land cover changes in support of appropriate land use planning (Coppock, 1994.) One objective of this research, therefore, was to measure land use/land cover change on a portion of the Borana Plateau from 1973 to 2003.

Another important issue is the extent that changes have occurred in the productivity of soils. Top soil is a non-renewable resource and it must be managed carefully to promote the sustainability of forage, livestock, and crop production. The second objective of this research thus was to assess the physical and chemical properties of dominant soils to determine whether degradation was occurring. Work was conducted in the Yabelo District of the Borana Plateau. This is one of five districts that comprise the Borana Zone. Yabelo District is situated 570 km south of Addis Ababa and is about 400 km² in size.

Spatial and temporal changes in land use and land cover were quantified at three intervals over the period 1973 to 2003 using remotely sensed data. LandSat images were collected for 1973, 1986, and 2003. Preliminary image interpretation was checked and adjusted via ground truth methods. Data interpretation and analysis were conducted using GIS software. Temporal change patterns over time were automatically produced once the software was calibrated and results were expressed in terms of changes against a baseline reference map. This approach resulted in the analysis of four basic land uses/land cover types: (1) grassland; (2) bushed grassland; (3) bushland; and (4) cropland. The grasslands are typically used for livestock grazing. They tend to be open areas with good visibility on flat areas and hill slopes dominated by perennial herbaceous plants with scattered small shrubs and trees; another descriptive term would be mixed savanna. The bushed grasslands are former grassland sites where woody

shrubs and trees have increased in density to be co-dominant with herbaceous plants in terms of cover. The bushlands are those sites where woody cover is fully mature and herbaceous plants have been almost eliminated. The croplands tend to be drainage sites where moisture accumulates and crops of maize can be grown. Traditionally, such sites have produced perennial grasses for dry-season grazing.

Soil sampling was stratified across the four site types with three repetitions per type. Composite samples were taken according from the surface of certain landscape positions using a coring tool at a depth of 0-20 centimeters. The samples were transported in plastic bags and processed at the National Soils Laboratory in Addis Ababa. The samples were analyzed for standard physical and chemical properties.

Major Findings

Tables 1 and 2 illustrate land use/land cover trends for Yabello District between 1973 and 2003. Dramatic declines in the grassland type were observed, while cropland increased five-fold and both the bushed-grasslands and bushlands increased substantially. These results support the idea that grazing land has been lost to crop cultivation and bush encroachment, in general. The increase in cultivation is the result of several factors. First, recurrent droughts and major death losses of milking cows due to starvation create significant periods of food insecurity for pastoralists. Lack of milk forces them to cultivate to produce calories to fill the gap. Growing their own maize also means that the pastoralists do not have to sell what few stock they have left to buy food. Secondly, due to the gradual change in livelihoods, the Borana have probably become agro-pastoralists in some areas and plan to grow maize as a routine part of their production system. Third, increased access to seeds via local markets may facilitate cultivation as well. Bush encroachment is recognized as one of the biggest threats to the rangelands of the Borana Plateau. Lack of fire and heavy grazing on residual savanna are probably contributing factors to the increase in woody vegetation. The pastoralists reportedly have been unable to use managed fire to control bush since the 1970s. Reoccurring drought may also contribute to vegetation change. Another important indirect cause of bush encroachment is population pressure. The population of Boran was about 300,000 in the 1980s and has reportedly increased to over 500,000 in recent years. More people mean more livestock, more grazing pressure, and a downward spiral in resource condition.

Table 3 illustrates physical features of soils in the study area. In general, these data show how the bushed-grasslands and bushlands differ from grasslands and croplands. The trends for soil texture indicated that, compared to grassland sites, both the bushed sites tended to be sandier with less silt and clay. The bushed sites had significantly higher values for bulk density and soil compaction compared to that for grassland and cropland sites. The overall trend of bulk density and soil compaction is in the order of bushlands > bushed grasslands > croplands > grasslands. What this says is that the bushland sites had the most tightly packed soils.

Table 1. Change in land use/land cover for Yabello District between 1973 and 2003 as interpreted from satellite images.

Land Use/Land Cover Class	1973		1986		2003	
	Area (km²)	%	Area (km²)	%	Area (km²)	%
Bushlands	80.0	20.0	100.0	25.0	115.0	28.8
Bushed-grasslands	134.0	33.5	161.0	40.3	198.0	49.5
Grasslands	173.0	43.3	106.0	26.5	24.0	6.0
Croplands	13.0	3.3	33.0	8.3	63.0	15.8
Total	**400.0**	**100.0**	**400.0**	**100.0**	**400.0**	**100.0**

Table 2. Percentage change in land use/land cover for Yabello District between 1973 and 2003 as interpreted from satellite images.

Land use class	Area in 1973		Percent change in land use		
	(km²)	%	1973-1986	1986-2003	1973-2003
Bushlands	80	20.0	+25.0	+15.0	+43.8
Bushed-grasslands	134	33.5	+20.1	+23.0	+47.8
Grasslands	173	43.3	-38.7	-77.4	-86.1
Croplands	13	3.3	+153.8	+84.8	+384.6

Table 3. Mean values of physical properties of soils as affected by land use/land cover.

Land use type	*Textural classes (%)			Tex. class	BD (g cm^{-3})*	COMP (kg cm^{-2})
	Sand	Silt	Clay			
Grasslands	39b	25a	36a	CL	1.37b	1.85d
Bushed-Grasslands	52ab	14b	34a	SCL	1.60a	3.11b
Bushlands	71a	9b	20a	SL	1.70a	4.35a
Croplands	40b	22a	38a	CL	1.42b	2.64c
LSD (0.05)	21.8	5.9	18.9	-	0.23	0.16
SEM (±)	8.92	2.42	7.70	-	0.09	0.07

**Means within a column followed by the same letter are not significantly different at P = 0.05. BD = Bulk density; COMP = Compaction; CL = Clay loam; SCL = Sandy clay loam; SL = Sandy Loam; LSD = Least significant difference; SEM = Standard error of the mean*

When the soil is tightly packed there is less opportunity for water and nutrients to infiltrate, thus contributing to lower plant productivity.

Table 4 illustrates chemical features of the soils. A key indicator is organic matter (OM), as OM can provide a beneficial production environment for plants. The loss of organic matter (OM) in bushlands and bushed-grasslands relative to the other sites is notable. Considering the grasslands as a reference point, the bushlands, bushed-grasslands, and croplands have lost 61%, 30% and 17%, respectively, of their top soil OM content. Croplands were higher in phosphorus and electrical conductivity (an indicator of salinity), which likely reflects their role as drainage sites. Croplands are often in the proximity to livestock holding areas laden with manure. Higher phosphorus levels in cropland soils are most likely due to run-off that transports nutrients from corrals to the fields. It is virtually certain that the Borana do not use any commercial fertilizers.

The soil physical data indicate that the bushed sites are degraded compared to the grassland and cropland sites. If it is assumed that the bushland and bushed-grassland sites were once grassland sites, the texture trends indicate that enhanced soil erosion has probably occurred with the increased prevalence of woody species. Woody species often out-compete herbaceous (grass, herb) species for light and water when grazing is heavy and fire absent. This can result in an under-story devoid of herbaceous vegetation. Sandy textures are heavier and would prevail in bushland and bushed-grassland sites as silt and clay is lost via erosion processes. Exposure of topsoil to rain and trampling by livestock can also lead to changes in bulk density and soil compaction as observed in the data. Compaction of soil surface produces crust which can severely hamper water infiltration and seedling emergence. The soil chemical data also indicate that the bushed sites are degraded compared to the grassland and cropland sites. A key indicator is the decline in soil OM. The loss of herbaceous biomass for nutrient recycling and loss of nutrient-rich top soil via erosion are probably the main contributing factors to changes in OM content.

Practical Implications

The changes in land use/land cover for Yabelo District are striking and support the idea that grazing lands are decreasing on the Borana Plateau. However, care must be taken in extrapolating the data too broadly in the region. Annual rainfall in Yabelo District tends to be at the high end (>650 mm per year) of records for the Borana Plateau, and this is largely because Yabelo District sits at higher elevations. This may predispose Yabelo District to more woody encroachment and cultivation compared to other districts of Borana Zone. These results also indicate that the changes in land use and land cover are associated with

Table 4. Mean values of some chemical properties of soils as affected by different land use types.

Land use type†	pH (H_2O)	*EC (dS m^{-1})	OM (%)	AvP (ppm)
Grasslands	6.40ab	0.07a	3.44c	0.78
Bushed-grasslands	6.40ab	0.08a	2.16b	2.37
Bushlands	5.70a	0.08a	1.36a	0.66
Croplands	7.00b	0.17b	2.85bc	13.85
LSD (0.05)	1.13	0.08	0.79	16.40
SEM (±)	0.46	0.03	0.32	6.70

*†Means within a column followed by the same letter are not significantly different at P = 0.05. *EC = Electrical conductivity; OM = Organic matter; AvP = Available (Olsen) P; ppm = Parts per million; LSD = Least significant difference; SEM = Standard error of the mean.*

fundamental changes in soil physical and chemical properties. The losses in soil OM and increases in soil compaction illustrate how difficult it could be to restore rangeland condition, even with renewal of prescribed burning regimes. The fundamental problems of heavy stocking would have to be corrected as well to have hope to improving herbaceous cover, and hence the physical and chemical properties of top soils.

An appropriate land-use policy is the first step in a process that promotes sustainable use of ecological resources. Efforts to promote lower stocking rates are important for the ecological health of the system, but the reality is that achieving lower stocking rates would be difficult given the pressures on the rangelands to yield livestock products. Assisting the pastoralists to diversify their livelihoods and connect with sustainable livestock markets could help reduce stocking rates in some cases. Degraded sites could be reclaimed using controlled fire and planting indigenous grass species, but it will involve a long process.

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About the Authors. Mr. Sintayehu Mesele is a member of the research staff at the Yabello Pastoral and Agro-pastoral Research Center, OARI, Yabello. Email Sintayehu_Mesele@ yahoo.com. Dr. Layne Coppock is an associate professor with Utah State University. Email lcoppock@ cc.usu.edu.

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Design by Susan L. Johnson

GLOBAL LIVESTOCK CRSP

Empirical Forecasting of Slow-Onset Disasters for Improved Emergency Response: An Application to Kenya's Arid Lands

Andrew G. Mude, ILRI; Christopher B. Barrett, Cornell University; John G. McPeak, Syracuse University; Robert Kaitho, Texas A&M University (GL-CRSP LINKS Project); and Patti Kristjanson, ILRI Pastoral Risk Management Project

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Slow-onset food crises associated with drought and loss of livestock in Kenya's arid lands routinely require emergency food aid and water distribution, livestock off-take, and other humanitarian interventions. Timely and cost-effective interventions depend fundamentally on accurate advance information of evolving situations. Improved forecasts are one essential element of emergency needs assessments and early warning systems. This brief reports on a newly developed empirical forecasting model that can predict, with reasonable accuracy and at least three months in advance, the expected child nutritional impact of slow-onset shocks such as drought.

Background

The ability to forecast the onset, duration, and severity of droughts, floods, and disease outbreaks with reasonable accuracy—especially in terms of their prospective human welfare effects—is critical to the design of timely and cost-effective early warning and emergency response systems. Better designed systems can minimize the suffering of populations adversely affected by such relatively slow-onset events. As the consensus on climate change and its consequences grows, there is an increasing concern that the frequency of climate shocks will rise, with more frequent and serious humanitarian crises and ensuing demand for emergency response.

Given the finite resources allocated for emergency response initiatives, there is growing demand for the development of timely, rigorous, efficient and practical methods of emergency needs assessment. To contribute to this effort, the research reviewed in this brief develops an empirical forecasting model to predict the human impact of slow onset disasters for early warning and emergency needs assessment.

The research focuses on the arid lands of northern Kenya. Largely populated by nomadic pastoralists and particularly vulnerable to recurring shocks such as droughts and floods, the region is well-suited for the purposes of this study. As part of an effort to address the vulnerability of the region's population, the Arid Lands Resource Management Project (ALRMP) has been collecting data in various communities across Kenya's arid districts since 1996. Data collected include detailed household-level information on livestock such as herd sizes, mortality rates, lactation rates, and managed off-take rates, and child-specific nutritional data, specifically mid-upper arm circumference (MUAC) measures.

The ALRMP data used in this study are monthly observations at the community level collected February 2002 to May 2005 in 54 communities across four districts (Baringo, Marsabit, Samburu and Turkana). The authors supplement the ALRMP data with a rich source of climate and forage availability data collected and produced by researchers of the Global Livestock CRSP Livestock Early Warning System (LEWS) project and its successor, the Livestock Information Network and Knowledge System (LINKS) project. One desirable feature of the LEWS/LINKS data is that they originate with remotely sensed and other data external to communities, so they are information imported into, rather than merely extracted from, the system under study. Lagged values of variables in the ALMRP and LEWS/LINKS data sets, such as changes in livestock fertility, mortality and productivity, and forage and water availability, are combined to predict changes in community-level MUAC measures. The authors designed this study to examine how good a forecast of changing community-level nutritional status we could generate and with what lead time in order to inform effective response to the prospective human impacts of climate shocks that frequently confront pastoralist communities.

Major Findings

Emergency response to widespread acute food insecurity is largely conditioned by the degree and prevalence of gross malnutrition. Acute food insecurity is typically assessed based on the proportion of children whose anthropometric measure(s) of weight relative to height or age reflect widespread high levels of food stress and acute undernutrition, commonly known as "wasting." Mid-upper arm circumference (MUAC), a superior

predictor of child mortality, is one such measure. A MUAC Z-score of less than -2 is widely regarded as an indicator of severe wasting (A Z-score is a statistical measure relative to a universal reference population. A Z-score<-2 indicates a child more undernourished than 97.5% of children of similar age.) A food crisis might be objectively defined as occurring whenever twenty percent or more of children are severely wasted.

Using this definition of a food crisis, the authors developed a model to forecast child nutritional status (as given by MUAC) based on movements in key explanatory variables several months in advance. Herd dynamics variables (the size of herds, mortality rates, sales and slaughter rates), measures of food aid, as well as variables capturing rainfall and forage availability were used to predict the prevalence of MUAC, and consequently, the likelihood of a food crisis.

Effective response to food crisis requires early warning of emergency conditions so as to mobilize resources. Two forecasting models are developed: a one-month forecast and a three-month forecast for the prevalence of severe wasting. While a one-month forecast will typically be more accurate, the short lead time leaves little leeway for food security managers to make effective use of the forecast. The longer, three-month forecast horizon, however, comes at a cost of diminished accuracy. The inverse relationship between forecasting horizon and forecast precision forces an operational tradeoff between models. Different end-users will favor different characteristics and thus different models.

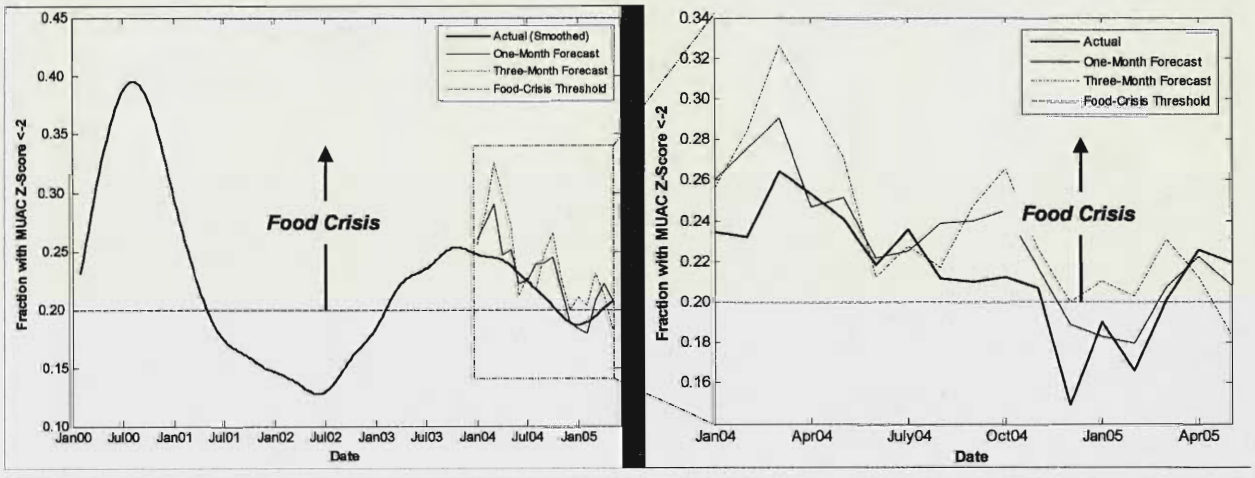
Figure 1 shows the monthly forecasts generated for January 2004 to May 2005 compared against subsequent, actual values. Figure 1(a) presents the forecasts superimposed on the full sample of actual values - the proportion of children with MUAC Z-scores<-2. The values are smoothed to highlight trends, especially the considerable variability in the prevalence of severe wasting. A food crisis existed during and following the 2000-1 drought, then re-emerged in 2003-4 in these northern Districts, then began reappearing last year. Figure 1(b) highlights forecast precision by zooming in on the forecasting period and plotting the unsmoothed actual values against the one- and three-month ahead predictions generated by the forecast model.

Three key points emerge from the figures. First, recall that a food crisis is defined as the state where 20% or more of children exhibit MUAC Z-scores <-2, reflecting severe wasting. Thus defined, the sample sites regularly experienced food crisis over the January 2000 and May 2005 period, but crisis was not constant. Second, the forecasts trace the actual values quite well, and seem to improve with time, as additional data improve forecast precision. Third, while the one-month forecasts outperform the three-month forecasts, the differences are not substantial.

How can policy makers use such forecasts of food crisis to make critical emergency response decisions? Furthermore, how confident can policy makers be in decisions they make based on the model's recommendation? To answer these questions, the authors construct a plausible scenario in which the model's forecasts can be used, and offer a measure of forecasting performance.

Consider the case of an organization tasked with responding to food crises. This sort of forecast model can provide early warning of a food crisis at a particular site in the form of predictions of specific levels of severe wasting. The organization can decide on the minimum likelihood of food crisis required before they deploy a costly aid package. This policy decision will depend on a range of variables, including the availability of funds to support emergency response, the operational costs of serving the affected population, logistical considerations regarding access, etc. Once such a likelihood threshold is chosen, the organization might initiate response

Figure 1. Fraction of Children with MUAC Z-score<-2: One and Three Month Forecasts.



if the forecast of food crisis reaches or exceeds the pre-determined minimum threshold.

To test forecast performance operationalized in such a way, a minimum response threshold was arbitrarily set at 66% (that is, the organization deploys aid whenever the forecast predicts a 66% or greater likelihood of food crisis). Defining emergency response when there is actually a food crisis, or no response where there is no food crisis, as 'correct' decisions, one can then calibrate forecasting performance by calculating the fraction of correct decisions generated by this decision rule in combination with the forecast model.

The results, presented in Table 1, are quite striking. Decisions based on forecasts are likely to be correct more that 75% of the time -- quite an impressive forecast performance. Moreover, the fairly small depreciation in performance as the forecasting horizon increases shows that these models can be used fairly accurately to provide a reasonable, three-month early warning to help with emergency response to mitigate the consequences of impending crisis.

Table 1. Model Performance in Generating Correct Decision for Famine Response.

FRACTION OF CORRECT DECISIONS	
One Month	Three Month
0.786	0.756

Practical Implications

Based on data collected from primarily pastoralist communities selected across four districts in Kenya's arid north, the authors have developed an empirical forecasting model that can predict, with reasonable accuracy and at least three months in advance, the expected human impact of slow onset shocks such as drought. Information on herd composition and herd management, climate and forage availability and food aid flows enable reasonably accurate three-month-ahead forecasting of child nutritional status, specifically severe wasting reflect in very low MUAC levels, with impressive precision. Longer lead forecasts may also be feasible and warrant investigation.

These forecasts were generated from a relatively small subset of variables that ALRMP regularly collects, augmented by data collected routinely by LEWS/LINKS. These data are not overly restrictive or costly to collect. Limiting data collection to these set of variables, collected consistently through time, might offer a cost-effective way to provide effective early warning to policymakers and emergency response professionals. The precision of these predictions appears sufficiently high that delays in acting on this information due to concerns over forecast accuracy should be limited. However, there remains work to be done to establish how best to communicate this information in as clear and timely a fashion as possible to appropriate audiences.

The authors recommend that the model be adapted as an effective famine early warning tool. As the model can be easily and regularly updated with new information that should continuously increase its forecast performance, a premium should be placed on developing standardized collection procedures and failsafe methods for entering, identifying and storing the necessary data. Such a forecasting model could prove an invaluable tool for early warning and emergency response to food crises.

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About the Authors. Andrew Mude recently completed his Ph.D. in Economics at Cornell University. He is now a Research Scientist at the International Livestock Research Institute (ILRI) in Nairobi, Kenya. Email: a.mude@cgiar.org. Chris Barrett is International Professor of Applied Economics and Management at Cornell University. E-mail: cbb2@cornell.edu. John McPeak is an Assistant Professor, Department of Public Administration, Syracuse University. Email: jomcpeak@syr.edu. Robert Kaitho is a Research Scientist for Texas A&M University. He is a team member of the GL-CRSP Livestock Information Network Knowledge Systems (LINKS) project. Email: rkaitho@cnrit.tamu.edu. Patti Kristjanson is a research scientist at ILRI in Nairobi, Kenya. Email: p.kristjanson@cgiar.org.

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Variation in Risk Perceptions Across Individuals, Time, and Space: Evidence from Pastoral East Africa

Cheryl Doss, Yale University; Christopher Barrett, Cornell University; John McPeak, Syracuse University
Pastoral Risk Management Project

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We analyzed risk rankings perceived by pastoralists for over two years during 2000-2002 that lived in multiple locations in northern Kenya and southern Ethiopia. We found that the primary determinants of these risk rankings are community-level variables that change over time, with household-specific and individual-specific variables exhibiting much less influence. These results have several important practical implications. First, the dynamic nature of risk perceptions means that assessments of risk collected in a community in a given point in time may largely be generated by current period conditions, and thus be limited use for predicting future assessments. This is particularly likely to be an issue in the rangelands we study which are characterized by highly variable conditions over time. Second, it is most important to prioritize community-based planning and monitoring of development efforts that address risk exposure. Third, individuals throughout the study area were most concerned about food security, and development efforts that directly address food security should be given highest priority. Concerns over human health, pasture, water, and general insecurity were also prominent.

Background

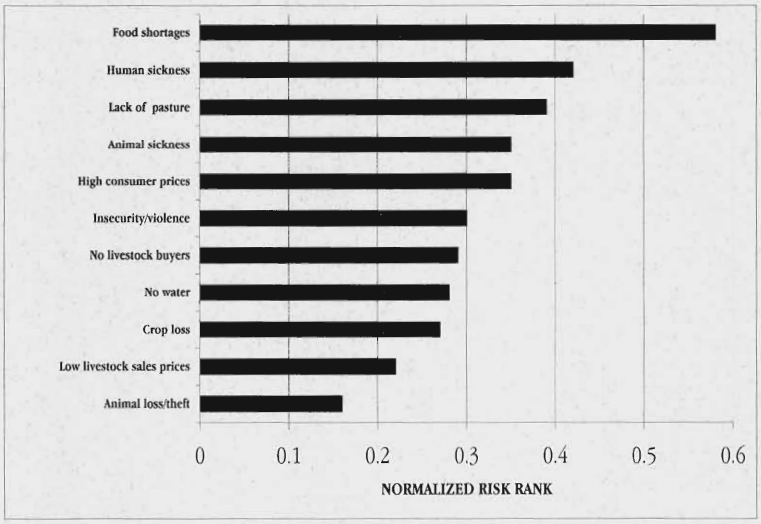
Residents of the arid and semi-arid lands (ASAL) of east Africa are exposed to many risks. Some of these risks originate from the pastoral production systems that comprise the main economic activities in these areas. The ASAL have rainfall patterns that are highly variable temporally and spatially, making pasture and water availability for livestock unpredictable. These risks translate into risks of human food shortages. Other risks originate from government policy; for example, quarantines can halt livestock sales that are the primary source of cash for many pastoralists. The lack of government presence can also lead to increased risk exposure; for example, weak state security services contribute to physical insecurity in these areas. Finally, the relatively poor infrastructure in the ASAL makes ex ante forecasting of these risks problematic and makes ex post coping with risks difficult, as roads, health centers, veterinary services, and markets are poorly maintained or non-existent.

This study investigated how ASAL residents perceive risks facing their households. We examined which risks people are most concerned about and the degree to which risk perceptions vary across time, communities, households within a community, and among individuals within a household. Appropriate policy responses clearly depend on how risks vary across time, space, and among and within households. Expressed risk perceptions are based not only on the objective risks that individuals face – such as the probability of low rainfall – but also on their subjective assessment of exposure to different shocks and their capacity to manage those shocks, ex ante or ex post.

From March 2000 through June 2002, we collected quarterly survey data from over 300 households across 11 communities located within a contiguous livestock production and marketing region in arid and semi-arid lands of northern Kenya and southern Ethiopia. The sites were chosen to capture relative variation in agricultural potential, market access, livestock mobility, and ethnic diversity. Rainfall is low and variable and the study period coincided with a major drought that affected much of the area in 2000, and continued well into 2001 in some locations. The infrastructure—in terms of roads, schools, and health facilities—is extremely marginal throughout the region. In each site a baseline survey was conducted in March 2000. Repeat surveys were conducted quarterly for an additional nine periods through June 2002.

In each household we interviewed the household head and, if applicable, one randomly selected spouse and one randomly selected non-head/non-spouse adult (age 18 years or older.) The head answered questions regarding the income, assets, and activities of the entire household. The other individuals reported on their personal assets, incomes, and activities. In addition to these standard questions, we asked respondents to identify and rank their concerns from a list of twelve different types of risks that could adversely affect their household in the coming three months. These data permit us to relate forward-looking subjective assessments of risk with households' and individuals' current situations.

Figure 1. Risk rankings for pastoral households in northern Kenya and southern Ethiopia aggregated for 2000 to 2002.



Major Findings

Figure 1 presents the overall results of the risk rankings, where a higher number means a risk was ranked as a greater concern. The risks ranked as the greatest concerns were shortages of food, human sickness, lack of pasture, animal sickness, and high consumer prices. Multivariate econometric analysis allowed us to analyze how risk rankings of these concerns are influenced by individual, household, and community-level characteristics as well as by changes over time and space. We report the detailed findings in a separate paper (Doss et al., 2006) and briefly summarize major results here.

At the community level, we controlled the analysis for (1) the mean percentage change in household herd size within the respondent's community over the previous survey period; (2) the occurrence of any livestock raids, animal quarantines, or outbreaks of animal or human diseases in the community during the previous survey period; (3) the deviation of monthly consumer prices from their mean over all months in that location; (4) the number of livestock traders buying animals in the community in the previous three months; and (5) a subjective indicator variable reflecting the ease of selling livestock. This is an unusually rich set of community-level covariates, especially in tracking the evolution over time in such variables, and thereby offers a rare glimpse into the impact of community-level variables on individual-level risk assessments.

Each of the community-level shock variables was statistically significant in explaining the ranking of at least one of the concerns. Wald tests found the community-level shocks were jointly statistically significant for each of the 11 risks studied. Individual-level risk assessments respond significantly to broader, community-level shocks, indicating information flow and social learning with respect to risk.

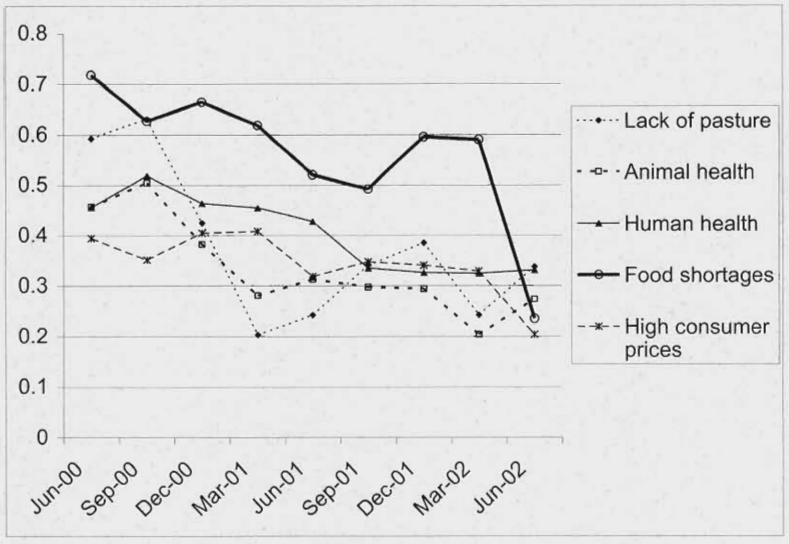
Once we controlled for the community-level variables, the household-level characteristics and shocks had a surprisingly modest effect on risk rankings. There are only two household characteristics—namely asset value and income—that had a statistically significant impact on more than one of the top five concerns. Household size and herd size impacted one ranking each. Jointly, household-level characteristics were statistically significant and associated with individual-level risk rankings for only six of the 11 risks enumerated, in striking contrast to the community-level characteristics that were uniformly (and highly) statistically significant. Even more surprisingly, household-level shocks had little effect on individuals' risk rankings. Human illness was the only household shock variable statistically associated with risk rankings, and this was only for one of the risks. Surprisingly, the indicator of a recent death in the family was not significant for any of the rankings. Joint Wald tests indicate that household-level shocks were not statistically significant in explaining individual rankings with respect to any of the 11 risks we studied. Once one controls for household and community characteristics and community-level shocks, households' idiosyncratic risk experiences seem to have negligible effect on individuals' risk perceptions.

Finally, we considered the impact of individual characteristics. The only statistically significant variable in more than one ranking was whether or not the individual was a head of household. Gender was statistically significant for only one of these five risks. Age, education, and status as a wife did not significantly influence the rankings of any of the top five concerns. Wald test results illustrate that individual characteristics had a relatively modest impact on individual risk rankings, being jointly statistically significant for only six of 11 risks.

Practical Implications

Four important implications can be drawn from this analysis. First, because risk perceptions vary markedly across time, common development practices such as Rapid Rural Appraisal, in which researchers drop into a village for a brief visit to ask about needs and concerns, may give results that are only relevant for that particular moment. For example, within just a 27-month period we observed both sharp seasonal and annual changes in risk rankings that call into question the generalizability of snapshot risk assessments for such dynamic circumstances. Figure 2 illustrates how risk rankings changed over time for our respondents. Local events—such as cattle raids, drought, or imposition of a quarantine for livestock disease control—have an important

Figure 2. Time series of risk rankings as perceived by pastoralists during 2000 to 2002 for the top five concerns.



impact on risk perceptions. Since rapid assessments are frequently fielded in response to such events, they may be especially prone to distortion. These results imply a need for ongoing, longitudinal monitoring of locations thought vulnerable to multiple risks in order that external interventions can adapt appropriately to changing risk profiles in such dynamic settings.

The second implication is that variation in risk rankings is more pronounced between communities rather than within them. Although there can be differences across households as stratified by herd wealth or across individuals based on gender, these differences are much smaller than those we observed across space and time. This implies that community-specific planning to mitigate and cope with risk is needed. A single plan for a large region runs the risk of overlooking community-specific concerns. Since most of this variation is between rather than within communities, community-based monitoring and formulation of development plans may suffice. While a community plan that does not take into account the variation of concerns across and within households runs the risk of being biased towards a subset of community members, our results indicate that it is more important to push for finer-grained analysis between different communities rather than within them.

Third, community-level shocks associated with rainfall, violence, animal and human disease, market conditions, etc., have a pronounced effect on individual-level risk perceptions, while household-level shocks associated with human illness and mortality or herd losses do not. This suggests that people learn actively from the experiences of others around them and adjust their risk assessments quickly in response, corroborating prior work in the area on subjective expectations of rainfall (Lybbert et al., forthcoming.) Although covariate shocks are relatively weakly correlated with individual-level income and asset shocks in this area (Lybbert et al., 2004, Lentz and Barrett, 2005), individuals appear to adapt their risk assessments more in response to community-level shocks than to those that strike their own household. This would also be consistent with the argument that social networks or sharing mechanisms within communities lead individuals to be less concerned about household specific shocks compared to community covariate shocks, though investigating this interpretation is left as a topic for further research.

Fourth and finally, the most prevalent fear was of food insecurity. The fear of food insecurity is largely driven by the fact that the study area regularly suffers from drought, herd loss, and sudden decreases in food (especially milk) availability. The perception of risk is highest for the core outcome of not having enough food, rather than underlying causes such as insufficient pasture, crop failure, high consumer prices, or livestock mortality. Policy responses to food insecurity in the area continue to focus heavily on emergency assistance in the form of food aid, the implementation of which is often not timely or well targeted (Lentz and Barrett, 2005). More emphasis also needs to be given to designing humanitarian assistance that is compatible with pastoralists' preferred drought mitigation strategy: migration (Morton, 2006; Aklilu and Wekesa, 2001). Food aid is all too often distributed from towns, which discourages mobility to remote rangelands (McPeak, 2003). In addition to food insecurity, human sickness is a major concern throughout the study area. Health services are minimal and improving them would help address this risk. Another finding is that lack of pasture is a much greater concern than lack of water, suggesting that pasture rather than water is viewed as the more binding constraint on pastoral production in this area. Finally, as the insecurity in this area is often characterized as a result of "cattle rustling," it is worth noting that the results indicate the fear of losing animals in a raid is relatively minor in our results compared to a general fear of insecurity. Individuals in this area are viewing insecurity as multi-dimensional, suggesting policy responses must go beyond anti-stock theft efforts.

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About the Authors. Dr. Cheryl Doss is the director of Graduate Studies for the MA program in International Relations and a lecturer in Economics at Yale University. Email: cheryl.doss@yale.edu. Dr. Chris Barrett is International Professor of Applied Economics and Management, Cornell University. Email: cbb2@cornell.edu. Dr. John McPeak is an Assistant Professor in the Department of Public Administration, Syracuse University. Email: jomcpeak@maxwell.syr.edu.

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Design by Susan L. Johnson

GLOBAL LIVESTOCK CRSP

Development Priorities in the Rangelands of Northern Kenya and Southern Ethiopia: Results of a Ranking Exercise Among Pastoralists

John McPeak, Syracuse University; Cheryl Doss, Yale University; and Christopher Barrett, Cornell University
Pastoral Risk Management Project

Research Brief 06-09-PARIMA December 2006

This study investigates development priorities of individuals living in arid and semi-arid areas of northern Kenya and southern Ethiopia that are predominantly used for pastoral production. Using a ranking exercise, individuals were asked which development interventions had been the most helpful in the past and to indicate their priorities for future development interventions. Results suggest there is relative consensus around a few key development interventions. The development priorities are not explicitly related to pastoral production, but rather focus on basic development needs such as human health, clean water, and access to education.

Background

Development efforts have met with limited success in the pastoral areas of Africa (Goldschmidt 1981; Brandstrom 1985; Lane 1996). Scoones (1995) describes the record in the following stark terms, "Millions of dollars have been spent with few obvious returns and not a little damage. Most commentators agree that the experience has been a disaster, so much so that many donors and other international agencies have effectively abandoned the dry zone in their development efforts." (p. 3). Recently, donors have begun showing renewed interest in pastoral development. They express frustration that development efforts in pastoral areas have been reduced to periodic humanitarian relief interventions that offer little prospect of long-term improvements to peoples' lives. As donors begin to formulate plans to address long term development problems there is a need to prioritize among different types of interventions. In response, the PARIMA team in 2001-2 fielded a survey that elicited development rankings from individuals in 11 communities in northern Kenya and southern Ethiopia. A total of 396 individuals (249 in Kenya, 147 in Ethiopia) were asked to rank the effectiveness of past development interventions and rank the development interventions they felt would be most helpful in their community in the future. This brief summarizes the findings of this study.

Major Findings

We first asked about the personal experiences of respondents with different kinds of projects. Table 1 summarizes the responses of whether they had individually experienced these interventions. Almost everyone had received food aid. Most people had experienced several interventions, with human health the next most common type of intervention (after food aid) that had affected respondents. Livestock health and water development were not far behind.

We then asked the respondents to rank the development interventions according to the degree of helpfulness to themselves and the community. The responses to this question were converted to a value between zero and one, with zero meaning that the project was not helpful at all and one being a project that was the most helpful. There was little difference between their rankings of the helpfulness to themselves versus that to the communities, so we focus here on the results for helpfulness to the community. Human health and water projects were by far the most helpful interventions, in the collective view of our respondents, with livestock health and food aid also highly rated (Figure 1). Thus the interventions most commonly experienced were also rated the most helpful, generally.

We also asked the respondents to conduct the same kind of exercise for ranking the development interventions they felt would be most helpful in the future. Again, we found little significant difference between rankings for the individual and for the community, so we report the results for priorities for the community (Figure 2).

In Table 2 we contrast the ordering of the intervention categories presented in Table 1 and Figures 1 and 2. Overall, the results illustrate that development efforts targeting human health, water, and education are seen as the most important, both in terms of past projects and people's priorities for the future. Interventions targeting the pastoral production system such as livestock

Figure 1. Ranking of past interventions most helpful to the community.

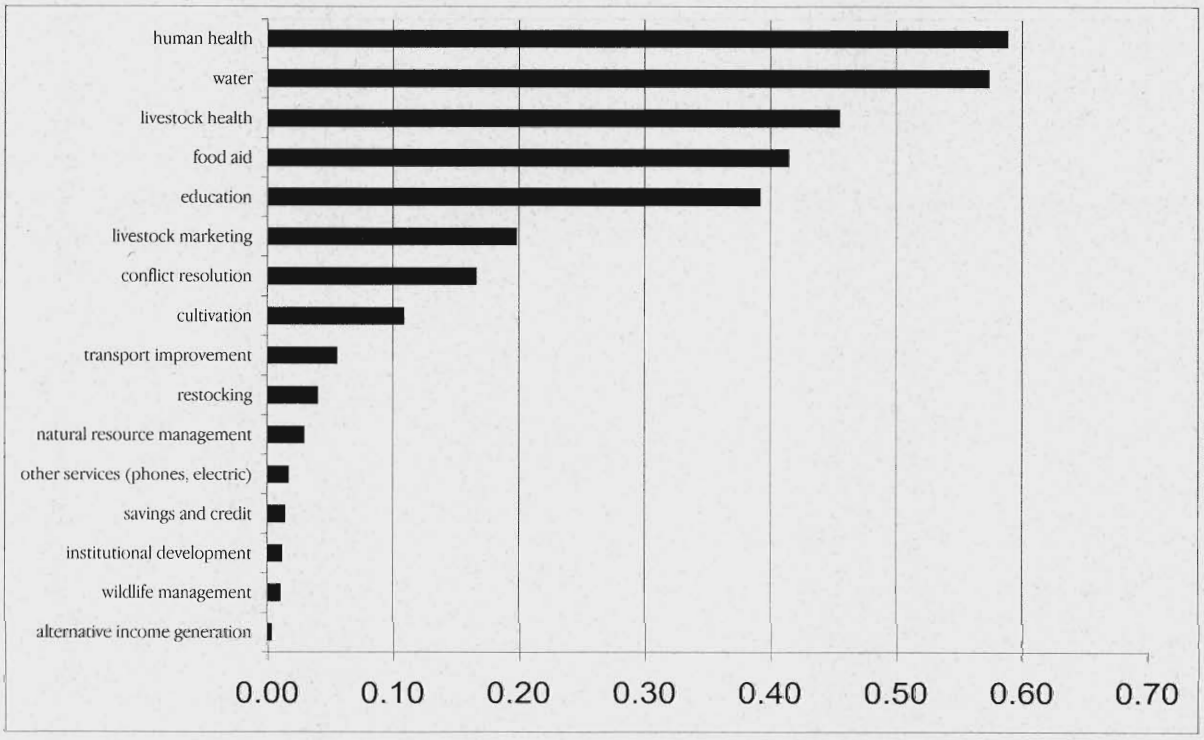
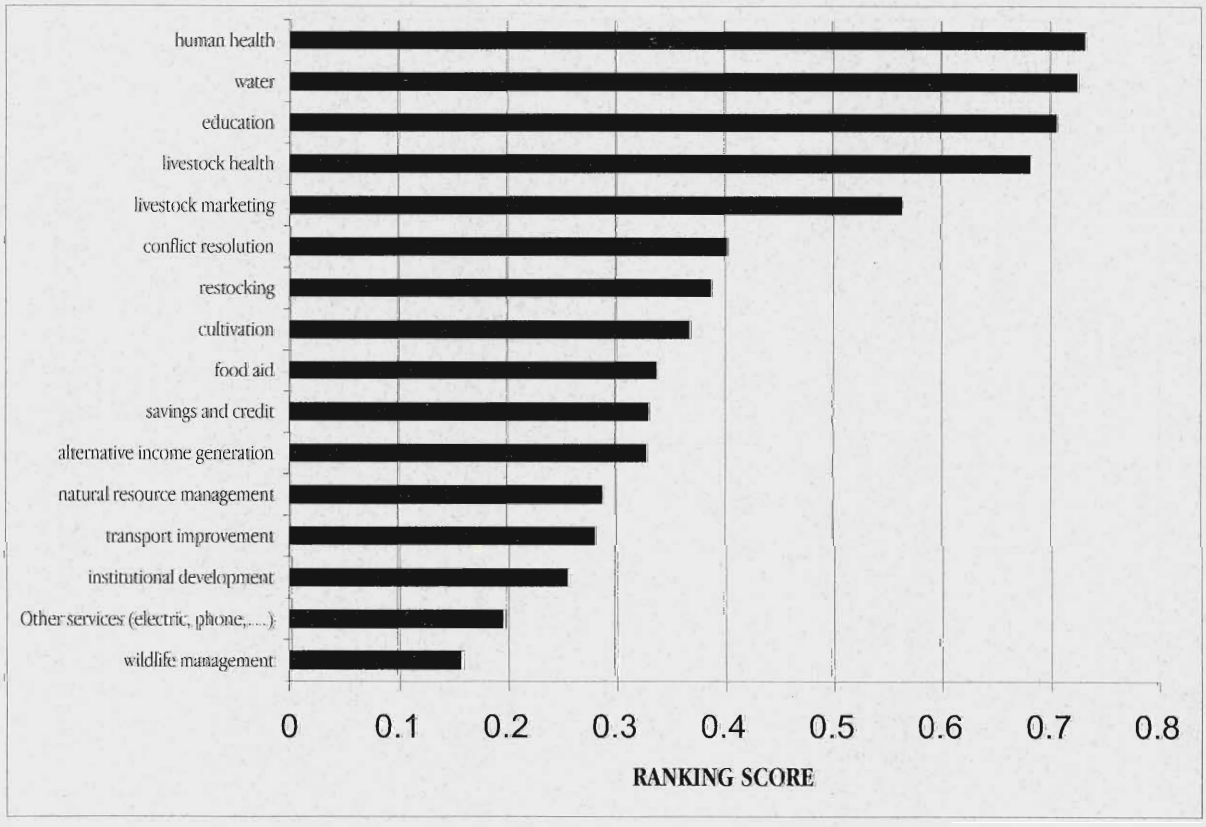


Figure 2. Ranking of future interventions most helpful to the community.



health, livestock marketing, and herd restocking fill in the middle range of the rankings. A variety of other types of interventions fall into the lower range of the rankings.

The results for food aid merit particular attention, as the motivation for increasing development efforts are often expressed as arising due to frustration with the recurring need for food aid. Food aid, as noted above, is the most widespread intervention. Respondents overall find it has been helpful; it was ranked the fourth most helpful type of intervention in the past. However, looking to the future, it slips to the ninth priority. In discussing these results with the communities, the general explanation of this was that if other development interventions succeed, there will be less need for food aid in the future. Thus a reduction in importance of food aid in the future is not just a desire of the donor community, but also a desire of the residents of these areas. But in the absence of effective means of supporting fragile livelihoods, our respondents plainly believe food aid has been valuable.

Practical Implications

The key conclusion of this study is that development efforts supporting basic human needs such as human health, clean water, and access to education are most highly desired by residents of this area. Development efforts should focus on ensuring that the basic human needs of residents of pastoral areas are met. This means that focusing on the development needs of "pastoral peoples" should emphasize the "people" first and the "pastoral" second. Past emphasis on the livestock on which many pastoral peoples' livelihoods depend is viewed as being only moderately helpful in the past rankings and, in the expressed view of these peoples on future development priorities, is less desirable than an emphasis on basic human needs.

Table 1. Experience of respondents with development interventions.

TYPE OF PROJECT	PERCENT OF INTERVIEWEES IMPACTED
Food Aid	97%
Human Health	88%
Livestock Health	76%
Water	74%
Education and Literacy	62%
Conflict Resolution and Security	62%
Transport Improvement	56%
Livestock Marketing	36%
Natural Resource Management	31%
Cultivation	28%
Wildlife Management	26%
Other Services (phone, electric)	18%
Restocking	13%
Savings and Credit	4%
Alternative Income	2%
Institutional Development	1%

Table 2. Summary Comparison of Results.

	PAST EXPERIENCE	PAST RANK	FUTURE RANK
Human health	2	1	1
Water	4	2	2
Education	5	5	3
Livestock health	3	3	4
Livestock marketing	8	6	5
Conflict resolution and security	6	7	6
Restocking	13	10	7
Cultivation	10	8	8
Food aid	1	4	9
Savings and credit	14	13	10
Alternative income generation	15	16	11
Natural resource management	9	11	12
Transport improvement	7	9	13
Institutional development	16	14	14
Other services (electric, phone)	12	12	15
Wildlife management	11	15	16

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About the Authors. John McPeak is an Assistant Professor in the Department of Public Administration at Syracuse University, Syracuse, New York USA13244-1020, E-mail: jomcpeak@maxwell.syr.edu. Cheryl Doss is the director of Graduate Studies for the MA program in International Relations and a Lecturer in Economics at Yale University, 34 Hill House, P.O. Box 208206, New Haven, CT 06520-8206 USA, E-mail: cheryl.doss@yale.edu. Chris Barrett is International Professor of Applied Economics and Management, Cornell University, Ithaca, NY 14853-7801 USA, E-mail: cbb2@cornell.edu.

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Design by Susan L. Johnson

GLOBAL LIVESTOCK CRSP

Community Perceptions Concerning Key Ecological Resources at Risk in Baringo District, Kenya

Mark N. Mutinda and Abdillahi A. Aboud, Egerton University; and D. Layne Coppock, Utah State University
Pastoral Risk Management Project

Research Brief 06-10-PARIMA December 2006

Key ecological resources in arid and semi-arid lands are often characterized by small patches of seasonal grazing and important water points that lend critical support to entire production systems. When key resources are degraded or lost, production systems can be badly compromised. The Baringo District of north-central Kenya is well known for enduring decades of environmental degradation and food relief. As an initial part of an effort to map and characterize key ecological resources at risk in Baringo, we interviewed 136 resident leaders from pastoral and agro-pastoral areas. We asked them to identify and rank their most vulnerable ecological resources, clarify why these resources have become compromised, and propose ideas for resource rehabilitation. Overall, pastoralists and agro-pastoralists ranked vulnerable resources differently. Climate and human factors were mentioned as being responsible for resource-related problems. When solutions to problems were discussed, respondents noted that government must play the critical role in resource rehabilitation. In contrast, they rarely proposed solutions based on their own initiative, and we interpreted this to suggest that the population in general has become overly dependent on outside forces to affect change. Resource rehabilitation efforts would require strong partnerships between government and resource users to be sustainable. How to forge and sustain such partnerships should be a focus of future research and development efforts.

Background

Key ecological resources in arid and semi-arid lands are often characterized by small patches of seasonal grazing and important water points that lend critical support to entire production systems (Scoones, 1991). Examples are dry-season grazing, permanent oases, and seasonal water points. When such key resources are degraded or lost, the production systems can be badly compromised. One example would be the loss of pastoral dry-season grazing to crop cultivation by settlers, a common process in the arid and semi-arid lands of east Africa. Another example is degradation of vital water points through erosion or pollution, hence making areas of associated grazing no longer accessible. Loss of key resources is often related to breakdowns in traditional systems of resource management and conservation.

Baringo District of north-central Kenya is largely comprised of arid and semi-arid environments. The district is well known for the extensive environmental degradation that has occurred over many decades due to a growing human population and heavy pressure on resources for grazing and fuel wood collection (Little 1992). In response to this situation, government and non-government organizations have repeatedly provided food to Baringo residents via emergency famine relief and food-for-work programs. As part of a larger study concerning the mapping and characterization of key ecological resources at risk throughout Baringo District, we engaged communities at various administrative levels to better identify the issues. One hundred and thirty six key informants were interviewed from seven divisions in Baringo. Four of the divisions were in the arid pastoral zones while three were in the semi-arid agro-pastoral zones. These key informants were asked to: (1) identify the vulnerable and lost key resources in the district; (2) rank key resources in order of their degree of vulnerability; (3) note major factors influencing vulnerability and loss of resources; and (4) suggest possible means of restoration. Key resources have been subsequently mapped on a GIS template. Here we report some of the interview results.

Preliminary Findings

Table 1 indicates that pastoralists and agro-pastoralists ranked vulnerable key resources differently. Agro-pastoralists tended to have greater concerns about water and croplands, while pastoralists were most concerned about vulnerability of dry-season grazing and water. Overall, the most cited key resource of concern involved water points.

Table 2 illustrates the factors perceived to be the main reasons as to why key resources have been vulnerable to loss or destruction. These factors were aggregated into indirect climate-related causes, direct human-related causes, and "other" causes. For example, climate-related causes included drought and a general "drying out" of the ecosystem, increasing soil salinity (in some cases), as well as changes in the courses of waterways. Direct human-related causes included insecurity, resource competition,

Table 1. Key resources at risk, their descriptions, and ranked vulnerability to loss by pastoral and agro-pastoral communities in Baringo District.

KEY RESOURCE	DESCRIPTION[1]	OVERALL RANKING ON VULNERABILITY TO LOSS		
		Pastoral (n=70)	Agro-pastoral (n=66)	Overall District (n=136)
Grazing Land	Primarily dry-season grazing	1	3	2
Water	Includes all types of watering points	2	1	1
Arable Land	Includes crop lands and valuable trees	4	2	3
Livestock	Includes cattle, sheep and goats	3	4	4

[1]*Where: Grazing land consists of riverine vegetation used as dry-season grazing, vegetation on hills reserved for dry-season grazing, grazing areas in swamps, depressions and valley bottoms used in dry seasons, and pastures found on high elevations; Water includes permanent springs, rivers, reservoirs, boreholes, and shallow wells; Arable land includes all forms of rain-fed and irrigated lands; riverine trees used as forage for bees and sites to hang hives. The top rank is (1) in all cases. Source: Mutinda (unpublished data).*

over-population of people and animals, destruction of watersheds, pollution, and soil erosion. Other causes, which may be at least indirectly related to human use patterns, included invasion by noxious woody species. Considering factors in these aggregate classes, climate was mentioned 334 times as a major factor in the loss of grazing, water, and arable lands, direct human influences were mentioned 510 times as a major factor, and "other" influences were mentioned 32 times as a major factor. This suggests that the population interviewed considered climate and human-related effects as co-dominant in the decline of key resources in Baringo District.

Respondents were then asked to suggest possible opportunities to restore vulnerable or lost resources. By far the most popular solutions involved putting all the responsibility on government. This included that government should develop new water resources (100 percent of respondents), provide more security (98 percent), restock herds (94 percent), control noxious bush species (90 percent), employ grazing guards (85 percent), provide food relief (82 percent), and give title deeds to farmers (52 percent). In contrast, very few respondents (only 2 to 8 percent) suggested ways of restoring key resources that involved community leadership or involvement.

Practical Implications

The downward trend in the ecological condition of Baringo District is known. Our work confirms that the pastoral and agro-pastoral communities in Baringo are well aware of the vulnerable state of their key ecological resources in general. They acknowledge that both climate and human activity are responsible for environmental changes they have observed. We have been surprised, however, by the minimal role given to community responsibility or initiative in the restoration of key resources by these respondents. While it is conceded that government must have a central role in efforts requiring large investments like water development, promotion of security, and provision of food relief, the general impression we have is that these communities exhibited an overwhelming tendency to look outside of themselves for viable intervention approaches. How this has come to pass is an important and interesting question. While this finding may simply be a case of respondent bias, we speculate that the pattern may indicate a "dependency syndrome." It is possible that poor governance and lack of effective technical intervention in the region over many years has undermined any hope or confidence that communities can be successful in taking the lead on their own development. They may be precluded from taking their own lead by external forces, or they may lack the internal leadership structures, resources, or vision to tackle complex issues themselves. There are cases elsewhere in Africa where community-led innovation is a cornerstone of development efforts (www.innovationafrica.net.) If restoration of key ecological resources is to have a good chance of success, strong partnerships between government and local resource users are required. Further research and development efforts are needed to reveal what types of partnerships are needed, and what limits them from being created.

Table 2. Major factors perceived to influence the vulnerability of key resources as identified by survey respondents (n=136).

KEY RESOURCE	FACTORS IDENTIFIED BY KEY INFORMANTS AS INFLUENCING THE VULNERABILITY AND LOSS OF KEY ECOLOGICAL RESOURCES	PERCENT OF RESPONDENTS
GRAZING		
	Climatic factors (drought, low rainfall, high temperatures)	96
	General insecurity	56
	Expansion of crop cultivation	45
	Lack of grazing guards to control reserved grazing	26
	Invasion by unpalatable bush species *(Dodonea viscosa)*	19
	Encroachment by settlements (sedentarization)	13
	Invasion by *Prosopis juliflora* (especially in swamps)	13
	Increased livestock numbers	6
	Breakdown of traditional resource management systems	4
WATER		
	Drying up and silting of earthen dams or pans	98
	Climatic factors (drought, low rainfall, high temperatures)	96
	Insufficient water sources	66
	Animals drinking from sources for people (reservoirs)	55
	Destruction of watersheds	51
	Damage to water points	47
	River changing course	22
	Pollution in up-river catchments	19
	Over subscription of water supplies	14
LAND		
	Population increase	51
	Cutting of riverine vegetation for building materials, charcoal making, and to clear sites for cultivation	32
	Increased soil salinity	22
	Scarcity of land that can be irrigated	19
	Soil erosion	6
LIVESTOCK		
	Diseases and lack of grazing	69

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About the Authors. Mark N. Mutinda is a doctoral student and lecturer, and Professor Abdillahi A. Aboud is a senior faculty member, in the Department of Natural Resources at Egerton University, Kenya. Email: for Mutinda is lnmutinda@yahoo.com. Email for Prof. Aboud is eu-crsp@africaonline.ke.co. Dr. Layne Coppock is an Associate Professor in the Department of Environment & Society at Utah State University, Logan, USA. Email: lcoppock@cc.usu.edu.

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Design by Susan L. Johnson

GLOBAL LIVESTOCK CRSP

Collective Action Among Agro-pastoralists in Baringo District, Kenya: Identifying and Nurturing the Entrepreneurs

Mark N. Mutinda, Stellamaris K. Muthoka, and Abdillahi A. Aboud, Egerton University; D. Layne Coppock, Utah State University
Pastoral Risk Management Project (PARIMA)

Research Brief 07-01-PARIMA December 2007

The rural population of Baringo District in the Rift Valley of north-central Kenya faces numerous challenges including widespread environmental degradation and poverty. The region has endured decades of failed development projects, proliferation of food aid, and has been studied extensively. We have recently undertaken a different approach focused on bottom-up participatory action research and outreach among the Il Chamus and Tugen ethnic communities. The objective is to explore new ways to empower local people via provision of information, novel experiences, and initial access to resources to allow them to envision an alternative future and implement their own activities to better-manage risks. Here we report on the first phase of this activity. Twelve potential entrepreneurs (six from each of the two ethnic groups) were carefully selected and sent on an extensive training and educational tour to Mwingi District in eastern Kenya. There they visited a variety of successful, community-led development projects. The tour helped convince the entrepreneurs of neglected opportunities in Baringo. They have since taken a lead in assisting their communities to form collective-action groups. The groups are now registered with the Kenya government and pursuing work plans aimed at improving their circumstances.

Background

Participatory action research and outreach, unlike conventional academic research, aims to create knowledge as well as positive impact in local communities via strong collaborative partnerships among researchers, rural people, and development agents. This process can be time-consuming but has long-term advantages in terms of translating ideas into effective interventions, stimulating innovation, and building capacity among stakeholders (Greenwood and Levin, 1998; Ashby, 2003).

Empowering the poor, however, is difficult for many reasons. One avenue where success has been observed is in terms of collective action whereby groups of local people join together on a voluntary basis to help address social and economic problems (Grootaert, 2001; Desta et al., 2006). While not all groups are guaranteed success, certain features may facilitate sustainability and the ability of groups to solve problems. Some desirable group characteristics may include cultural and economic homogeneity. Institutional features that enhance prospects for group effectiveness include provision of agreed and enforceable rules governing the sharing of costs and benefits, forums for resolving conflicts, ways of punishing deviators, methods of monitoring, and relating individual costs to the benefits one receives from group resources. Other investigators have noted the importance that group members receive basic education inputs and be well trained in the management of group dynamics, micro-finance, and small business development; groups also need to avoid political meddling (Desta et al., 2006).

The Baringo District of north-central Kenya has endured decades of resource abuse and high rates of population growth (Little, 1992; Herlocker et al., 1994). Many of the traditional systems of natural resource management have broken down long ago. Provision of food relief is common and some contend that the local people are mired in a dependency syndrome with little motivation to improve their circumstances (Aboud, personal observation).

The PARIMA project initiated a participatory research and outreach activity in Baringo during 2006 to explore whether local communities could be effectively stimulated to better address local challenges for their livelihoods. New partnerships were formed among researchers, local agro-pastoral communities, and development agents towards this end. The researchers included an interdisciplinary team from Egerton University representing the Departments of Natural Resources, Agricultural Economics & Marketing, and Human Nutrition & Pre-Clinical Studies. The local communities included members of the Il Chamus and Tugen ethnic groups that reside in the lowland flood plains and the rocky hills, respectively, in the vicinity of Marigat town. Development agents included government agencies and local NGOs. The project step-wise activities have included: (1) Identification of potential local entrepreneurs; (2) helping instill in the entrepreneurs an ability to visualize alternative futures; (3) facilitating access of the entrepreneurs to some initial key inputs and advice to implement their ideas on a pilot basis; and (4) monitoring how the entrepreneurs fare and the

extent that other community members follow or otherwise become engaged via independent initiatives and/or collective action.

The participating communities of Kibingor (Tugen) and Ng'ambo (Il Chamus) were identified via use of key informant interviews and focus group discussions with community leaders. Six entrepreneurs from within each of the communities were identified based on face-to-face interviews. We were looking for people with the following personal characteristics: (1) those with limited financial and livestock resources; (2) those having self-motivation, illustrated by at least preliminary involvement in local enterprise or community endeavors; (3) those having new ideas; (4) those with an ability to serve as community role models, namely innovators with the aptitude to deliver results and build trust; (5) those willing to commit some personal resources (money, time, labor, land, livestock, etc.) to cost-share in the early stages of an entrepreneurial activity; and (6) people with energy and a youthful orientation that also had evidence of basic literacy.

We interviewed 169 people overall, about evenly distributed over two rounds between Kibingor and Ng'ambo. After the first round 42 people remained, and they were interviewed again. We selected 12 finalists from among the 42. The 12 were comprised of four men and eight women ranging in age between 20 and 56 years. They were taken for a five-day training tour of Mwingi District in eastern Kenya; the ecological conditions in Mwingi are similar to those of Baringo. Mwingi District is inhabited by the Kamba ethnic community and is very advanced in terms of the creation and management of collective action projects. It was specifically selected as the tour destination for these reasons.

Preliminary Findings

Table 1 illustrates aspects of the Mwingi tour. Nine major

Table 1. Local community development projects in Mwingi District visited by the Baringo participants during 2007.

Activities Observed	Description	Knowledge Acquired
Commercial Mango and Citrus Farming	Various small-scale farms and use of soil conservation practices	Value of mangoes and citrus crops as possible new cash crops for Baringo
Water Development Projects	Old earthen dams renovated by communities using locally available materials	Value knowing that communities can help themselves with minimum inputs from government
	New earthen dams built by communities	Value of group work
	Improved management of community water facilities	Value of group ownership and responsibility for community water resources; value of fencing and special watering troughs to exclude animals from human water sources
	Rules governing use of water	Value of water use rules
Women's Handicraft Production	Women's groups engaged in making handicrafts for export	Value of some traditional skills for income generation
Bee Keeping and Honey Processing Plant	Groups engaged in apiculture and adding value to products	Value of income diversification via local natural resources
Silk Production	Groups engaged in wild harvest, production, and processing of silk	Value of income diversification via local natural resources
Reclamation of Denuded and Eroded Land	Soil conserved using terraces and re-planted with grass species	Value of, and need to reclaim, Baringo lands
Irrigation	Using buckets to individually hand-water horticultural crops	Value of individual effort and simple technology
Vegetable Production	Small vegetable plots	Value of vegetable gardens for food production and income generation
Livestock Production	Larger, healthier animals compared to those in Baringo	Value of improved livestock breeding and management
	More male cattle than female cattle in local herds	Value of male cattle for ploughing and drought sale

activities are summarized in terms of what was observed and the value of the observations for the participants. It was interesting to note that production and management actions seemingly routine in Mwingi were new ideas for the Baringo travelers.

The Baringo participants realized that although the Mwingi residents were basically even poorer than themselves, the latter were way ahead in terms of local development processes. The participants noted that individual hard work and collaborative group actions were major factors in the success of activities at Mwingi. The Baringo entrepreneurs also noted that their communities indeed seem to possess a "dependency syndrome" and expect government to do nearly everything for them, unlike the situation in Mwingi.

The Baringo travelers were very motivated based on what they experienced at Mwingi and they were subsequently instrumental in forming collective action groups back near Marigat. These groups have been officially registered with the Kenyan Ministry of Social Services, opened local bank accounts, and proceeded to create work plans with prioritized activities for their home areas.

The Baringo travelers were also able to appreciate the contribution that women can make to development projects, something that was previously taken lightly within their home areas. The female entrepreneurs from Baringo realized that they could play a major role in enhancing their livelihoods. Overall, a process of innovation diffusion has been stimulated (Rogers, 2003).

The project has provided the entrepreneurs with further training and access to resources to help them get their new projects started in their home areas. This included formal training in forming and managing voluntary groups, preparation of a group constitution and by-laws, drafting of project action plans including budgets, group registration with the Kenyan Ministry of Social Services, and technical training in the management of tree seedlings, bee keeping, etc. Finally, we provided some seed funds for the purchase of five bee hives and the raw materials for handicraft production. Development agents have participated by assisting with each of the registration and training activities above.

What is the future role of research in this activity? We contend that research has a vital role to play in terms of systematic monitoring of the new Baringo activities and noting the factors that most threaten, or assist, the sustainability of interventions. Another novel aspect of Action Research is the idea that in the process of monitoring, researchers can collaborate with communities and development agents to prescribe and implement corrective measures to promote success. This way, the entire process engages all in a cycle of mutual learning and advancement.

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About the authors: Mark N. Mutinda is a doctoral student and lecturer in the Department of Natural Resources at Egerton University, Njoro, Kenya. Email: lnmutinda@yahoo.com. Ms. Stellamaris K. Muthoka is a doctoral student and lecturer in the Department of Human Nutrition & Pre-Clinical Studies, also at Egerton University. E-mail: skaveni@yahoo.com. Professor Abdillahi A. Aboud is a senior faculty member in the Department of Natural Resources, Egerton University. Email: eu-crsp@africaonline.co.ke Dr D. Layne Coppock is an Associate Professor in the Department of Environment & Society at Utah State University, Logan, USA: lcoppock@cc.usu.edu.

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Design by Susan L. Johnson

GLOBAL LIVESTOCK CRSP

Stakeholder Alliance Facilitates Re-Introduction of Prescribed Fire on the Borana Plateau of Southern Ethiopia

Getachew Gebru, Solomon Desta, D. Layne Coppock, Utah State University; Lemma Gizachew, OARI; Dadhi Amosha, PARIMA; Feyissa Taffa, Oromia Pastoral area Development Commission
Pastoral Risk Management Project

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The implementation of a new prescribed fire program to restore bush-encroached rangelands in southern Ethiopia—and hence increase herbaceous forage supplies for livestock—is given as an example of an integrated action involving multiple institutions to address resource-management problems. The resumption of planned fire—traditionally conducted over hundreds of years by pastoralists until the 1970s—was preceded by key activities including mobilization of the pastoral community, review of government proclamations regarding use of fire, interaction with policy makers, capacity building among pastoralists and agency personnel on how to implement and manage planned fires, development of an overall prescribed burn plan, selection of geo-referenced sites, and then implementing large-scale burns on an annual cycle. The process has required a combination of indigenous knowledge, relaxation of policy constraints, use of modern technology, careful hands-on training, applied research, and building trust to create a truly collaborative approach. The key elements of change have been participatory action research, outreach, and engagement with a wide variety of stakeholders. One springboard for success has been the commitment of the Oromia Agricultural Research Institute (OARI) and the Oromia Pastoral area Development Commission (OPaDC) to support an authentic, demand-driven research agenda with a focus on applied and adaptive work in the pastoral areas.

Background

African rangelands are extensive and support large populations of pastoral people and livestock. The semi-arid Borana Plateau is an especially important rangeland for Ethiopia. It is over 95,000-km^2 in size and home to about 350,000 people and one million head of cattle, small ruminants, and camels. The grazing systems of the Borana Plateau have become increasingly unsustainable in recent decades, however, because of human population growth, expansion of maize production in dry-season grazing areas, and range degradation in the form of woody encroachment. Heavy grazing by livestock, reduced mobility of pastoralists, and lack of fire have contributed to conversion of open, mixed savanna communities to dense woodlands and bushlands. Herbaceous forage production for cattle and sheep can then be reduced via competition with woody plants for water and light. Residual grass can be subjected to intense grazing pressure, further exacerbating the downward spiral. Prescribed fire is the most cost-effective means of manipulating vegetation in savanna ecosystems of eastern Africa. An apparent blanket national ban on the use of fire compelled the pastoralists to stop this traditional practice in the 1970s (Coppock, 1994). This was intended to protect croplands and other natural resources across the nation from indiscriminant burning, but one unintended consequence of this policy has been a weakening of traditional forms of range management that depended, in part, on the regulated use of fire to control undesirable woody plants, promote herbaceous forage production, and reduce populations of disease-carrying ticks. Efforts by pastoral communities to revive indigenous range management practices like the use of fire are now gaining the positive attention of policy makers. An alliance among pastoral communities, researchers, policy makers, and development actors has been forged to re-introduce prescribed fire to the Borana Plateau, and achievements made thus far are the focus of this brief.

Progress and Findings

Public Engagement. In mid-January of 2005 a joint workshop involving OARI, OPaDC, and PARIMA was organized that brought together 40 people from pastoral communities, local administration, regional policy makers, government experts, NGOs, and other friends of pastoralists to discuss the national fire ban which had been in place for over 30 years. After a thorough review of government proclamations, this workshop ended by recommending that the use of fire resume in the Borana rangelands, but the participants also underscored the need for capacity building and training in the modern techniques of implementing prescribed fire.

Training on the Use of Prescribed Fire. Training of researchers, development agents, and pastoralists on use of prescribed fire was initiated by PARIMA in February 2005. The course outcomes included: (1) Learning about the role of fire in rangeland ecosystems; (2) learning

how to plan and implement a managed fire; (3) learning how to monitor fire effects to assist management decision-making; (4) making progress towards conceptualizing a community based, fire-management program across the Borana Plateau. On appropriate sites, fire can improve subsequent quality and quantity of herbaceous forage, assist in the reduction of some undesirable plant species, reduce populations of ticks, reduce woody cover to conceal large predators, and strengthen traditional and participatory range-management practices.

A modern prescribed-fire plan is comprehensive and follows U.S. federal guidelines (LaMalfa and Coppock, 2005). It includes spatial mapping information, pre-treatment digital photos, site vegetation characterizations, treatment justification and objectives, and hazard preparations. Fuel load and weather information is also collected as prescribed burns are best conducted under optimal conditions of air temperature, relative humidity, days since the last rainfall, wind direction, and wind speed. Other components related to burn management include firebreak preparations and a post-fire site rehabilitation plan.

Selection of sites to be burned has been jointly conducted by pastoralists and agency personnel. Criteria include fuel load availability, site suitability, potential of sites to be used as fodder reserves (*kalo*), and the relative ease of managing the site after the fire has been conducted. Actual implementation of fires has involved full participation of pastoralists and agency personnel.

Table 1. Frequency of occurrence (percent) of herbaceous plants on a pair of treated and untreated rangeland sites on the north-central Borana Plateau following the long rainy season of 2005. Entries represent data collected for 300 points per site selected on a restricted random basis. The treatment consisted of manual thinning of Acacia drepanolobium *stands followed by prescribed fire. Exposed bare ground changed from 3% (treated) to 7% (control).*

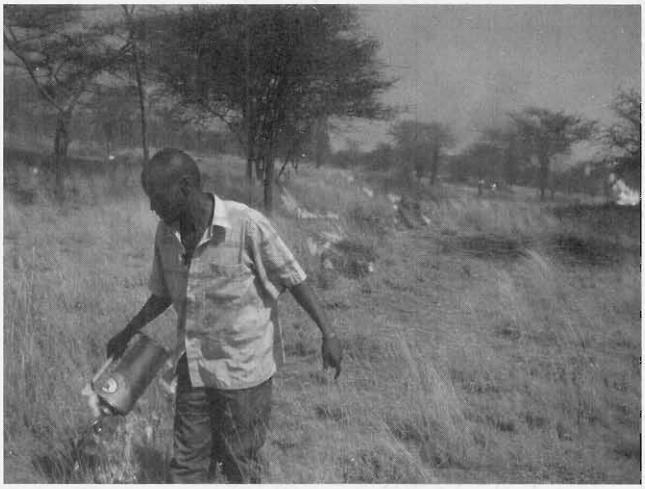
CATEGORY	TREATMENT	
	Thinned and Burned	Control
Achyranthus sp.	1	0
Cenchrus ciliaris	7	0
Chloris gayana	1	0
Chloris roxburghiana	2	19
Chrysopogon plumulosus	33	35
Eleusine indica	1	4
Heteropogon sp.	1	0
Lintonia nutans	3	12
Solanum sp.	1	0
Sporobolus pyramidalis	7	4
Themeda triandra	41	18

Ecological Effects of Fire and Manual Thinning of Bush. Frequency data for vegetation and bare soil occurrence has been collected on paired sites on the north-central Borana Plateau before and after a treatment that included manual thinning of *Acacia drepanolobium* stands followed by fire. Fires on the Borana Plateau are best conducted during January or February, the peak of the long dry-season. The post-fire assessment is best conducted following the long wet season that occurs during March to May. In addition, a paired, adjacent unburned site is assessed for comparison with each burned site.

An example data set from a pair of pilot sites burned in 2005 is shown in Table 1. These sites are about 20 hectares in size. Results suggest that changes in the herbaceous composition and exposure of bare ground have occurred as a result of fire. The overall forage species composition has improved in the fire site and the amount of bare ground has decreased. The striking change has been the doubling of cover for the highly valued *Themeda* forage grass. It increased from 18% of cover to 40% in this case. The amount of exposed bare ground was reduced by treatment from 7% (control site) to 3% (thinned and burned site). This suggests that the herbaceous plants emerging after fire and precipitation have been more vigorous, and by reducing exposed base ground risks of topsoil erosion have been lessened. One rule of thumb from the range literature has been that range sites can be burned no more often than once every five years for optimal effects.

The ecological data have been supplemented with qualitative impressions from local pastoralists via use of focus groups. In these discussions the Boran noted that fire resulted in: (1) An improved condition of the herbaceous layer; (2) a good kill of noxious bush species; (3) increased site visitation by wild grazing animals; (4) increased availability of key grasses used for housing thatch and other building materials; (5) less tick burdens on livestock; (6) fewer instances of predatory animals; and (7) less teat damage on cow udders as related to cuts from *Acacia drepanolobium* thorns.

Scaling-Up the Activity. Overall, given a total of three sites burned in a pilot program, the outcomes have been positive. In view of this and the enthusiasm generated, new partnerships have been recently formed to scale-up the approach. This came at an opportune time when the USAID Pastoral Livelihood Initiative (PLI) was launched through the CARE and Save the Children/USA consortia. The PLI effort allowed the fire initiative to be expanded in terms of active members to include more NGOs. The technical



Mr. Askebir Tesfaye, development agent from Arero Rural and Pastoral Development Office, uses a drip torch as perscribed in U.S. Forest protocols. During the 2005 PARIMA course on fire management, three sites (Alona, Dembi, and Dikale) were burned for demonstration purposes. The course set a framework for future collaboration and resulted in a task force to make recomendations for fire management policy. Photo by Eric LaMalfa.

backstopping has been further enhanced via USAID support for a team from the U.S. Forest Service (USFS) to engage in capacity building and further blending the integration of modern and indigenous knowledge on fire application. The focus of the USFS team has been to build capacity of partners to carry out much larger burns. Other institutions that have joined in the broadened partnership have been SOS Sahel, the Gayo Pastoral Development Initiative, the Ethiopian Forestry Research Center, and the Oromia Water Design and Supervision Enterprise. A steering committee at the regional level, and fire teams at the district levels have been formed. The steering committee takes the lead in reviewing and approving action plans. The role of the local teams is to prepare the detailed action plans, mobilize the pastoral communities, collect data, and report back to the steering committee. Based on the detailed plans made, and with technical back stopping from the USFS team, several large-scale prescribed fires were conducted, and covered a total of 900 hectares in 2007. These locations are currently being monitored by OARI. Plans are now underway to carry out more large-scale burns in February of 2008 with assistance from the USFS.

Practical Implications

An alliance has been forged among pastoral communities, researchers, policy makers, and development actors to re-introduce prescribed fire to the Borana Plateau. The process has required a combination of indigenous knowledge, relaxation of policy constraints, use of modern technology, careful hands-on training, applied research, and building trust to create a truly collaborative approach. The key elements of change have been participatory action research, outreach, and engagement with a wide variety of stakeholders. One springboard for success has been the commitment of the Oromia Agricultural Research Institute (OARI) and the Oromia Pastoral area Development Commission (OPaDC)—as the major regional agencies—to support an authentic, demand-driven research agenda with a focus on applied and adaptive work in the pastoral areas. This intervention model could be adopted for use in other pastoral or rural areas of Ethiopia. Furthermore, the focus need not be restricted to use of fire. It can be expanded to other issues. The bottom line is that a large alliance is needed to effectively confront large problems. No one partner, or subset of partners, is effective enough to do it alone. Partnerships also create space for innovation and generation of knowledge.

Pastoral communities on the Borana Plateau have historically used fire as a tool to manage natural resources. Any attempt to institute managed fires within a community needs to be broad-based and address the reasons why people use fire, the benefits to be gained through its use, and the contemporary consequences of use. In short, a strategy for prescribed burning had to be developed within a broader land-use and resource-management program.

Prescribed burning requires decisions on where, when, and how to burn, what preparations are needed to control the fire, and coordinated actions to control the spread of the fire. To ensure success of controlled burning, community members must be party to decisions on the need for burning and its control. They must be responsible for determining which areas can be burned, when, how, and by whom. They must also be able to delegate these responsibilities. The essential role of technical assistance is to facilitate decision-making by the community, not to dictate the decisions.

A wise and sustainable strategy should therefore involve the pastoral community in the planning and implementation of the intervention. Sustaining the positive impacts of the rangeland restoration effort will require buy-in from pastoralists in terms of improved grazing management. The ability to manage grazing is related, in part, to the ability to sell livestock at certain times for fair prices. Livestock marketing is thus also linked to the success of a fire program in the bigger picture.

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About the Authors: Dr. Getachew Gebru is a research associate with PARIMA through Utah State University and is based in Addis Ababa. Email: G.Gebru@cgiar.org. Dr. Solomon Desta is a research associate with PARIMA through Utah State University and is based in Nairobi. Email: S.Desta@cgiar.org. Dr. D. Layne Coppock is an Associate Professor in the Department of Environment & Society at Utah State University, Logan, UT, USA: Email lcoppock@cc.usu.edu. Dr. Lemma Gizachew is Director of Livestock Research, Oromia Agricultural Research Institute, based in Addis Ababa, Ethiopia. Email: Lemmag61@yahoo.com. Mr. Dadhi Amosha, is a natural resources field supervisor with PARIMA and is based in Addis Ababa. Email: D.Amosha@cgiar.org. Mr. Feyissa Taffa is Department Head for Natural Resources in the Oromia Pastoral area Development Commission, based in Addis Ababa. Email: feyissa_taffa@yahoo.com

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GLOBAL LIVESTOCK CRSP

Building Effective Community Participation and Stakeholder Partnerships to Promote Positive Change in the Southern Ethiopian Rangelands

Solomon Desta, D. Layne Coppock, Getachew Gebru, Utah State University; Seyoum Tezera, Dadi Amosha, PARIMA Pastoral Risk Management Project

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Recently there has been increased recognition that authentic community participation and creating strong inter-institutional partnerships are both important in the process of capacity building, generating innovation, and sustaining development achievements in rural Africa. Here we summarize a process of community participation and formation of institutional partnerships in support of pastoral risk-management interventions over the past seven years on the Borana Plateau. Community involvement has been stimulated using Participatory Rural Appraisal (PRA) methods. This has resulted in the proliferation of pastoral collective-action groups that have diversified livelihoods, engaged markets, and improved incomes. Implementing and sustaining positive change, however, has also been related to building a dynamic network of 46 like-minded partners across Ethiopia and northern Kenya. These partners include community based organizations, women's groups, policy makers, educators, researchers, private sector firms, various GO and NGO development agents, and others. It is argued that widespread impact across such a large area could not have been achieved without the assistance of many partners that contribute complimentary resources and expertise to plug gaps that can otherwise impede progress. Challenges and opportunities in creating and maintaining partner networks in support of such rural development are discussed.

Background

Community participation and multi-stakeholder partnerships are essential to ensure that agricultural research and development efforts are relevant and sustainable. This is different from the traditional, top-down model of basic research leading to extension and then impact. By engaging rural people and other stakeholders in a circular process of analysis, reflection, and action, human capacity can be built and prospects for greater innovation can be achieved (Ashby, 2003; Sanginga, 2006).

Participatory development approaches have gradually become popular. Community participation means different things to different people, however, and there are various degrees of participation (Arnstein, 1969). At the lowest level, a community can simply be engaged to provide information to researchers. At the highest levels a community is given power to help interpret research results and make decisions that affect their development process. We define community participation as in Heller (2003) as the "active engagement of communities that is rooted in the authentication of power and influence sharing in decision making at all levels." This process is based on mutual respect, knowledge, and trust.

Similarly, the value of authentic stakeholder partnerships has also received more recognition. Partnerships lack a precise definition. We use the definition of partnerships from Sanginga (2006) as follows: "a collaborative arrangement between independent organizations to plan and implement a jointly agreed program with shared resources and information in a manner that generates collaborative synergisms."

Despite recent trends in thinking about the value of collaboration and partnerships, there are few tangible examples that illustrate the validity of these ideas. Members of the PARIMA project have been engaged in traditional survey and technical research concerning pastoral risk management for many years, both before and during the early years of the project. But it has been a commitment to engagement and action via non-traditional, participatory methods in recent times that has truly altered the trajectory of the project and increased the prospects that research can be translated into positive and tangible effects on the lives of pastoralists. In addition, the PARIMA project is too small to affect positive change on the vast rangelands by itself. Sweeping change requires the coordinated efforts of many partners. Our main objective, therefore, is to report on efforts made by PARIMA to enable genuine community participation and forge effective inter-institutional and other partnerships in southern Ethiopia and northern Kenya during 2000-2007.

Findings

Community Participation. The PARIMA project used Participatory Rural Appraisal (PRA) as designed by Lelo et al. (2000) to bolster community participation in the

identification of local problems and shared implementation of possible solutions. Genuine participation increases the likelihood that communities will have ownership of their development projects. The major outcome of a PRA is a priority list of community problems and possible solutions. The best-bet problem-solving strategy is called a Community Action Plan (CAP). Various CAPs formed the basis for creating risk-management intervention projects that were jointly implemented among semi-settled pastoralists with help from various regional and local partners (Table 1). Engagement of the pastoral communities through PRA has augmented their self confidence, pride, initiative, creativity, responsibility, and willingness to cooperate.

This participatory engagement with pastoral communities was initially pushed by PARIMA, but soon it was demanded by communities as word spread. By 2005 the number of collective action groups mushroomed into 59 with a total of nearly 2,200 members across five districts on the Borana Plateau. About 76% of the members are women. Successful in micro-finance and livestock marketing, the groups have since graduated into legally recognized producer cooperatives. Such positive outcomes have been instrumental in providing the incentives for inter-institutional and other partnerships to flourish, as noted below. More details on the PRA process in Ethiopia are provided in Desta et al. (2004).

Partnerships. The PARIMA project, which has always been small in terms of material and human resources, nonetheless

Table 1. Partnership network for the PARIMA project in southern Ethiopia and northern Kenya[1] during 2000 to 2007.

REGIONAL MEMBERS	LOCAL MEMBERS				
	Yabelo District	Moyale District	Liben District	Dugda Dawa District	Dire District
CIFA	AFD	LUNA	ELFORA	OCPB-DD	OCPB-D
OCPC	LUNA	OCPB-M	OCPB-L	OPaDB-DD	OPaDB-D
OPaDC	OCPB-Y	OPaDB-M	OPaDB-L	EPG-DD	EPG-D
KPWG	OPaDB-Y	EPG-M	EPG-L	DA-DD	DA-D
POLICY	EPG-Y	DA-M	DA-L		
BTL	DA-Y	BZA-M	SAVE/USA		
IMMIG	BZA-Y		GZA		
FIDS	EO-Y		COOPI		
KARI			GTZ		
OARI					
ALRMP					
LMA					
AU-IBAR					
PARIMA					
STI					

[1] *Where regional or international members include: CIFA=Community Initiatives Facilitation and Assistance (Kenya and Ethiopia); OCPC=Oromia Cooperative Promotion Commission (Regional State); OPaDC=Oromia Pastoral area Development Commission (Regional State); KPWG=Kenya pastoral women's groups (100% women); POLICY=federal and regional policy makers for Ethiopia; BTL=Borana traditional leadership (Aba Gada); IMMIG=federal immigration officials (at Moyale; Kenya and Ethiopia); FIDS=Furra Institute of Development Studies; KARI=Kenya Agricultural Research Institute (Marsabit); OARI=Oromia Agricultural Research Institute (Yabelo); ALRMP=Arid Lands Resource Management Project (Kenya); LMA= Livestock Marketing Authority (Ethiopia); AU-IBAR=African Union Inter African Bureau for Animal Resources; PARIMA=Pastoral Risk Management team of the GL-CRSP; STI= Southern Tier Initiative of the USAID Mission to Ethiopia.*

Where local (district) members include: AFD=Action for Development; LUNA=private exporting firm; ELFORA=private exporting firm; OCPB=Oromia Cooperative Promotion Bureau (Y=Yabelo branch, M=Moyale branch, and L=Liben branch, DD=Dugda Dawa branch, D=Dire Branch); OPaDB = Oromia Pastoral area Development Bureau (Y=Yabelo branch, M=Moyale branch, and L= Liben branch, DD=Dugda Dawa branch, D=Dire branch); EPG=Ethiopian pastoral groups (76% women and 24% men; Y= Yabelo groups; M=Moyale groups; and L=Liben groups, DD=Dugda Dawa groups, D=Dire groups); DA=district administration (Y=Yabello, M=Moyale, and L=Liben, DD=Dugda Dawa, D=Dire); SAVE/USA=Save the Children USA (international NGO); BZA= Borana Zonal Administration (Y=Yabelo, M=Moyale), and GZA = Guji Zonal Administration, EO-Y= Education Office at Yabello.

had an ambitious research and development agenda. The PARIMA project began seeking institutional partnerships early in 2000 when it started field activities in southern Ethiopia. In addition to being small, PARIMA viewed itself only as a temporary entity, a perspective shaped by the uncertainty of three-year project-renewal cycles. More than anything else, however, the importance of partnerships to promote development was close to the heart of the PARIMA team from the beginning.

During the partnership formation stage PARIMA, in collaboration with local administrations, took a lead and organized workshops where potential GO and NGO partners could share ideas and discuss ongoing pastoral development programs. This gradually led to a collective recognition of a need to network more effectively. Overall, a grand total of 46 research, development, and community-based entities have filled complementary advising, implementing, training, and funding roles on the project over the past seven years (Table 1). Twenty five of these entities were key contributors to implementing risk-management pilot projects in Yabelo, Dugda Dawa, Negelle, Dire, and Moyale. The shared vision for intervention was to improve the livelihoods of semi-settled pastoralists via collective action, income and asset diversification, improved access to marketing, and non-pastoral investment schemes. Since the pilot projects have been widely distributed over five districts—and thus separated by an average distance of over 100 kilometers—the "PARIMA partnership system" is not one monolith for all the southern rangelands, but rather it has been replicated in several places with different local partners.

Specialist input or material support has been solicited from many partners to fill certain gaps. For example, Egerton University (Kenya) was important to train people in authentic participatory methods. The Kenyan NGO called Community Initiatives Facilitation and Assistance (CIFA) was enlisted to help make contacts with women's collective-action groups in northern Kenya that had a proven track record of achievement and hence could provide models for the Ethiopians. The Southern Tier Initiative (STI) of the USAID Mission to Ethiopia was approached to provide funding. The Fura Institute of Development Studies (Ethiopia) implemented capacity-building short-courses. CARE-Borana provided logistic support at the initial phase of the Dida Hara Community Development project, GTZ provided a water pump to a community project in Negele, Ethiopia, to assist in a horticulture component. Kenyan women's groups mentored their Ethiopian colleagues to help pilot projects get underway. Ethiopian federal and regional policy makers and Boran traditional leaders provided their input to project activities. The LUNA and ELFORA are private-sector, livestock-export abattoirs that linked to selected community projects and have dramatically enhanced livestock trade. The AU-IBAR (Nairobi) provided working capital to enhance market involvement of selected communities. The Ethiopian Livestock Marketing Authority (LMA) facilitated marketing linkages.

Challenges in this process have been numerous. They include efforts to instill a common vision and approach among partners, agreeing on roles and responsibilities, overcoming mistrust among various agencies that needed to work together, and sharing credit for project successes to reduce competitiveness. To navigate these waters, the PARIMA staff made a sustained effort to operate in a transparent fashion and put the needs of project beneficiaries at the forefront. The PARIMA staff members have had to endure very high transaction costs to carry out this agenda.

Partnerships have been maintained via regular information sharing and mutual help. The PARIMA project, with support from the USAID Ethiopia Mission, took the lead to train partners in participatory approaches, micro-finance, and small-business development. Partners have also joined hands to co-fund, administer, and monitor local activities.

All partnerships have not been sustained throughout the entire project life. Some partners come and go depending on circumstances. For NGOs—in particular, those having a limited project cycle—may not remain as long-term partners. As most NGOs are heavily donor driven, they can change their emphasis and priorities quickly. Staff turnover and institutional restructuring in government have been problems also. Some government offices have turned over their staff 10 times in seven years, for example. Institutional restructuring involving two major Ethiopian agencies also occurred over five times during the same period. The restructuring often has been accompanied by changes in the institutional mandates that affect roles in the partnership, and thus this requires readjustments.

There is a growing tendency among major Ethiopian GOs to work together and mobilizing joint resources on the Borana Plateau. This has also been manifested in new programs concerning prescribed fire and dairy processing. PARIMA is receiving requests from other regional states to provide assistance through training and consultation to replicate partnership models.

Practical Implications

The success observed so far underscores the value of participatory approaches and stakeholder partnerships. This culture is now taking root on the Borana Plateau. We have learned that if researchers and development organizations are committed to engage communities, participation and collaboration can indeed create space for added energy, creativity, and capacity building, even in a difficult pastoral setting. Genuine community participation involves power sharing.

The partnerships have been vital to helping create the generally positive and sustained outcomes of the community pilot projects. In the past there were virtually no development traditions on the Borana Plateau of embracing community-led initiatives or forging inter-institutional linkages. One challenge is how to sustain partnerships and community participation approaches. This could be facilitated when the major donors or ministries that underwrite development in the region begin to link project performance—and positive impact on pastoral people—with their continued financial support, and when improved project performance, in turn, is explicitly linked to the benefits of community participation and stakeholder partnerships.

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About the Authors: Dr. Solomon Desta is a research associate with PARIMA through Utah State University and is based in Nairobi, Kenya. Email: S.Desta@cgiar.org. Dr. Layne Coppock is an Associate Professor in the Department of Environment & Society at Utah State University, Logan, USA: Email lcoppock@cc.usu.edu. Dr. Getachew Gebru is a research associate with PARIMA through Utah State University and is based in Addis Ababa, Ethiopia. Email: G.Gebru@cgiar.org. Mr. Seyoum Tezera is a senior field assistant with PARIMA based in Addis Ababa. Email: S.Tezerra@cgiar.org. Mr. Dadi Amosha is a natural-resources field supervisor with PARIMA based in Addis Ababa. Email: D.Amosha@cgiar.org.

The GL-CRSP Pastoral Risk Management Project (PARIMA) was established in 1997 and conducts research, training, and outreach in an effort to improve the welfare of pastoral and agro-pastoral people with a focus on northern Kenya and southern Ethiopia. The project is led by Dr. D. Layne Coppock, Utah State University. Email: lcoppock@cc.usu.edu

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Design by Susan L. Johnson

GLOBAL LIVESTOCK CRSP

Pastoral Conflict and Use of Key Resources along the Ethiopia-Kenya Border: Implications for Policy and Development

Anastasia Kagunyu, Shibia Mohammed, Michael Okoti, and Francis Wayua, KARI; Sintayehu Mesele, Getachew Haile, Lemma Belay, Amsalu Tilahun, and Usman Kero, OARI

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The international border between Kenya and Ethiopia occurs in a remote rangeland area. The border has witnessed increased conflicts in recent years, especially between Gabra and Borana pastoralists. The border has also been subjected to heightened political tensions. In this study researchers from both sides of the border have joined together for the first time to conduct extensive field work. General objectives for this research are to characterize key natural resources and pastoral migration routes along the border and better understand elements of cross-border conflict. We interviewed some 200 pastoralists and mapped the area using GPS technology. Research findings indicate that pastoral communities have traditionally moved across the international border primarily in search of forage for livestock during dry periods. Such movements, however, have been recently curtailed due to conflicts. There are many border sites now considered as unutilized "no-man's lands." Ethnic and political tensions have also negatively affected development projects and cross-border trade. There is an ongoing need for the Kenyan and Ethiopian governments, traditional leadership institutions, as well as local development agents and other elites to support peace and reconciliation initiatives if the situation is to improve.

Background

The international border between Kenya and Ethiopia is over 600 km in length from East to West. The border occurs in very remote rangeland locations. Pastoral people often live on both sides of this border. Livestock production is the major economic activity while crop production is practiced in small, arable pockets on the landscape. Livestock plays very important roles including food production, income generation, wealth storage, transportation, draught power, and provision of manure to fertilize fields. The livestock population of northern Kenya and southern Ethiopia is dominated by cattle, goats, camels, and sheep. The major ethnic group that lives on both sides of the border near the town of Moyale is the Boran. The Gabra are another common pastoral group that is found elsewhere in the borderlands area.

Pastoral groups on the border now seem to be locked in perpetual crisis. Challenges include conflicts with neighbors and occurrence of natural disasters such as droughts, floods, and disease. Traditionally pastoralists have coped with forage scarcity by moving herds over long distances across the Ethio-Kenya border. Today, however, international borders increasingly present challenges for pastoralists. Livestock often still must move across the border as before to find forage and water, but this movement is more often blocked by conflict or government intervention compared to that in the past. Variation in natural resources between northern Kenya (lower elevation) and southern Ethiopia (higher elevation) has positive aspects for pastoral resource use overall. Pastoralists from the two countries have traditionally exchanged ideas, shared resources, and engaged in trade. As populations grow and the region becomes more politicized, however, the scope for resource competition and cross-border conflict has increased. Other factors such as livestock disease transmission across the border have received increased attention given the growing importance of livestock marketing chains. If border circumstances could be improved it could have positive implications for people of the region. This brief reports on some preliminary results from cross-border research jointly conducted by KARI and OARI scientists from Marsabit and Yabello, respectively.

This study has many objectives. They include: (1) To identify and map commonly shared pastoral resources along the border; (2) to identify routes and seasons of livestock movement along the border; (3) to assess impacts of livestock on rangeland condition and trend and with respect to the spread of disease; (4) to characterize cross-border interactions among different pastoral communities, both positive and negative; (5) to identify locations, causes, and magnitudes of resource conflicts along the border; and (6) to recommend systems of sustainable rangeland resource management and utilization, conflict management, and improved animal health delivery based on our research findings. A total of 200 respondents have been interviewed for this study from both sides of the border over the past 18 months. The main study sites are the Dire, Miyo, and Moyale districts in Ethiopia and the Dukana and Sololo areas in Kenya. Nearly all respondents have been Gabra or Boran, with

only two from the Gari and Wada communities. We used various research techniques to collect data including semi-structured questionnaires, focus group discussions, key informant interviews, and direct observation. Mapping has been conducted using GPS technology.

Findings

The Gabra and Borana communities have well-defined, seasonal livestock foraging patterns in the border area. Different livestock species have traditionally used those areas most suitable for their dietary needs (grazing or browsing). It is also clear that neighboring pastoral communities have shared common resources along the border lands, especially during dry seasons and droughts. Shared resources have included water points, pastures, and mineral licks. Some of these resources are in Ethiopia, others in Kenya, and others occur right along the international border line. Some of these resources are controlled by various groups while others are uncontrolled. Respondents report that cross-border movement has greatly decreased in recent years mostly because of tribal clashes between the Gabra and Boran and other political problems. As a result, some traditional migratory routes have become impassable and some drought fallback areas are now considered as "no mans' lands" and hence no longer used. During much of the time of our surveys the official Ethio-Kenya border crossing at Moyale town was closed. Some communities have been acutely affected by the loss of cross-border access. This prominently includes the Gabra at Dukana, Kenya. No mans' lands now dominate the landscape along the border. They include places called Saru, Sabare, Forole, Turbi, Rawana, Basil, Ele Lae, Ele Goff, and Aramsam.

Many factors have contributed to these problems. Resource-based competition for forage and water is central. Traditional livestock raiding by one pastoral group on another continues to occur. Political interference and local businessmen wanting to sustain demand for small armaments have also heightened tensions.

Pastoral communities have many layers of decision-making structures that are related to resource use. These include the herders, household heads, local chiefs, and village committees. These different entities often have overlapping duties and rights. This presents a challenge to understanding community management of environmental resources because it is unclear which level of authority matters in each type of resource- use decision. This is worsened by the fact that pastoralists often do not recognize official boundaries or borders. Diminishing roles of traditional governance and resource management systems have had large effects on the increase in resource-based conflict along the Ethio-Kenya border. According to our research, communities no longer strictly observe traditional norms relating to the use and management of natural resources.

Our interviews also reveal that male youths and middle-aged men are the ones usually involved in violent conflict among pastoral or agro-pastoral groups. Women are key players, however, as they often incite the men (especially husbands and sons) to raid neighbors. Males who do not participate can be labeled as cowards by the women. This agrees with Field (2005) who noted that pastoral males conducting raids are still considered heroes in their traditional cultures.

Resource conflict has serious implications for development in northern Kenya and southern Ethiopia. Development is profoundly disrupted by conflict. Problems are common for northern Kenya where development investments (cattle dips, small shops, police posts, and water points) are abandoned because of conflict. Conflict has also disrupted trade between Ethiopia and Kenya. This includes import and export business related to small ruminants, clothing, food, etc. Primary education has been halted in the community of Saru in Kenya when the Gabra community was displaced by violence and their children could no longer attend the local school. This contributes to illiteracy, lack of human capacity, and hence poverty. Respondents also noted that persistent violence between the Gabra and Boran has led to a seemingly permanent dislocation between the two cultures. For example, in times past Gabra and Boran would sometimes inter-marry. This no longer is the case.

Cattle raiding creates absolute poverty for communities when all or most of the animals are stolen and people suddenly become destitute. These people then must move to urban centers where they put added pressure on social services and relief distribution. A case in point is in Dukana town, Kenya, where displaced people have formed a village called *manyatta taka* meaning "displaced people."

Raiding can result in the dispersal of livestock diseases. This was clearly indicated in the descriptions of the spread of various livestock maladies as identified by respondents. There was an indication that some diseases were new to some areas and hence had no local cures. Local access to veterinary support is very poor.

Resource conflicts contribute to resource degradation and resource recovery. Livestock tend to be concentrated in "safe" areas nearer to settlements to reduce the chance they will be stolen. This contributes to local overgrazing that has reportedly led to the disappearance of valued perennial forages including *Cenchrus ciliaris, Chrysopogon plumulosus, Pennisetum mezianum, Echinochloa haploclada, Panicum coloratum, Leptothrium senegalense, Blepharis linariifolia, Aristida adscensionis,* and *Indigofera clifordiana.* In contrast, the no-man's lands where conflict has eliminated a regular presence of livestock appears to improve forage condition because it is rested from herbivory.

Practical Implications

In northern Kenya and southern Ethiopia livestock production is an important economic activity. Pastoralists contribute to the economy of both countries via livestock production. Pastoralists require extensive access to forage and water to be successful. Traditionally, this has included an ability to cross between what is now southern Ethiopia and northern Kenya. However, today in a situation of resource-based conflict and periodic border closures the local pastoral production systems have been compromised.

For pastoral communities along the Ethio-Kenya border to better realize their socio economic potential, there is an on-going need for peace and reconciliation. This could be done by developing more avenues for mediation among various communities. Policy makers at local and federal levels should act to help local people solve these conflicts. This effort needs to incorporate traditional conflict-resolution institutions and the input of development agents.

We have observed that the negative impact of cross-border conflicts is enormous. Many of our respondents yearn for peace. There have been efforts to establish cross-border peace committees that have met several times. However, it is the overarching problem of insecurity that continues to constrain these efforts. Our respondents have also noted that insecurity serves the agendas of some local elites including unsavory businessmen and politicians. Are there truly incentives for peace building, or not? Could the social and economic benefits of peace for many outweigh the benefits of conflict for a few?

Our findings reveal that it is possible for the Gabra and Boran to come together as they came up with many independent suggestions that could support reconciliation. According to our respondents, long-term stability should be founded on traditional conflict-resolution mechanisms. It has been said that the power of both *Laduu shanan* and *Dibbee shanan* is key. These are traditional council institutions of the *Gada* system for the Boran and Gabra, respectively. They are chaired by the *Abba Gada* (Boran) or the *Abba Yao* (Gabra). They still represent the final authority for conflict resolution among the indigenous people. Government has a role in facilitating the success of traditional conflict resolution. Another suggestion is to promote mixed settlements of Boran and Gabra along the border to help stabilize the region. It has been proposed that such settlements could create new opportunities for friendship and social interaction. They also recommend more stakeholder dialogue on the major regional and international factors that underpin conflict in the region.

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About the Authors: Ms. Anastasia Kagunyu is a research scientist based at the National Arid Lands Research Center of the Kenya Agricultural Research Institute (KARI)-Marsabit and she is the leader of this effort. Email: anakaguash@yahoo.com. Mr. Sintayehu Mesele is a research scientist based at the Pastoral and Agro-Pastoral Research Center of the Oromia Agricultural Research Institute (OARI)-Yabello. Email: Sintayehu_Mesele@yahoo.com. Mr. Shibia Mohammed is a research scientist based at KARI-Marsabit. Mr. Michael Okoti is a research scientist based at KARI-Marsabit. Email: michaeldominion2003@yahoo.com. Mr. Francis Wayua is a research scientist based at KARI-Marsabit. Email: fwayua@yahoo.co.uk. Mr. Getachew Haile is a research scientist at OARI-Yabello. Email: getlews2002@yahoo.com. Mr. Lemma Belay is a research scientist at OARI-Yabello. Email: lemb_1980@yahoo.com. Mr. Amsalu Tilahun is a research scientist at OARI-Yabello. Email: amse_tilahun@yahoo.com. Mr. Usman Kero is also a research scientist at OARI-Yabello.

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GLOBAL LIVESTOCK CRSP

Honey Production, Processing, Quality, and Marketing in the Mountains of Northern Kenya

Moses Lengarite, Anastasia Kagunyu, and Francis Wayua,
National Arid Lands Research Center (KARI) – Marsabit
Pastoral Risk Management Project

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Improving risk management for rangeland inhabitants can involve income diversification. Honey production is one possibility, as some locals already do it using traditional means. To what extent can honey production be increased, the quality improved, and markets expanded? We report here on a pilot study of honey production and marketing in the mountainous regions of Marsabit and Samburu Districts. We used social science methods and technical assessments in an inter-disciplinary approach. We conclude from case studies of traders that honey production and processing can already be profitable in the area. Expansion of beeswax processing may further increase profitability. The Nyiru Mountains appear to be a key honey production zone, with peak production occurring during June to July and October. Local marketing systems should be strengthened by assisting the organization of traders and bee-keepers. To enhance the market competitiveness of local honey for urban consumers in Kenya, local honey requires improved processing and quality assurances. To reduce costs, processed honey should be packaged in bulk using plastic jerry cans. To improve honey quality and price for market, traders should take care to blend crude (and uniformly ripe) honey from sources having similar viscosities, colors, and nectar source-plants.

Background

The mountainous and riverine areas of northern Kenya offer suitable habitats for honeybees. Local beekeepers already produce honey using low-cost, traditional methods. Honey is a natural product highly valued by consumers for food, health, and cultural aspects. Consumer demand for honey is increasing locally and globally (Nyariki et al., 2005). Honey production therefore appears to be a viable option for economic development and income diversification among some residents of northern Kenya, who otherwise engage in livestock herding and petty trade. One of the main challenges facing bee-keeping in the region is the limited market outlets and problems related to poor infrastructure, remote producer locations, and market-chain inefficiencies. Marketing challenges are further compounded by the harvest and mixing of unripe and mashed honey containing many impurities (Lengarite et al., 2005). In the Ndoto Mountains of northern Kenya, local honey traders have expressed concern on the low quality of crude honey supplied by traditional bee-keepers (Lengarite and Keya, 2004). The low-quality honey is largely a processing problem, has a reduced shelf life, and commands low market prices (Lengarite et al., 2005).

Honey production is expanding in Kenya, but data on production trends, processing, and marketing is fragmented. Annual honey production in Kenya is estimated at 700 metric tonnes (Mohamed, 2006). The arid and semi-arid lands of Kenya typically yield only crudely processed honey for Kenya's urban markets.

We therefore decided to undertake some pilot studies of honey production in the Ndoto and Nyiru Mountains and Mount Kulal in the Marsabit and Samburu Districts. We wanted to characterize the level of honey production, better understand how honey was processed, reveal the constraints on the quality of marketed honey, and explore the extent to which market opportunities could be expanded. Local honey markets studied were at South Horr, Ngurunit, Tuum, and Arsim.

We collected 17 crude and processed honey samples and samples of plants that bees commonly utilize for nectar. The honey quality analyses were conducted using standard methods at laboratories in Nairobi. Experienced bee-keepers in Ngurunit assisted with physical assessments of texture, taste, smell, and colour identification of honey. This helped us identify the native plants that honey bees were using as nectar sources. Semi-structured questionnaires, group discussions, and participant observation were used to collect data on the processing and marketing of honey. Participatory tools were used to sensitize communities during our surveys. Survey subjects and interviewees (78 in total) included local honey processors and traders, consumers, and bee-keepers. In each market one major honey trading entity (four in

total) was selected for a case study on the profitability of honey processing. Annual honey sales and costs were collected, and gross margins were analyzed. Further research details may be obtained from the authors. A full report is forthcoming.

Findings

Honey Production. Honey is a highly seasonal product. The areas studied contain montane and *Acacia* riverine vegetation that support honey production in wet and dry seasons, respectively (Lengarite et al., 2005). The total volume of processed honey traded per year in the four producer markets was estimated at a total of about 4.91 metric tonnes, with 74% marketed externally, and with a total market value of KSh 1.6 million. Trading centers with the highest annual volumes of processed honey were Tuum (2.1 metric tonnes) and South Horr (1.19 metric tonnes). These occur at the foothills of the Ngiro and Oldonyo Mara Mountains, with a local population of about 1,500 traditional bee-keepers. Trading centers along the foothills of the Ndoto Mountains had the lowest annual volumes of processed honey, namely Ngurunit (0.93 metric tonnes), and Arsim (0.69 metric tonnes) attributed to low honey production from about 300 traditional bee-keepers. The processing volume tends to be lower during the long rainy season of April to May and the short rainy season of October to November. Production peaks in a lagged fashion at the end of the long rains (June to July) and during the onset of the short rains (October). The volumes of processed honey in Tuum were generally higher, and this was attributed to well-establish market outlets and better-organized local honey collection.

Processing. Local honey processors are typically the traders. Traders buy crude (raw) honey from the bee-keepers. The processing uses low-cost materials to strain the crude honey and package it in local containers. Honey processing is done by letting the crude honey drain through a cotton cloth into a container. The straining process is intended to remove wax and other impurities. The major constraints in honey processing reported by the traders were lack of processing skills (47%) and lack of suitable materials to process and package honey (47%). The poor-quality materials lower the quality of processed honey and consumer appeal and thus reduce market prices. The costs of packaging of processed honey can be high, as a majority of the respondents (80%) noted a lack of suitable, locally available packaging materials. The main materials used in packaging are mineral-water bottles (40%), plastic jerry cans (28%), and small plastic jars (28%). The water bottles and plastic jerry cans are relatively cheap and available at the trading centers; most local consumers (84%) are satisfied with these types of packaging. Small plastic jars, however, are not readily available and can be more expensive. When combined with a need to affix labels on the jars, cost of packaging with jars and labels increases significantly. Perceived challenges of honey marketing varied among traders and bee-keepers in different localities. As noted elsewhere, most locally processed honey is sold externally. The major marketing problems noted by respondents include inaccessible markets (32%), lack of marketing skills (28%), high costs of transport (20%), and lack of well-organized marketing chains (20%). Most honey traders (92%) travel long distances themselves (200 to 1,000 kilometers) to sell their honey. The bee-keepers expressed the problem of unreliable local markets in terms of matching the seasonality of honey production with demand and a scarcity of local honey traders.

Honey Quality. Samples of locally processed honey from Tuum were analysed by the Kenya Bureau of Standards in Nairobi, and results indicated that it was of "fair to good" quality. The processed honey met the standard quality requirements for consumers in Kenya. Moisture content, however, was at the maximum allowable level (20%), and this was attributed to processing mixed unripe honey with ripe honey. The group at Tuum collects honey from different bee-keepers in different localities, and crude honeys are blended during processing. The blending of crude honey from different bee-keepers contributes to the increased moisture content of the processed honey and lowers quality. There are also problems associated with mixing honeys of varied thicknesses, colors, and nectar sources.

Honey Marketing. Local marketing networks consist of bee-keepers (individuals and groups), traders, and consumers. The main marketing channel for crude (unprocessed) honey is directly from bee-keepers to local traders (the processors) and then to external consumers. Other secondary channels are direct from bee-keepers to local consumers. There are about 15 external market outlets for processed honey from the study area. Regional destinations include Nairobi, Nanyuki, Maralal, Nakuru, Isiolo, Marsabit, Naivasha, and Limuru. Local destinations include Korr, Loiyangalani, Merille, Kargi, and Wajir. Tuum (11) and South Horr (10) have the highest established number of external market outlets, while Ngurunit and Arsim have the lowest. The destinations for Tuum honey are mainly supermarkets (72%) while shops, colleges, and tourist camps comprise the remainder. The Tuum group has a honey-quality certification from the Kenya Bureau of Standards, and the local honey handlers have undergone some scrutiny to meet requirements of the competitive outlets. The Tuum processing group has diverse market outlets allowing for the expansion of honey-processing.

Profitability. Annual costs and revenues from processed honey sales significantly varied among the honey-trading entities profiled in four case studies (Table 1). Income above variable costs ranged from 11% (Tuum) and 33% (Ngurunit) to 58% (Arsim) and 71% (South Horr). The high costs for packaging, labor, and transport incurred at

Table 1. Summary of annual total revenues, variable costs, and income above variable costs for four honey-trading/processing entities in northern Kenya.[1]

CATEGORY	DETAIL	TRADER LOCATION			
		Tuum	Ngurunit	South Horr	Arsim
Total Revenue	Processed Honey	514,134.00	51,385.00	260,000.00	175,000.00
Variable Costs	Crude Honey	211,640.00	23,495.00	52,000.00	37,800.00
	Labor	67,200.00	6,000.00	7,200.00	6,000.00
	Packaging	103,448.00	3,246.00	4,080.00	5,800.00
	Transport	54,200.00	1,272.00	12,500.00	22,800.00
	Honey Processing Materials	11,370.00	600.00	500.00	500.00
	KBS Quality Assurance	10,000.00	NA	NA	NA
Total Variable Costs	*All Cost Detail Above*	*457,858.00*	*34,613.00*	*76,280.00*	*72,900.00*
Income Above Variable Costs	**Total Revenue – Variable Costs**	**56,276.00**	**16,772.00**	**183,720.00**	**102,100.00**

[1]*Annual quantities of honey processed varied from 2,114 kg valued at KSh 243/kg (for Tuum) to 121 kg valued at KSh 423/kg (Ngurunit), 650 kg valued at KSh 400/kg (South Horr), and 540 kg valued at KSh 325/kg (Arsim). Annual quantities of crude honey purchased for processing varied from 2,963 kg valued at KSh 71/kg (Tuum) to 365 kg valued at KSh 64/kg (Ngurunit), 910 kg valued at KSh 57/kg (South Horr), and 756 kg valued at KSh 50/kg (Arsim). Honey packaging includes purchase of jars, bottles, jerry cans, and plastic wrap. Transport includes costs of transport for traders, processed honey, and packaging materials. Honey processing materials includes sieving cloth and containers. Certification of honey quality by the Kenya Bureau of Standards was done only by Tuum.*
At the time of research, the exchange rate was about KSh 80 per 1 USD.

Tuum and Ngurunit were the primary reasons for their lower profitability. The individual honey traders in South Horr and Arsim realized the largest profitability by using cheap locally available packaging and from premium prices of honey earned from selling bulk, processed honey to external traders. Due to the remoteness of honey producers, transport of processed honey to the urban markets carried the highest toll on the expenditure (39%), labor costs were generally high (30%) and packaging was also high at about 28%. Processing honey is a sustainable revenue generation business, and the revenue made covers the cost of processing, packaging and marketing. In the survey area about 60% of the honey traders discard beeswax; only 28% actively process and market beeswax. Processing beeswax for sale may significantly increase income from honey.

Practical Implications

For traders, our pilot study suggests that honey processing and marketing can be a highly profitable business in some cases. Diversification by processing other products such as beeswax, and linking traders to beeswax industries, may further increase profitability. The Nyiru Mountain area is a key honey-production zone. Our observations suggest that a combination of montane and riverine habitats may be optimal for sustained seasonal productivity of honey bees in the area. The best months for external honey buyers to be linked to local honey processors seem to be during June, July, and October. The Tuum honey-processing group may offer a model in terms of the volume of higher-quality honey production and a better-organized processing and marketing network. Strengthening local marketing systems by helping bee-keepers and traders build technical capacity and better organize themselves for increased marketing efficiency is important. Facilitating honey certification and quality assurance could also help locals compete more effectively in regional consumer markets. Packaging processed honey in bulk using cheap, plastic jerry cans—without labeling—may help cut costs and boost profits. Local honey traders should improve processing techniques, even at the Tuum location. One avenue is for processors to take more care to blend crude (and uniformly ripe) honey from sources having similar viscosities (thicknesses), colors, and nectar source-plants. This could promote more product uniformity, quality, and improve market prices.

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About the Authors: Mr. Moses Lengarite is a research scientist based at KARI-Marsabit. Email: moslengarite@hotmail.com. Ms. Anastasia Kagunyu is a research scientist based at KARI-Marsabit. Email: anakaguash@yahoo.com. Mr. Francis Wayua is a research scientist based at KARI-Marsabit. Email: fwayua@yahoo.co.uk.

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Design by Susan L. Johnson

GLOBAL LIVESTOCK CRSP

Diffusion of Collective-Action Innovations Among Pastoralists in Liben District, Ethiopia

D. Layne Coppock, Solomon Desta, Getachew Gebru, Utah State University; Getachew Kassa, Addis Ababa University; Seyoum Tezera, PARIMA – Ethiopia
Pastoral Risk Management Project

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In 2001 PARIMA and her partners began to create collective-action groups among illiterate, settled pastoralists in Ethiopia. These groups—soon dominated by women—focused on savings-led microfinance, small business activity, and livestock marketing to increase incomes and diversify livelihoods. Fifty-nine groups with over 2,100 members were formed using intensive training methods, and they have subsequently merged into legally recognized cooperatives. We regard this approach as successful and sustainable. We were curious, however, if "the word has spread" and collective-action has spontaneously arisen beyond our immediate project area. Preliminary findings from recent surveys of settlements in Liben District indicate that diffusion of collective-action behavior has occurred. For example, nine of 20 settlements visited in a 2006 survey had groups that formed without project assistance three years earlier; these groups had 10 to 45 members each and included men only, women only, or women and men combined. These groups occur within a 10-kilometer radius of the orginal center of PARIMA activity in Liben and group members pursue settled lifestyles. In contrast, collective-action innovations do not appear among traditional, mobile pastoralists in more remote areas. Uptake of collective-action innovations may offer many development benefits for new adopters, but sustaining the process requires vigilance and continued investment in awareness raising, training, strengthening of partnerships, and attention to peace building and natural resource management.

Background

The Borana pastoral system of southern Ethiopia has been traditionally viewed as an excellent example of sustainable range livestock production in east Africa. However, beginning in the 1980s, population growth for people and livestock, periodic droughts, growing insecurity, and lack of development investments began to take their toll. The traditional pastoral system is no longer sustainable (Desta and Coppock, 2004). One option to improve pastoral risk management involves efforts to diversify pastoral livelihoods and better connect producers to livestock markets (Desta et al., 2006). We have chipped away at the problem using participatory methods and collective action. Pastoral women's groups were discovered in northern Kenya during 2000 that had made remarkable achievements in terms of wealth accumulation, livelihood diversification, and provision of social services. These women had been destitute and pulled themselves up in inspiring ways (Desta and Coppock, 2002). Ethiopia was more isolated and lacked such initiatives, so female leaders from Ethiopian pastoral groups were brought to northern Kenya in 2001 to learn from their peers during a short tour sponsored by the PARIMA project. One result of the tour has been a mushrooming of collective-action groups across the Borana Plateau. A total of 59 groups with over 2,100 members (76% female) were established in just a few years. One important aspect of success has been the careful mentoring of group members provided by the PARIMA project and her partners. We have incorporated efforts to reduce illiteracy via informal education, promoted a culture of savings–led micro-finance, assisted in the management of complex dynamics of voluntary groups, instilled principles of good group governance, exposed members to principles of small-business management, and facilitated links with emerging livestock markets. When combined with new options to trade small ruminants for export, many groups flourished and entered market chains in effective ways (Desta et al., 2006). Groups have subsequently been formed into legally recognized producer cooperatives.

Despite the success of this approach, resources to create more collective-action groups are limited. We therefore have been interested in the extent that ideas and practices embodied in collective-action have been spontaneously adopted elsewhere in the pastoral population. We commissioned a consultancy study to independently assess the extent that collective-action has diffused across the Borana Plateau since 2001. Here we present preliminary findings from Liben District. Data were collected during 12 days in 2006 using interviews and focus groups (Getachew Kassa, unpublished report).

Liben District has urban and rural features. The town of Negelle has a population of 30,000 and is located at a higher elevation. Farming and agro-pastoralism

are practiced in the vicinity of Negelle. Smaller towns include Bittata. Elsewhere in Liben there are extensive rangelands, and the pastoralists living in these remote locations are more traditional than urban dwellers in terms of culture and continued reliance on mobile livestock production. Efforts by PARIMA and her partners to stimulate collective action among people in Liben District have been focused in and around Negelle.

An innovation is a new idea, practice, or technology (Rogers, 2003). Innovations may spread easily, spread with difficulty, or fail to spread altogether. Many factors influence rates of innovation diffusion. They include features of the innovation such as cost, complexity, and compatibility with the local culture and how far an innovation must travel. Early adopters can quickly pick up innovations, while others may never pick up innovations (Rogers, 2003). In the case of the collective-action practices promoted by PARIMA and her partners, the core innovation is the savings-led micro-finance activity, along with associated aspects of livelihood diversification.

Findings

Twenty settlements (ollas) in Liben District were visited that occurred within a 20- kilometer radius of where PARIMA project activity was initiated in 2001 (Getachew Kassa, unpublished report). Settlements were located within six administrative units called kebeles. Settlements were located in a peri-urban zone of influence surrounding Negelle and Bittata. Although the people encountered in the survey were largely pastoralists, they had mixed livelihoods that included livestock production, crop cultivation, and petty trade.

Of the 20 settlements visited, nine were identified that had spontaneously formed strong collective-action groups based on the PARIMA model, starting in 2003. Informants reported that these groups formed as a result of hearing about the success of the PARIMA groups in the Negelle area. The main focus of the newly discovered groups was the savings-led micro-finance component. On average, the nine groups had 10 to 45 members each. Three groups were for men only, three were for men and women combined, and three were for women only (Getachew Kassa, unpublished report).

The PARIMA model was not created anew by the early adopters; rather, elements of the PARIMA model were adapted to strengthen local forms of mutual-assistance networks, referred to as *idir* or *iqub*. These include rotating savings and loan operations and some redistribution of livestock. With the adoption of organizational principles, structures, and income-generation activities from the PARIMA model, most of the new groups have become better-organized and more entrepreneurial. Small business involvements have expanded to include more kiosks, small restaurants, trade in livestock and livestock products, and cash-crop vegetable farming. With these improvements in income group members have been able to improve their homes with tin roofs, purchase sheep and goats for fattening, acquire milk cows, and invest in their children's education and health care. They also claimed that they are now more food secure and less vulnerable to risk as compared to before the addition of the PARIMA model to their lives. Interviewees noted that the PARIMA collective-action model was compatible with local culture. The need for early adopters to be located near markets, towns, banks, and offices of development agents has been essential in helping create economic opportunity. New groups attracted members from among the poorest of the poor. Respondents often noted several advantages of collective action. They included (1) the potential to increase community visibility in attracting external development resources; (2) improvement in bargaining power for marketing purposes; (3) nurturing a culture of savings and the building of assets; (4) strengthening of cooperation, solidarity, self-reliance, and self esteem among group members.

Nine of the 20 settlements having spontaneously formed groups occurred within 10 kilometers of the epicenter of PARIMA project activity starting in 2001. Once the radius during this particular survey exceeded 10 kilometers from the PARIMA epicenter, however, no other collective-action groups were encountered. It appears as though diffusion has been limited to peri-urban areas. The collective-action model is not well adapted to conditions of traditional, mobile pastoralism that occurs in more remote locations.

In addition to the 2006 survey by Getachew Kassa, there has been other evidence of the diffusion of collective action in Liben. For example, another nine spontaneously formed groups have been recently seen up to 20 km from Bittata town (Seyoum Tezera, personal observation). These groups were reportedly encouraged to form by one outside individual who had been trained by PARIMA in 2001. Therefore, even a single person can accelerate the diffusion process. More research on diffusion is on-going in other districts of the Borana Plateau. The whole picture has yet to be fully documented.

Practical Implications

In the peri-urban area of Negelle and Bittata in Liben District, the spontaneous emergence of collective-action innovations is pervasive, especially among women. The innovations appear to diffuse readily because they are easily communicated, the impacts are readily observed, they are not too complicated, and they fit the local culture. Overall, the collective-action model appears to be strengthening social capital and has started a foundation for diversified livelihoods, improved incomes, and enhanced human welfare, especially among settled pastoralists and displaced persons.

To promote further diffusion of the collective-action model promoted by PARIMA and her partners, the following are important, according to study respondents: (1) Launch more effective awareness-raising campaigns concerning the benefits of collective action using various media, seminars, and workshops; (2) enhance the capabilities of the spontaneously organized groups and use them as entry points to further diffuse the initiative; (3) strengthen collaborative partnerships among groups, government agencies, and non-governmental organizations; (4) build capacity of extension agents; (5) invest in conflict mitigation, peace building, and efforts to restore or rehabilitate natural resources on the rangelands, because this can reduce resource competition, facilitate marketing, and reduce wastage (deaths) of livestock assets; and (6) investigate other non-pastoral income and credit-generating alternatives of broader relevance to all pastoralists in Liben District.

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About the Authors: Dr. D. Layne Coppock is an Associate Professor in the Department of Environment & Society at Utah State University, Logan, USA. Email lcoppock@cc.usu.edu. Dr. Solomon Desta is a research associate with PARIMA through Utah State University and is based in Nairobi, Kenya. Email: S.Desta@cgiar.org. Dr. Getachew Gebru is a research associate with PARIMA through Utah State University and is based in Addis Ababa, Ethiopia. Email: G.Gebru@cgiar.org. Dr. Getachew Kassa is an assistant professor and research fellow with the Institute of Ethiopian Studies in Addis Ababa University. Email: getachewkn@yahoo.com. Mr. Seyoum Tezera is a senior field assistant with PARIMA based in Addis Ababa. Email: S.Tezerra@cgiar.org.

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GLOBAL LIVESTOCK CRSP

Consumer Perceptions on the Quality and Marketing of Milk in Moyale, Kenya

Francis O. Wayua, Mohamed G. Shibia and Moses S. Mamo,
National Arid Lands Research Center (KARI) – Marsabit
Pastoral Risk Management Project

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Pastoral income diversification can depend on increasing market involvements. One option is for pastoralists to sell more dairy products to local towns. We used focus-groups involving high-income households, low-income households, managers/owners of hotels and restaurants, and managers of a local milk-processing cooperative in Moyale, Kenya, to answer questions concerning why, how, and where they buy milk, how they assess milk quality, satisfaction with milk quality, and whether milk quality can be improved. All consumers recognize the value of high-quality milk. Higher-income consumers typically procure raw, packaged, or powdered milk at a quality and price they find satisfactory. Problems occur for low-income consumers, however, who must buy raw milk from traders at open-air markets. Traders pool raw milk from many sources and routinely adulterate it with water and other substances prior to sale. Low-income consumers are unsatisfied with the quality of milk they can buy. Discussants offered ideas as to how such problems might be addressed. These include raising awareness on milk- handling procedures and helping consumers organize to affect change in the behavior of traders. Local health authorities also need to be more vigilant about milk-quality enforcement. Some higher- and lower-income consumers said they could pay more for higher-quality milk.

Background

Pastoral risk management can involve the sustainable diversification of incomes and assets at the household level. This may require greater participation of pastoralists in markets. Markets accessible to pastoralists take varied forms. For example, pastoral livestock can be sold in long, international marketing chains, but dairy products can be sold in short, local chains. Sale of small quantities of dairy products has long been known as important for pastoralists in east Africa, especially for poorer households that have little else to sell. Growing towns and settlements in the rangelands offer opportunities for increased incomes for pastoralists via sales of dairy products. Moyale, a town straddling the border escarpment between Ethiopia and Kenya, now has over 40,000 residents in total. Moyale appears to be an important terminal market for pastoral dairy products from both southern Ethiopia and far northern Kenya. The highly seasonal rangeland environment around Moyale imposes large constraints for increasing the quantity of dairy products that might be sold because the forage and water supplies for milking stock fluctuate with rainfall. In contrast to quantity, however, there may be scope to improve the quality of dairy products that reaches consumers in places like Moyale, particularly if the consumers are able and willing to pay higher prices for improvements in quality. If the latter is true, then technical or policy interventions that improve the quality of marketed milk could be justified in a demand-driven research format. Limited information concerning the quality of pastoral dairy products offered for sale in rangeland towns indicates that the quality of milk, for example, is often very poor. Here we report on preliminary findings dealing with perceptions of several categories of Moyale consumers concerning their local milk market.

For this research, we first used key informant interviews to sort out the varied categories of consumers. Focus group discussions (two per consumer category) were then organized for lower-income residents, higher-income residents, managers of a milk-processing cooperative (PARMCO), and managers/owners of small restaurants and hotels. Consumers also varied with regard to whether or not they had pastoral versus non-pastoral backgrounds, as culture could influence their values and perceptions about dairy products. Each focus group consisted of six to eight participants and lasted up to two hours. People were asked: (a) why they buy milk; (b) where they buy milk; (c) how they assess milk quality; (d) whether or not they are satisfied with the quality of milk they can buy; (e) whether or not the quality of milk on the market can be improved; and (f) whether or not they are willing or able to spend more money on higher-quality milk. More methodological details and a justification for the focus group approach are available from the authors.

Global Livestock Collaborative Research Support Program
University of California - Davis ■ 258 Hunt Hall ■ Davis, California 95616 USA
Phone 530-752-1721 ■ Fax 530-752-7523 ■ E-Mail glcrsp@ucdavis.edu ■ Web glcrsp.ucdavis.edu

Findings

Regardless of wealth status, households tend to purchase milk for similar reasons, namely to have milk for general household consumption, feeding children, preparing tea, making sour milk and butter, and for dealing with certain health ailments. Butter is used to cook food, as hair ointment, and as a baby food supplement. Restaurants and hotels tend to buy milk for use in tea and other menu items for customers. The PARMCO purchases raw milk from known suppliers and then processes it for sale to the public in sealed plastic bags. Overall, good-quality milk is highly valued by all consumers as a nutritious and healthy food. Conversely, focus groups noted that consumption of poor-quality milk can be unhealthy and even dangerous. Milk can transmit diseases like brucellosis and Rift Valley Fever. Drinking rancid milk can result in diarrhoea and vomiting.

In general, the wealthier residential consumers, retail outlets, and the PARMCO cooperative are able to buy milk products of higher quality in and around Moyale. This includes raw milk from local producers, heat-treated (UHT) milk in packets that comes from elsewhere in Kenya, and imported powdered milk. Raw milk is often procured via contractual arrangements between consumers and known producers. Higher-income consumers tend to be satisfied with the quality of milk they buy. Poorer people, in contrast, tend to buy raw milk offered by traders at local open-air markets. The source of this raw milk is unclear and diverse and it can originate from producers in southern Ethiopia or northern Kenya. Lower-income consumers are generally dissatisfied with the quality of milk they can find.

Overall, our study respondents noted that milk quality is related to cleanliness and purity. Higher-quality milk from pastoral producers is typically found during rainy seasons while lower-quality milk occurs during dry seasons when the overall supply is reduced. Raw milk with a high probability of cleanliness and quality can be obtained via special arrangements that are made between consumers and certain producers as noted above. Wealthier consumers can supply their own (clean) plastic containers to transport such milk, and this transportation can be carried out by the consumers themselves or via middlemen. In contrast, the quality of raw milk for sale to poorer people at open-air markets is highly variable. The focus groups noted that poor-quality milk typically results from adulteration that is routinely carried out by the traders or middlemen. Raw milk from various sources that is destined for the open-air markets is pooled by traders upon arrival in Moyale. The volume and physical properties are then enhanced using additions of water, chemicals (tetracycline, local substances), and solids (wheat flour). In some cases lower-value camel milk may be mixed with higher-value cow milk and sold as cow milk. Raw milk that arrives in Moyale from Ethiopia or Kenya may be carried by sellers on foot, but it more commonly arrives in plastic containers on public transport (buses or minivans.) Milk is collected from a 100-km radius to the north of Moyale in Ethiopia where there is a tarmac road and where milking stock are raised in a more productive, semi-arid environment. Milk is also collected from a 30-km radius to the south of Moyale in Kenya where road conditions are very poor and where milking stock are raised in a less productive, arid environment.

All consumers assess milk quality in several ways that includes color, taste, and texture. Other creative tests occur, and these include use of boiling, dipped matches, and looking for milk layering or separation properties. Boiled milk of higher quality will yield foam, for example, and will not have a burned residue at the bottom of the cooking pot. A match dipped in watered-down milk will not light. Lower-quality milk will often layer into water, milk, and solids.

Consumers vary in the degree that they handle or process purchased milk. Higher-income consumers who purchase raw milk procure it early in the day from trusted sources and then they boil the milk and use it within 24 hours. Higher-income consumers from non-pastoral backgrounds tend to supply their own containers for raw-milk procurement to reduce the risk of contamination and smoky aromas that arise from pastoral fumigation practices. According to the managers/owners of the hotels and restaurants, there are several quality levels of milk on the market that they can access, and this includes milk from both cows and camels. Like wealthier households, the managers/owners of hotels and restaurants have specific suppliers that they trust to deliver higher-quality milk. The hotels and restaurants tend to boil and refrigerate milk before offering it to their customers. Similarly, the PARMCO cooperative advises their suppliers to bring high-quality, non-fumigated milk, even if it means that PARMCO pays higher prices. The PARMCO has special equipment for pasteurizing and processing milk.

Despite that wealthier households, hotels, restaurants, and PARMCO are able to access milk of a suitable quality—unlike the poor—all consumers agree in general that milk quality is a major risk in Moyale. To reduce milk-quality problems, the discussants felt that the problem of adulteration by traders and middlemen has to be addressed. It may be possible for Kenyan consumers to go around the traders or middlemen to forge direct links to Kenyan producers, but not for Kenyan consumers to do the same on the Ethiopian side. This is because there is no legal authorization for the latter to occur. Pastoral producers on both sides of the border could be trained in best practices for milk handling, and this has been conducted by KARI in the past at other locations in northern Kenya. To improve milk quality starting at the producer end, the first step would involve improving the hygiene associated with milk

handling. It would be important to advocate the washing of containers with clean, boiled water (no soap) followed by fumigation. For PARMCO, the managers have also considered having their own dairy herd. They have secured one local area for forage production, but PARMCO needs other inputs and support to succeed in this venture.

The lower-income consumers believe it is very difficult to improve the quality of milk for sale at the open markets because milk comes from a wide variety of sources and handled by the traders and middle men. The Kenya Public Health Department has an office in Moyale-Kenya. It needs to supervise milk quality on a regular basis at the open-air markets, and then actively confiscate product that has been adulterated or is otherwise of poor-quality. Besides having the Kenya Public Health Department be more active, another idea was for low-income consumers to have their awareness raised and form a consumer coalition. This would probably involve women who are the most informed purchasers of milk. The coalition might be able to influence the behaviour of traders and middle men by offering price incentives for higher-quality milk and refusing to buy adulterated product.

The managers/owners of restaurants and hotels note that milk quality and safety monitoring should be the joint responsibility of the Kenyan Ministries of Health (Public Health Department), Livestock and Fisheries Development, and the Kenya Agricultural Research Institute (KARI). The discussants are critical of the government departments in the region for not supporting them fully. Currently, the focus groups feel that the Public Health Department only makes active milk-inspections in Moyale-Kenya when a disease outbreak occurs or when there are many complaints from the citizenry. The most recent "safe-milk campaign" occurred in 2006 during a regional outbreak of Rift Valley Fever, for example. Since that time some discussants felt that the vigilance of public health authorities has become reduced. Lack of public health enforcement for milk quality also means that an entity like PARMCO, which allocates scarce resources to inspect raw milk it receives, can be at a disadvantage compared to competitors that do not make a similar effort.

Both high- and low-income households were willing to spend more money on higher quality milk as this was an important safeguard for their health. The issue of exactly how much more Moyale consumers are willing to pay is another research topic that we are pursuing in an associated study. Focus group participants felt, however, that if consumers offered to pay more, those supplying adulterated milk would consequently increase their prices. Discussants also noted that it is the responsibility of buyers to ensure they purchase milk of a suitable quality for the price. Unlike the households, managers/owners of the restaurants and hotels said they were unwilling to pay more for higher quality milk. This is logical given they are satisfied with the quality of milk they can procure.

Practical Implications

It appears that the largest problem of milk quality and marketing in Moyale-Kenya deals with how to affect an improvement in milk quality that can be afforded by the lower-income consumers, in particular. This problem has two main components, namely (1) how to overcome the incentives for traders and middle men to adulterate milk offered for sale in the open-air markets; and (2) determining how milk quality could be promoted prior to the arrival of milk at Moyale. Of the possible solutions offered by discussants, the most promising over the short term may involve improving awareness about best milk handling procedures among the producers and helping consumers organize to compel new attitudes and behaviour among the traders and middlemen. Such initiatives could also benefit from increased vigilance of the local health authorities.

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About the Authors: Mr. Francis Wayua is a research scientist based at KARI-Marsabit. Email: fwayua@yahoo.co.uk. Mr. Mohamed G. Shibia is a research scientist based at KARI-Marsabit. Email: mohamedshibia@gmail.com. Mr. Moses S. Mamo is a technical officer based at KARI Marsabit. Email: karimar@africaonline.co.ke.

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Design by Susan L. Johnson

GLOBAL LIVESTOCK CRSP

Can Collective Action and Capacity Building Reduce Vulnerability Among Settled Pastoralists?

D. Layne Coppock, Solomon Desta, Getachew Gebru, Utah State University; Seyoum Tezera, PARIMA – Ethiopia
Pastoral Risk Management Project (PARIMA)

Research Brief 07-08-PARIMA December 2007

In 2001 PARIMA and her partners began to create collective-action groups among illiterate, settled pastoralists in southern Ethiopia. These groups—dominated by women—focused on savings-led microfinance, small business, and livestock marketing to increase incomes and diversify livelihoods. Fifty-nine groups with over 2,100 members were formed using intensive capacity-building methods. After six years we wanted to compare group members with their neighbors who never participated in the PARIMA program. We surveyed 180 individuals from groups and paired control (traditional) communities. Respondents were asked to assess the extent that they perceived positive, negative, or no change in their lives over the past three years in terms of a variety of social, economic, and ecological attributes. Considered overall, an average of 81% of the sampled group members perceived that their lives had improved in everything from income and quality of life to personal confidence and human health. In contrast, an average of only 16% of control respondents felt the same way. These preliminary results suggest that collective action can be a viable development strategy here, especially among poor, settled, or displaced people living in peri-urban areas of the rangelands. However, collective action will be most sustainable when accompanied by intensive training, technical support, an effective legal framework, and growing market opportunities.

Background

The Borana pastoral system of southern Ethiopia has been traditionally viewed as an excellent example of sustainable range livestock production in East Africa. Beginning in the 1980s, however, population growth for people and livestock, periodic droughts, growing insecurity, and lack of development investments began to take their toll. Many hundreds of thousands of livestock have died from droughts and natural-resource degradation. The human population, on the other hand, continues to slowly grow resulting in increasing rates of poverty. The number of destitute pastoralists living on perimeters of local towns and settlements has increased. The Borana pastoral system has thus deteriorated (Desta and Coppock, 2004). One option to improve local circumstances for pastoral risk management has involved efforts to diversify pastoral livelihoods and better connect pastoralists to emerging livestock markets (Desta et al., 2006). We have chipped away at the problem using participatory methods and collective action. Pastoral women's groups were discovered in northern Kenya during 2000 that had made remarkable achievements in terms of wealth accumulation, livelihood diversification, and provision of social services. These women were destitute and pulled themselves up in inspiring ways (Desta and Coppock, 2002). Ethiopia was more isolated and lacked such initiatives, so female leaders from Ethiopian pastoral groups were brought to northern Kenya in 2001 to learn from their peers during a tour sponsored by the PARIMA project. One result of the tour has been a mushrooming of collective-action groups across southern Ethiopia. Fifty-nine groups with over 2,100 members (76% female) were established in a few years. These tend to be concentrated near towns and villages.

One important aspect of this process has been careful investment in and mentoring of group members. PARIMA and her partners have been reducing illiteracy via non-formal education, promoted a culture of savings–led micro-finance, assisted people to manage group dynamics, instilled principles of good group governance, exposed members to principles of small-business management, and have helped link the groups to livestock markets (Desta et al., 2006). As the groups have matured the level of project investment in them has leveled off and declined after 2005. Groups have subsequently merged and formed legally recognized producer cooperatives.

Despite the apparent success of this approach, we still lacked hard evidence as to how participants who have undergone collective action differ from their traditionally minded peers. Does group membership really confer advantages in terms of social and economic benefits relative to those for people who never participated?

We used structured surveys to interview adults selected randomly from collective-action groups as well as from paired controls (traditional peers). Across two districts, we ended up with a total of 180 survey respondents. Of this total, 120 were group members while 60 were traditional neighbors.

The survey had several components. One component contained questions that clarified whether or not the traditional pastoralists had ever been involved in collective action or had received education or special training. If they fulfilled these characteristics then they would not provide a valid comparison for the group members. Another component of the survey dealt with quantifying the perceptions of respondents with respect to household-level changes in their social, economic, and ecological circumstances over the past three years (2004-7). A third component included questions that pertained to the perceived incidence or severity of household hunger over the previous six months, as well as what respondents planned to do in the coming five years with respect to their coping strategies. We wondered if respondents and their families intended to intensify or diversify their production, migrate out of the system, or merely continue with traditional behaviors.

For this brief we emphasize data patterns for answers to 12 of the survey questions that relate to perceptions of social, economic, and ecological circumstances. The possible responses to each of the 12 questions came from a five-point scale. For example, a typical question would be formatted as follows:

Over the past three years, the quality of life for my household members and me has: (a) Improved a lot; (b) Improved some; (c) Not changed; (d) Worsened some; or (e) Worsened a lot

Findings

Of the 180 respondents, 161 were women. The mean age was 35 years old. Most respondents were married (87 percent). They had average household sizes of seven people with about one-third being children. Group members tended to reside closer (average of 10 km) to the main district towns of Negelle or Moyale compared to their control neighbors (average of 21 km). Nearly all respondents were "livestock poor" with only a very few livestock per household. Most respondents appeared to be functionally illiterate, although about two-thirds felt they had a trusted, literate confidant to rely upon when dealing with problems that required reading, writing, or simple calculations.

Results confirmed that the control respondents were indeed unaffected by collective action or any special capacity-building opportunities in their home areas. They had virtually no knowledge of micro-finance or banking, little exposure to small-business endeavors, and no mentoring or educational experiences from the PARIMA project or her partners. These were important findings because they indicated that differences in perceptions between group members and the controls (below) could be attributed to collective-action interventions. Other research indicates that spontaneous diffusion of collective-action innovations has occurred on the Borana Plateau independent of PARIMA project activities. Locating traditional respondents for surveys who have not been affected by collective-action innovations can thus be increasingly difficult (see Research Brief 07-06-PARIMA).

Table 1 illustrates trends comparing the stated perceptions of group members versus control respondents for the 12 circumstances. For all 12, a large majority of respondents (70 to 90 percent) that were affiliated with the collective-action groups reported that positive changes had occurred for themselves or their household members over the past three years. In stark contrast, only a minority of respondents (5 to 21 percent) from the controls reported positive change in their circumstances over the same period. The only exception to this broad pattern was for the human health issue, where 52 percent of control respondents said their health situation had improved. This was still far less, however, than the 87 percent of group affiliates who perceived that their health situations had improved.

Perhaps the most unexpected contrast in Table 1 was provided by the livestock marketing issue. While 70 percent of group-affiliated respondents said their involvement in livestock marketing had increased during the past three years, only 8 percent of control respondents said the same. This is particularly striking because—in theory—all pastoralists of the same wealth class, residing in the same general location, should be able to sell or trade animals to a similar degree. It suggests that collective action has been especially influential in stimulating livestock trading behavior among group members as compared to their neighbors.

Collective action may also have implications for hunger alleviation. While only 8 percent of control respondents noted that their households had not experienced hunger over the past six months, for the group members this was 26 percent. Accordingly, 75 percent of the controls said that the incidence of hunger had been "common to severe" over the same time frame. For the group members this declined to 23 percent.

Group members indicated that their livelihood strategy for the next 5 years would be focused on diversification (63 percent) or intensified production (24 percent). In contrast, the dominant responses of the controls were either to continue with traditions (55 percent) or they did not know what they would do (22 percent).

Practical Implications

Comparing group members with their traditional peers attempts to assess the cumulative impacts of collective action and capacity building among this target population. Overall, the perceptions of survey respondents clearly indicate that positive impacts of collective action have occurred.

Table 1. Percentage of respondents from collective-action groups or from among traditional peers that perceived (a) positive change, (b) no change, or (c) negative change for various social and economic circumstances during the period 2004-7 on the Borana Plateau. Sample sizes were 120 for the group members and 60 for the traditional peers.

CIRCUMSTANCES	COLLECTIVE ACTION GROUPS			TRADITIONAL PEERS (CONTROLS)		
	Positive Change	No Change	Negative Change	Positive Change	No Change	Negative Change
Skills/Knowledge	90	6	4	12	88	0
Human Health	87	5	8	52	40	8
Community Reliance	82	8	10	15	53	32
Cash Income	72	13	15	7	78	15
Personal Confidence	83	3	14	22	62	16
Ability to Solve New Problems	82	7	11	17	68	15
Access to Credit	85	7	8	5	93	2
Home Comfort	80	9	11	12	57	31
Access to Livestock Marketing	70	9	21	8	87	5
Involvement in Small Business	78	13	9	10	80	10
Interest in Educating Children	74	20	6	23	47	30
Quality of Life	85	3	12	12	50	38

We conclude that collective action and capacity building can improve livelihoods and promote human welfare in this particular setting involving settled pastoralists in southern Ethiopia. However, collective action will be most sustainable when accompanied by intensive and long–term training, technical support, an effective legal framework, and growing livestock market opportunities.

The PARIMA project and her partners have invested six years of effort in careful supervision and mentoring to create strong and sustainable collective-action groups in southern Ethiopia. Collective action is thus not a "quick fix" but a long-term investment to create human and social capital. A reliable legal and policy framework must be in place to support the rights and responsibilities of people who join collective-action associations or the producer cooperatives that evolve from them. Livestock production will continue to be the main economic engine of the rangelands. Thus, development of sustainable livestock markets can provide an important impetus to support and expand viable collective-action initiatives in this region.

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About the Authors: Dr. D. Layne Coppock is an Associate Professor in the Department of Environment & Society at Utah State University, Logan, USA. Email lcoppock@cc.usu.edu. Dr. Solomon Desta is a research associate with PARIMA through Utah State University and is based in Nairobi, Kenya. Email: S.Desta@cgiar.org. Dr. Getachew Gebru is a research associate with PARIMA through Utah State University and is based in Addis Ababa, Ethiopia. Email: G.Gebru@cgiar.org. Mr. Seyoum Tezera is a senior field assistant with PARIMA based in Addis Ababa. Email: S.Tezerra@cgiar.org.

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Design by Susan L. Johnson

GLOBAL LIVESTOCK CRSP

What are Consumers in Moyale, Kenya Willing to Pay for Improved Milk Quality?

Francis O. Wayua, Mohamed G. Shibia, and Moses S. Mamo, KARI-Marsabit;
DeeVon Bailey and D. Layne Coppock, Utah State University
Pastoral Risk Management Project

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Pastoralists in northern Kenya and southern Ethiopia may be able to diversify income by selling milk to urban residents. However, milk sold in open-air markets is often low in quality because it has been transported long distances without refrigeration and is subject to spoilage, or because milk is adulterated prior to sale to boost volume or enhance appearance. Open-air markets are characterized by low-income consumers who must make choices about milk quality with virtually no information other than their own sensory perceptions. PARIMA researchers used an experimental-auction approach to determine what residents in Moyale, Kenya, are willing to pay (WTP) for improved milk quality. Researchers created milk samples that varied in taste and texture and asked participants to bid for them in order to reveal the value of their preferences. Results indicate that consumers are indeed willing to pay for improved milk quality. For example, compared to younger women, older women would pay a 20% premium for higher-quality milk. Furthermore, poorer consumers would pay a 19% premium simply for assurances on milk safety. These findings indicate that there are economic incentives to enhance milk quality and justify attention to basic technical and/or organizational interventions that could improve the quality of milk marketed to the residents of this border town.

Background

Milk is a primary food for people living in the dry lands of Ethiopia and Kenya. Fresh milk produced from livestock is typically consumed by pastoralist families who own animals, but surplus milk may be taken to nearby villages and towns to sell in open-air markets. The time between milking and sale can range from hours to over a day. Milk is not refrigerated and is susceptible to rapid spoilage from bacterial growth. Milk is often adulterated prior to sale via addition of water, fillers, or colors to boost volume and improve appearance.

Income diversification is an important risk management strategy for pastoralists in this region. Generating income from milk sales could be an important component of a diversification strategy for pastoralists living near villages and towns. However, efforts to expand milk markets depend on enhancing milk quality, being able to appropriately signal milk quality to consumers, and the consumers' "willingness to pay" (WTP) for improved milk quality.

Pastoralists and traders might be able to marginally improve milk quality for sale by using simple cooling technologies. For example, when milk is transported long distances to markets on the roof racks of public vehicles, plastic containers (jerry cans) wrapped with water-soaked hemp could be an effective means to reduce milk temperatures compared to current practices, and hence delay milk spoilage. In terms of organizational interventions, agents working on behalf of consumers or producers could oversee markets to guard against milk adulteration. Higher-quality milk could be sold to local cooperatives where it can be pasteurized for sale to wealthier consumers. Producers could establish a certification system to assure buyers of milk quality. Any of these efforts, however, increase transaction costs for pastoral producers and traders that need to be covered by higher prices paid by consumers. In other words, economic incentives need to be in place to improve the quality of milk for sale in Kenya and Ethiopia.

Establishing willingness to pay for milk quality is important. It is, however, only a first step in such a market development process. This is because WTP does not consider how pastoralists and markets would need to be organized to provide higher-quality milk. If consumers are willing to pay for improved milk quality (and improved food safety) in these markets, overall milk quality should improve because these markets appear to be competitive. However, poverty characterizes most of the population in this region, and this raises questions about consumers' WTP for improved quality—in this case higher milk quality—because demand for higher quality is often thought to be associated with higher incomes.

Methods

This study reports, based on experimental auctions, whether or not consumers in the border town of Moyale, Kenya, are willing to pay more for milk that is of higher quality. The demographics of participants were also used to determine the components (niches) of the market to identify those subgroups that might be willing to pay more for improved milk quality. This type of information is important for pastoral producers if they want to increase their incomes from milk sales. To the researchers' knowledge, no previous work has examined WTP for milk quality using this approach in this region.

The design for this study is described in detail by Wayua et al. (submitted), and the authors can be contacted for more information. Consumers representing several income levels, places of residence, and occupations were contacted through key informants and selected using stratified-random procedures. Persons so chosen were responsible for making decisions on food purchases.

Participants were engaged at two levels Focus groups were used to determine general perceptions concerning milk quality and marketing. Some members of focus groups were asked to participate in experimental auctions. Three auctions were conducted. One was for owners or managers of small hotels and restaurants; one was for higher-income household consumers; and one was for lower-income household consumers. Researchers wanted 12 participants per auction. Auctions were conducted in Moyale, Kenya. Greater Moyale straddles the Ethio-Kenya border, includes Moyale, Ethiopia, and has a population of over 40,000 residents. There were 31 auction participants overall, including 17 females and 14 males. Almost all were married with an average of four children per household.

Auction participants were endowed with KSh 50 in cash for use in bidding along with a glass (one liter) of milk to be considered as a baseline. They were allowed to examine (taste, smell, visually inspect) this milk and estimate what they would pay for it. They were then given oral instructions as to auction procedures. These consisted of 10 rounds whereby the subjects bid in a demand-revealing (second-price) auction format. The rationale for using this approach is to more accurately reveal true valuation of the milk by the participants.

When subjects placed bids, they bid on what they would be willing to pay to exchange their endowed milk for one of four alternative milks that they could also inspect. The endowed milk was an experimental substitute for lower-quality milk available in open-air markets, having been fumigated and pasteurized and then diluted by water to 25% of volume. Descriptions of the other milks are shown in Table 1. Note that food-safety issues would not allow the use of samples of milk actually sold in open-air markets. Thus, these auctions are only approximations of a general process of differentiation and valuation of milk quality by consumers. At the end of the experiment the winning subject had paid the second-highest bid price to exchange their original milk for other milks. At the end, all participants conducted a short interview to report their demographic characteristics and attitudes that might affect demand for milk quality, and hence auction results. A regression equation was used to estimate influence of various characteristics on participants' WTP for milk quality.

Findings

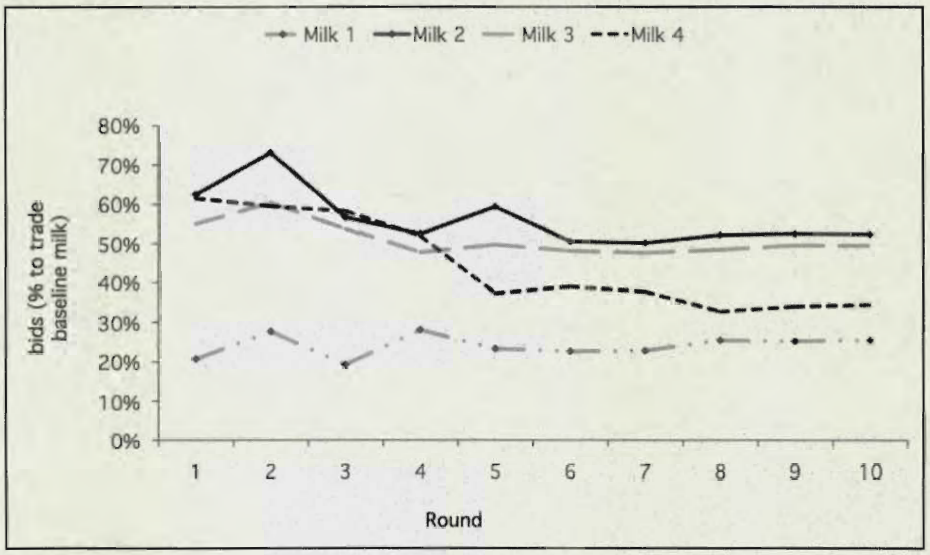
In summary, auction participants tended to be fairly young, poor [68% had a monthly income less than KSh 5000 (or US$63)], with limited formal education. Less than half said they have confidence in the Kenya government's food-safety inspection systems. Nearly half had direct experience with food poisoning. Almost 60% said they would highly value more information concerning from where local milk originated and how it had been handled and processed. Over 80% said they would highly value assurances about the safety of marketed milk.

Figure 1 shows the average percentage bids of the experiments by round across all three auctions. Percentage bids were calculated as the actual bid made by participants divided by the estimated value of the endowed milk. On average this price was KSh 15.65 per liter over the 31 participants. Patterns of average bids are consistent with past studies where early-round bids tend to be higher and more variable compared with those of later-round bids.

Table 1. Descriptions of milks used in the Moyale experimental auctions. PARMCO stands for the Pastoral Resource Marketing Cooperative located in Moyale, Kenya.

Milk type	Description
Baseline Milk	Fumigated, pasteurized, fresh milk processed at PARMCO. It was later adulterated (diluted) for this trial by adding bottled water to obtain a milk:water ratio of 75:25 (Taste/texture: smoky and diluted)
Milk 1	Factory-processed UHT milk purchased from shops in Moyale (Taste/texture: fresh milk having a "UHT processed flavor")
Milk 2	Cultured, fermented milk (soured, no sugar added) processed at PARMCO (Taste/texture: sour and curdled)
Milk 3	Non-fumigated, pasteurized fresh milk processed at PARMCO (Taste/texture: Fresh milk and undiluted)
Milk 4	Fumigated, pasteurized fresh milk processed at PARMCO (Taste/texture: smoky and undiluted)

Figure 1. Average percentage bids to replace baseline milk with four alternative milks in the Moyale experimental auctions. The baseline milk was fumigated, pasteurized, and diluted fresh milk. Milk 1 was UHT (ultra high temperature processed) milk. Milk 2 was cultured, fermented, and undiluted. Milk 3 was non-fumigated, pasteurized, and undiluted. Milk 4 was fumigated, pasteurized, and undiluted.



The average percentage bids from Figure 1 provide evidence for the consumer's WTP for milk quality. For example, Milk 1 (UHT-ultra high temperature processed milk) was eventually valued 25% higher than the baseline milk, Milk 2 (cultured and fermented) was valued 30% higher than the baseline milk, and Milks 3 and 4 (fumigated or non-fumigated, but both pasteurized) were valued at 50% higher than the baseline milk. The baseline milk was the least desired overall, confirming that the dilution was an effective treatment.

Taste of the milks likely affected how they were ranked. For example, processed fresh milk from PARMCO was perceived as being higher quality than the UHT milk. Although UHT milk is typically more expensive, this makes sense when one considers that UHT milk can sometimes have a "slightly off" flavor resulting from processing at very high temperatures.

Statistical results also provided evidence that certain subgroups of consumers may be willing to pay for higher quality milk, and this helps to reveal niche market opportunities. For example, compared to the younger females in the auctions (about 20 years of age), older females (about 40 years of age) were willing to pay 20% more for milk quality. The poorer consumers indicated that they would pay a 19% premium for milk if they simply had some assurance of food safety. There was only weak evidence that participants with no formal education were less willing to pay for milk quality as compared to participants with some formal education. This suggests that literacy may be important in becoming informed about milk quality. Somewhat surprisingly, level of income, numbers of children in the household, and type of buyer did not affect average bids. Therefore, results from all three auctions could be combined.

Practical Implications

While this experiment was only an approximation for actual market conditions, the results imply that WTP exists for milk that can demonstrate improved quality characteristics. Because the milk actually sold in open-air markets is likely of much poorer quality than that used as the baseline milk, these results may actually underestimate the actual premiums that might be paid for improved milk quality in the authentic local setting.

There appears to be adequate incentives for pastoral producers and milk traders to consider technical or organizational interventions to improve milk quality. This could include appropriate means to keep milk chilled and reduce contamination when it is transported from pastoral settlements to markets. It may also merit use of milk inspectors or certification schemes to ensure that milk has not been adulterated. One consumer target for this approach could be older females who have had some formal education.

Finally, this study demonstrates that experimental auctions can be successfully conducted in this part of Africa to determine WTP for food characteristics.

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About the Authors: Mr. Francis Wayua and Mr. Mohamed Shibia are research scientists based at KARI-Marsabit. Email: fwayua@yahoo.co.uk and mohamedshibia@gmail.com. Mr. Moses S. Mamo is a technical officer also based at KARI-Marsabit. Email: karimar@africaonline.co.ke. Dr. DeeVon Bailey is a Professor in the Department of Applied Economics at Utah State University. Email: Deevon.Bailey@usu.edu. Dr. D. Layne Coppock is an Associate Professor in the Department of Environment & Society at Utah State University, Logan, USA. Email Layne.Coppock@usu.edu.

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GLOBAL LIVESTOCK CRSP

Are Cattle Die-Offs Predictable on the Borana Plateau?

D. Layne Coppock, Getachew Gebru, and Solomon Desta, Utah State University; Sintayehu Mesele, OARI; Seyoum Tezera, PARIMA Project
Pastoral Risk Management Project

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Drought regularly affects rangelands and contributes to high death rates for livestock and poverty for pastoralists. But do livestock losses occur randomly simply when rainfall is low, or are they cyclical and predictable? Previously, PARIMA researchers proposed that high stocking rates—combined with low rainfall—trigger livestock die-offs on the Borana Plateau. It takes about six years for animal numbers to recover, setting the stage for another die-off when a dry year occurs. This "boom-and-bust" cycle is based on observed herd crashes in 1983-5, 1991-3, and 1998-9. Researchers predicted in 2002 that the next major die-off would occur during 2004-06, and one goal of this brief is to report on recent observations. Team members also examined ecological change in relation to livestock patterns. Results confirm that a major crash occurred during 2005, verifying the prediction. The rangelands have been degraded by decades of heavy livestock grazing, resulting in bush encroachment and top-soil erosion. Will the next livestock crash occur "on schedule" around 2011? Probably not—it is expected sooner. Researchers speculate that the production system is rapidly changing, a view shared by local pastoralists. Livestock carrying capacity is reportedly declining and animal die-offs may become more frequent and irregular.

Background

Drought routinely affects pastoral areas. Ellis and Swift (1988), after working in arid Turkana District, Kenya, proposed that some East African pastoral systems have vegetation and livestock populations that are largely controlled by rainfall. If rainfall is high, livestock and vegetation are more productive. If rainfall is low, livestock may die of starvation and vegetation is unproductive. This implies that livestock numbers in such systems change mostly in response to annual rainfall variation and are unpredictable. Because such systems are rainfall controlled, livestock only have a minor role in affecting the composition and productivity of vegetation and condition of soils.

For the semi-arid Borana Plateau, however, PARIMA researchers proposed an alternative to that of Ellis and Swift. Desta and Coppock (2002) noted that livestock crashes in Borana appeared predictable due to interactions between livestock population density and forage resources. When stocking rates exceed a threshold size (over 30 head of cattle per square kilometer, for example), a major die-off becomes more likely when the annual rainfall happens to be low (for example, less than 400 millimeters per year). Previous crashes, when over 40 percent of cattle died, have been documented on the Borana Plateau in 1983-5, 1991-3, and 1998-9. This remarkable pattern led team members to think that the time between crashes was related to the time needed for herds to recover their numbers following drought to once again become vulnerable to a sudden lack of forage during a dry year. Desta and Coppock (2002) thus predicted that the next cattle crash in Borana after 1999 would occur during 2004-06. Researchers had also made observations of plants and soils in the region and speculated that overgrazing by livestock was exerting major negative effects on rangeland productivity.

The first objective of the work reported here was to verify the herd crash prediction. A second objective was to determine whether long-term soil and land-cover changes have occurred on the Borana Plateau. A third objective was to determine how the pastoralists view the livestock population and other ecological patterns in the rangelands. If the herd crash was confirmed, ecological degradation demonstrated, and pastoralists shared PARIMA researchers' view of what was happening, then researchers felt they would have a solid example of a rangeland ecosystem controlled by livestock in combination with rainfall, and quite unlike the situation proposed by Ellis and Swift (1988.)

Unlike previous work (Desta and Coppock, 2002), the researchers were no longer able to maintain a network of enumerators to provide cattle herd data after 2003. The team thus tracked regional herd dynamics from 2003 to 2007 via their own casual observations as well as by reviewing independent reports generated by governmental and non-governmental organizations. To examine the long-term pattern of herd crashes in relation to rainfall, The authors obtained annual rainfall data for four

representative sites on the central plateau (Yabelo, Arero, Negele, and Mega) for 27 years (1980 to 2007). These data came from the Ethiopian Meteorological Organization (EMO) and the Southern Rangelands Development Unit (SORDU). The researchers compared and contrasted annual rainfall patterns with the occurrence of livestock crashes on a qualitative (presence/absence) basis. The assessment of rangeland soils and land cover was conducted for the 400-km² Yabelo District by Mesele (2006) for four land types: (1) grassland; (2) bushed grassland; (3) bushland; and (4) cropland. Soil sampling was stratified with three samples per site type taken to a depth of 20 cm. Samples were analyzed for standard physical and chemical properties. Land cover change was quantified using LandSat images for 1973, 1986, and 2003. Pastoralists' perceptions about livestock production trends and ecosystem change were assessed in 2008 using five focus groups with 10 members each from several districts across the study area. Male elders dominated these recruits, but women and people from all wealth classes participated. The Focus Group Discussions (FGD) centered on seven questions. Discussions averaged 2.5 hours in length.

"Today many of us could not afford to purchase grain because of the ever-increasing price of grain and, on the other hand, the ever-declining price of livestock other than mature male cattle, which only the very few wealthy can own. The other livestock species and age classes are getting cheaper in the market. Also, emaciated animals cannot reach the market. Most of us are forced to sell at low prices and procure grain to survive at the expense of few productive animals."

Findings

Figure 1 illustrates the pattern of annual rainfall and livestock crashes over the past 27 years. Indeed, a major crash occurred in 2005 with 40-60% of livestock reportedly dying, consistent with the prediction (Gebru, 2007.) For the seven years when a herd crash occurred, the mean (±SE) for annual rainfall was 511±51 mm, while that for the other 20 years was 710±38 mm. The net rainfall decline in the crash years was 22% below the long-term mean of 660 mm. While the crashes tended to occur in drier years, not all of the drier years had crashes (Figure 1.) When the livestock population is recovering from a crash, it is very unlikely that another die-off will occur despite annual rainfall that is often comparable to that of years when crashes occur. PARIMA researchers interpret this as indirect evidence of the interaction between the density of the cattle population and annual rainfall.

Percent change in land cover for Yabelo District is shown in Table 1. The area covered by grassland declined by about 149 km² over 30 years, while that for bushland, bushed grasslands, and croplands (maize) increased. The district has been transformed by heavy livestock use from a grass-dominated system—useful for grazing livestock like cattle—to a system dominated by shrubs and trees. Soil texture data (not illustrated) indicated that the topsoil of bushed and bushed-grassland sites were sandier than those of the grasslands or croplands. Bushed sites had significantly higher values ($P<0.05$) for soil bulk density and soil compaction.

Table 2 illustrates chemical properties of the soils. Of particular note is the decline in organic matter (OM) in the topsoil of bushlands and bushed-grasslands relative to that of other sites. Croplands exhibited higher values for soil phosphorus (P) and OM that reflect their landscape position in drainages. Croplands are former dry-season grazing sites that have deep soils and residual soil characteristics of

Figure 1. Average annual rainfall across four meteorological stations on the north-central Borana Plateau, 1980-2007. Black bars denote years when a cattle crash occurred.

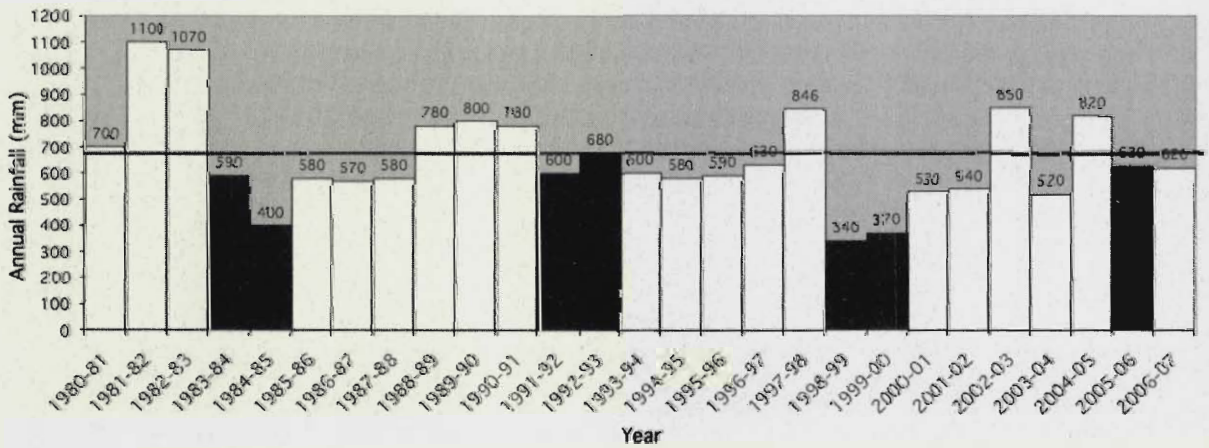

Table 1. Percent change in land cover for Yabelo District between 1973 and 2003 as interpreted from LandSat images. Source: Mesele (2006).

Land cover class	Area in 1973		Percent change in Land Cover		
	km²	%	1973-1986	1986-2003	1973-2003
Bushlands	80	20.0	+25.0	+15.0	+43.8
Bushed- grasslands	134	33.5	+20.1	+23.0	+47.8
Grasslands	173	43.3	-38.7	-77.4	-86.1
Croplands	13	3.3	+153.8	+84.8	+384.6

Table 2. Mean values of soil chemical properties as affected by land cover. Means within columns followed by same letters are not significantly different at p=0.05. EC=Electrical conductivity; OM=Organic Matter; AvP=Available P (Olsen); ppm=parts per million; LSD=Least significant difference; SEM=Standard Error. Source: Mesele (2006).

Land use type*	pH (H2O)	EC (dS m-1)	OM (%)	AvP (ppm)
Grasslands	6.40ab	0.07a	3.44c	0.78
Bushed- grasslands	6.40ab	0.08a	2.16b	2.37
Bushlands	5.70a	0.08a	1.36a	0.66
Croplands	7.00b	0.17b	2.85bc	13.85
LSD (0.05)	1.13	0.08	0.79	16.40
SEM (±)	0.46	0.03	0.32	6.70

productive, perennial grasses such as *Pennisetum spp.* Soil transformations that accompany change from grasslands to bushlands are detrimental to the productivity of grasses.

The focus group results from mid-2008 clearly supported the following concepts:

1. The "boom and bust" pattern for the livestock population has long been recognized, but pastoralists see the frequency and severity of die-offs as increasing. The terms in the local language (Oromifa) for the cycle include *midame*, *chabe*, and *duwahafe*;
2. Many factors affect herd dynamics, including an increasing frequency of dry years, changes in land use, increased conflict over resources, fragmentation and degradation of natural resources, and growth in the human and livestock populations;
3. The next big livestock die-off is imminent—not in 2011, but right on the doorstep;
4. Livestock markets are uncertain and often unprofitable. Grain for human consumption is becoming more expensive;
5. Overall, the future for pastoralism is perceived as very negative. The possible ways to mitigate problems lie more in the realm of livelihood diversification, increased livestock marketing, and restoring herd mobility.

A focus-group member portrays the situation for the people: "Today many of us could not afford to purchase grain because of the ever-increasing price of grain and, on the other hand, the ever-declining price of livestock other than mature male cattle, which only the very few wealthy people can own. The other livestock species and age classes are getting cheaper in the market. Also, emaciated animals cannot reach the market. Most of us are forced to sell at low prices and procure grain to survive at the expense of few productive animals."

Participants explained their concern that they may finish selling their more valuable stock for grain purchase shortly. They fear the end of pastoralism is within sight. They explained there are actions they can take to reduce the impact of drought and herd die-offs including: continue to find ways to increase the mobility of herds; build houses in local towns as an investment; sell livestock and keep money in the bank; and regain lost resource areas that were previously important fall-back zones during drought—such areas have been lost to overpopulation and resource degradation.

Practical Implications

Despite the various methods used in this research, the basic conclusions are clear. The Borana pastoral system, as traditionally practiced, is changing quickly. The results are consistent with the attributes of a production system that is strongly affected by livestock and human populations, as well as rainfall variability. This is unlike the framework proposed by Ellis and Swift (1988.)

This research has confirmed strong elements of predictability in the cattle "boom-and-bust" cycle, at least for the period between 1983 and 2005, which could be important in motivating pastoralists to consider diversifying assets and incomes, as well as helping relief and development agencies plan their activities. However, resource degradation, population growth, and rainfall variation may be working in tandem to further alter the production system. After 2005, herd crashes may become harder to predict. The 50 local focus group participants had a uniformly negative view of the future of pastoralism here - remarkable given that the Borana Plateau has long been regarded as an example of sustainable pastoralism. The options are few and focus on capacity building, livelihood diversification, markets, peace-building, and ecological restoration. Helping some pastoralists exit the pastoral sector could also be a prominent strategy.

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About the Authors: Dr. D. Layne Coppock is an Associate Professor in the Department of Environment & Society at Utah State University, Logan, USA. Email Layne.Coppock@usu.edu. Dr. Getachew Gebru is a research associate with PARIMA through Utah State University and is based in Addis Ababa, Ethiopia. Email: G.Gebru@cgiar.org. Mr. Sintayehu Mesele is a staff researcher at the Pastoral and Agro-pastoral Research Center of the Oromia Agricultural Research Institute (OARI) in Yabelo, Ethiopia. Email: Sintayehu_mesele@yahoo.com. Dr. Solomon Desta is a research associate with PARIMA through Utah State University and was based in Nairobi, Kenya, at the time of this research; he is now based in Addis Ababa. Email: S.Desta@cgiar.org. Mr. Seyoum Tezera is a senior field assistant with PARIMA based in Addis Ababa. Email: S.Tezerra@cgiar.org.

The GL-CRSP Pastoral Risk Management project (PARIMA) was established in 1997 and conducts research, training, and outreach in an effort to improve the welfare of pastoral and agro-pastoral people with a focus on northern Kenya and southern Ethiopia. The project is led by Dr. D. Layne Coppock, Utah State University. Email: Layne.Coppock@usu.edu.

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GLOBAL LIVESTOCK CRSP

Successful Implementation of Collective Action and Human-Capacity Building Among Pastoralists in Southern Ethiopia: Lessons Learned, 2001-2008

Seyoum Tezera, PARIMA-Ethiopia; Solomon Desta, Getachew Gebru and D. Layne Coppock, Utah State University
Pastoral Risk Management Project

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Since 2000 the PARIMA project has implemented pilot risk-management activities among poverty-stricken, semi-settled pastoralists in southern Ethiopia. The goal has been to improve human welfare via collective action and capacity building. Outcomes include progress in income generation, asset conservation, and livelihood diversification. The approach has been unique to southern Ethiopia in that a bottom-up, participatory perspective has dominated. It has focused on the priorities and felt needs of local people rather than top-down development of livestock or agricultural technology. Fifty-nine collective-action groups were created. Dominated by women, they have included over 2,300 members and most groups have been recently merged to form cooperatives. Not one group has failed and many group members have emerged as key leaders of large cooperatives that include a wider variety of recruits. Creating sustainable impacts via collective action and capacity building requires time, patience, and skill—it is not a quick fix. The process of taking raw, illiterate volunteers and transforming them into functional and sustainable groups took two to three years on average. Ten lessons for success are forwarded as guidelines for pastoral development under similar circumstances.

Background

The PARIMA project has operated in southern Ethiopia since 1997. Project efforts to engage semi-settled pastoralists using participatory approaches began in 2000. PARIMA's approaches departed from top-down research traditions because project researchers focused on more of a bottom-up, participatory process that put outreach at the front and sought to empower local people and build stakeholder partnerships. Methods and outcomes of this work are documented in detail elsewhere (Desta et al., 2006; Coppock et al., 2009; Tezera et al., In preparation). The 59 collective-action groups created over seven years have proven to be sustainable and nearly all have been transformed into legally recognized producer cooperatives. This process has involved at least 2,300 pastoralists overall, of whom over 75% have been women. The primary goal of collective action has been defined by the people themselves, namely improving incomes and well-being via capacity building and livelihood diversification. Researchers have also estimated that the total number of direct beneficiaries for this effort may exceed 13,800 people; these include the families associated with the 2,300 group members.

Why focus on people rather than on the traditional pastoral research topics of range livestock, forage production, or dry-land agriculture? There are several reasons, but prominent among them is that team members believe that traditional pastoral production systems in southern Ethiopia are no longer viable due to human population growth, heavy stocking rates, and natural-resource degradation. Options for positive and rapid impacts on human welfare and improved risk management lie more in the realm of human-capacity building and livestock marketing (Coppock et al., 2009).

The step-wise model PARIMA developed for capacity building is shown in Figure 1. Details are covered in Desta et al. (2006) and Coppock et al. (2009). Use of Participatory Rural Appraisal (PRA) methods was the foundation for local identification of priority problems and potential solutions at a wide variety of pastoral settlements; problems were dominated by scarcity of food, water, and money, while local solutions centered on the need to increase incomes and diversify livelihoods. Incentives for the (mostly female) volunteers to organize themselves came from observations of dynamic women's groups in northern Kenya, made during a field tour when Ethiopian women were taken across the border. The successes of the Kenyans were embraced and emulated across the Borana Plateau.

Once Ethiopian collective-action groups were formed, investments were made by PARIMA to build capacity of group members. This involved having partners create short courses and interventions that included training in literacy and numeracy, micro-finance, small-business development, management of group dynamics, and livestock marketing. Efforts were also made to help create a northbound marketing chain linking pastoralists, traders, and exporters.

Findings

Time and Costs Required for Impact. Overall, PARIMA estimates that it takes from two to three years to transform raw, illiterate volunteers into functional and sustainable groups, capable of solving their own problems and undertaking a gradual process of livelihood diversification (Tezera et al., In preparation) This time frame is broken out into several phases, including an establishment phase (three to six months), a growth phase (eight to 12 months), and a maturation phase (12 to 16 months.)

Given suitable logistical support and adoption of PARIMA's capacity building model under similar circumstances as those found on the Borana Plateau, within three years a target community of 13,800 persons could be impacted at an approximate cost of up to US $34 per person (Tezera et al., In preparation). Costs should be less in places having higher population densities; the population density on the central Borana Plateau is probably 10 persons per square kilometer overall, including inhabitants of towns and settlements.

Lessons Learned

1. Emphasize Interventions Starting on a Small Scale. PARIMA began to form collective-action groups by establishing primary cells of five to seven members each for the initiation of savings and loan activities. Five to seven of these cells were then aggregated into secondary groups for a total of 25 to 49 members overall. These secondary groups were the basis for several years of strategic investments; they were later merged to form legally recognized cooperatives. Researchers have observed that small units are adaptable, self-replicating, cost-effective, and more likely to sustain themselves in remote places. By starting small, new associations can be built-up in a step-wise process. Small groups are encouraged to include a few friends or relatives deemed trustworthy; memberships are thus voluntary and new members are carefully screened. Membership is never dictated or top-down. Small groups based on mutual trust have been observed to diffuse in the project area (Coppock et al., 2007b).

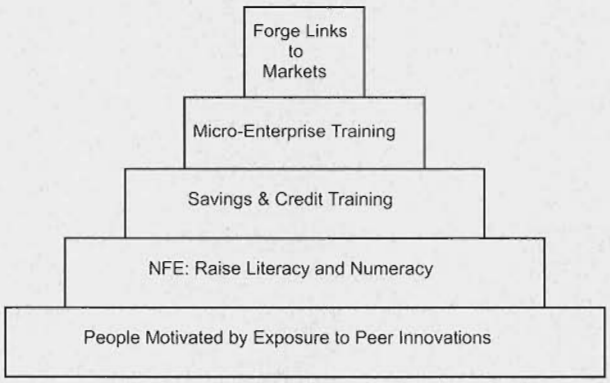
2. Emphasize Authentic Community Participation and Impact. PARIMA used a genuine participatory approach (PRA) that empowered communities to identify their felt needs and develop community action plans (CAPs) to guide their development efforts. In this process, team members acted as facilitators. They did not advance their own agenda. The space created for community participation enhanced a sense of community ownership of the process and increased the local capacity to solve problems. A well-conducted PRA can be a week-long engagement of detailed analysis between facilitators and a community. It takes time and needs to build communication channels and trust. The facilitating agency also needs ready access to ample funds to support CAPs so that a tangible outcome eventually occurs. It is notable that communities also must provide in-kind match to indicate their true interest in, and commitment to, the CAP.

3. Emphasize Genuine Partnership Building. PARIMA worked with many partners to enable impact under conditions where project beneficiaries were widely dispersed and development actors limited in number with scarce resources. Partners learned to share experiences, knowledge, and resources to maximize return per unit of investment. Project partners included governmental and nongovernmental agencies. Sustaining such partnerships is difficult, but necessary. Credit for success must be widely shared to encourage stakeholders to also share ownership of outcomes.

4. Emphasize Women in Development. Team members gave special attention to actively involve pastoral women in all phases of project efforts. Over 75% of members of the collective action groups have been women. Some groups have been organized as exclusively women. Different levels of success have been observed based on gender mix of the memberships. Women-only groups appear to be more cohesive under times of stress, even when they possess a high level of ethnic diversity, including Muslims, non-Muslims, etc. Such groups have demonstrated a high level of mutual respect and support for one another. They also have played significant roles as "peace makers" during times of local conflict. Women have been more creative, responsible, and entrepreneurial than men in terms of their micro-finance and small-business activities. Moreover, women have typically used the proceeds from their investments to improve the well-being of their families and reinvest the balance in productive outlets. Overall, the program has helped to empower women and bring gradual change to the household decision-making structure. Women's position and visibility in the communities has improved tremendously.

5. Emphasize Capacity Building for Communities and Other Stakeholders. Capacity building is one of the key components of the PARIMA model (Figure 1). All training offered was demand driven. Capacity building was conducted for pastoralists as well as staff of partner organizations. Because of the high turnover among government personnel, PARIMA chose to focus more on building capacity of community members. Literacy and numeracy were considered essential for the success of the savings and credit and small-business development activities. A non-formal education (NFE) program for adults and children was conducted in one of the PARIMA sites called Didahara. The program went well and was eventually handed over to the district education office. Another approach followed by PARIMA was to provide a lower cost and more flexible proxy non-formal education program (proxy-NFE) for group members with minimum material support for the teachers who were selected by the

Figure 1. Step-wise process of capacity building for pastoral collective-action groups in southern Ethiopia as created by the PARIMA project. Source: Coppock (unpublished).



communities themselves. All of the proxy-NFE centers enabled significant numbers of community members to begin to read, write, sign their names, and do simple arithmetic. The program has not achieved all the goals as intended, and in part this is due to the limited time of many community members to participate.

6. Emphasize "Peer to Peer" Learning Among Project Beneficiaries. Compared to the pastoral women of southern Ethiopia in 2000, the pastoral women's groups observed in northern Kenya were far better off in terms of asset accumulation, livelihood diversification, and general social welfare. Thus, PARIMA linked both together via cross-border educational tours and mentoring visits to share experiences and transfer knowledge. The first tour to northern Kenya was conducted over 10 days in early 2001 and involved 15 pastoral women and five development workers from across the Borana Plateau. It cost less than US $250 per person to undertake. The impact in southern Ethiopia has ultimately affected many thousands of people. These efforts facilitated "peer to peer" learning that led to quick and lasting impacts on the attitudes of the Ethiopians towards the value of cooperation, market involvement, savings, diversification of income sources, undertaking community investments, and improving natural-resource management. In addition to cross-border tours, numerous in-country tours were organized to take pastoral leaders to the central Ethiopian highlands to observe major livestock marketing facilities, dairy farms, and cooperatives. Because their community influence is greater than that of researchers or extension personnel, outstanding leaders from selected groups were also taken to mentor others.

7. Emphasize Market Linkages and Networking. Creating reliable market linkages and business alliances is important for groups to survive and flourish. Important livestock market linkages that involved 11 collective-action groups and the LUNA and ELFORA export abattoirs were created to facilitate livestock trading. Since 2003-4, hundreds of thousands of sheep and goats, and thousands of cattle and camels, made their way from northern Kenya and southern Ethiopia to markets in the Ethiopian highlands and Gulf States using such linkages. Pastoral groups are also linked to cooperatives in the central part of the country to diversify their market outlets so that they won't be dependent on risky export opportunities. Such initiatives help pave the way for improved use of market information, cell phone technology, and other innovations.

8. Emphasize Respect for Local Culture to Facilitate Impact. PARIMA respects local culture on the Borana Plateau and uses it to facilitate effective implementation of the intervention model. The deep-rooted pastoral culture of the Borana community to reserve grazing, water, and other essential resources for use in difficult times (such as drought) was easily translated into the usefulness of saving money for future use. Similarly, the process of extending and repaying small loans within an agreed time frame was reinforced by the local cultural practices of the temporary loaning of livestock. Other social-support and resource management functions of traditional society have been important in facilitating the implementation of other collective-action processes.

9. Emphasize Effective Management of Internal Group Conflicts. Social conflict among members was consistently observed in the early stages of all groups. Groups bring people together from different personal, cultural, and religious backgrounds. Internal conflicts also can become more prevalent over time as groups become better established and entertain the needs and aspirations of each member. Lack of conflict may also mean that important issues are dormant and the group is not working effectively. If conflicts are not handled properly they can easily cause group disintegration. In one of the northern-most sites, the collective-action groups underwent a series of internal conflicts when they initially failed in a livestock-marketing activity. This resulted in a complete cessation of all group activities for over 12 months. Later, after examining their mistakes, they agreed to use a new approach that involved establishment of a multi-purpose cooperative and including experienced local traders to undertake the livestock marketing activities. Using regular monitoring and evaluation activities (also called action research); PARIMA has kept in touch with all groups on a quarterly basis over the past seven years. By documenting issues and helping mediate conflicts and building trust with all parties, the PARIMA team was able to help groups effectively manage each and every conflict. This also illustrates the long-term commitment needed to promote sustainability.

10. Emphasize Voluntary, Well-Managed Transitions of Groups to Form Cooperatives. Smaller groups should be aggregated to take advantage of scale benefits. Larger associations having hundreds of members can combine more human and financial resources to be successful. However, the graduation of groups to formal cooperatives must be on a voluntary

basis, and the process needs to be carefully managed. If this process is pushed on a non-voluntary basis by outside forces the chance increases that cooperative action will fail. People rushed into cooperatives without adequate training, or an inability of cooperative members to screen new applicants for trustworthiness and talent will undoubtedly contribute to serious problems for sustainability. The registration of groups according to the federal Cooperative Act should provide members with greater access to loans and markets and it can provide a legal basis to help reduce delinquency on personal loan repayments. The downside, however, is that cooperatives can have a higher visibility and hence a greater vulnerability to political hijacking and meddling; there is also a cost for the added layers of bureaucracy. All of the PARIMA groups that have graduated to form cooperatives have done so voluntarily, and they are doing well as of today.

Practical Implications

Since the PARIMA intervention model was novel for the pastoral areas of southern Ethiopia as well as the team members, researchers learned as they worked. Learning by doing and adapting to the local context have been important to achieve lasting success. Each element of the process required time, patience, and skill to implement. Key challenges included overcoming: (1) negative views of policy makers concerning informal collective action; (2) traditional views of pastoral men to discount the potential role of women to take a lead in pastoral development; (3) barriers in the traditional relationships between pastoral producers, traders, and livestock buyers; (4) an illiteracy rate among adult pastoralists of 95%; (5) barriers for cross-border interactions of Ethiopian and Kenyan citizens; and (6) risks of cooperative formation, as above. However, by PARIMA project assessments, most of these challenges have been overcome. Pockets of this destitute and vulnerable community have been transformed into more self-reliant and robust entities.The capabilities of the project beneficiaries are impressive, and PARIMA suggests that this approach be institutionalized, tested, and further modified for a larger area of Borana and Gugi zones as well as other parts of rural Ethiopia.

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About the Authors: Mr. Seyoum Tezera is a PARIMA senior field assistant based in Addis Ababa, Ethiopia. Email: S.Tezerra@cgiar.org. Dr. Solomon Desta is a PARIMA research associate through Utah State University and was based in Nairobi, Kenya at the time of this research. He is now based in Addis Ababa. Email: S.Desta@cgiar.org. Dr. Getachew Gebru is a PARIMA research associate through Utah State University and is based in Addis Ababa. Email: G.Gebru@cgiar.org. Dr. D. Layne Coppock is an Associate Professor in the Department of Environment & Society at Utah State University. Email Layne.Coppock@usu.edu.

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GLOBAL LIVESTOCK CRSP

Preliminary Perspectives on the Health Needs of Pastoral Women on the Borana Plateau Using Participatory Approaches

Seyoum Tezera, PARIMA-Ethiopia;
Solomon Desta and D. Layne Coppock, Utah State University
Pastoral Risk Management Project

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Since 2000, the PARIMA project has conducted participatory research and outreach among pastoralists in southern Ethiopia. This has led to notable achievements in terms of forming collective-action groups dominated by women, stimulation of sustainable micro-finance and micro-enterprise activities, and improving linkages of pastoral producers to livestock markets. Despite such gains, there are many other challenges to be addressed. One is poor human health. PARIMA researchers used participatory and qualitative methods to conduct a preliminary assessment of women's health problems among members of six, well-established collective-action groups from the Borana and Gugi zones in the Oromia Regional State during 2008. Conventional wisdom from local public-health authorities suggested that malaria and diarrhea would be the most common ailments in the area. Results, however, indicated that women are most concerned with challenges related to their reproductive health (pregnancy-related problems, sexually transmitted diseases, etc.) Community-action plans have been developed for implementation and include prioritizing attention to training skilled local birth attendants and investing in awareness-raising, prevention, and treatment of sexually transmitted diseases. Improved health could have major effects on the welfare of pastoral women and the economic performance of collective-action groups.

Background

The PARIMA project has operated in southern Ethiopia since 1997. Its efforts to engage semi-settled pastoralists using participatory approaches began in 2000. The 59 collective-action groups that were created over seven years have proven to be sustainable, and nearly all have been transformed into legally recognized producer cooperatives. This process has involved at least 2,300 people overall, of whom over 75% have been women. The primary goal of collective action has been defined by the people themselves, namely improving incomes and well-being via capacity building and livelihood diversification.

Despite such notable successes, many challenges remain. One is poor human health in the region. Knowledge concerning the health needs of pastoralists in general, and that of pastoral women in particular, is lacking for southern Ethiopia. Most health statistics for rural Ethiopia are aggregated over vast areas, and participatory rural assessments are rarely, if ever, undertaken.

The main objective of the work reported here is to identify health problems that are most perceived as priorities by pastoral women in the PARIMA study area. Researchers also wanted to explore related issues of the accessibility and affordability of local health care. In the process, they assisted women to identify intervention priorities and develop sustainable community-based action plans to address health issues. PARIMA has also secured funds to begin the implementation of these action plans, but that part of the process is still underway and not reported here. The intent is to develop the capacity of collective-action groups to establish community-based health service mechanisms using their own capabilities and growing financial resources.

Researchers started with a general review for five districts (Yabelo, Dugda Dawa, Dire, Moyale, Liben) covering the Borana and Gugi zones to see what local health officials felt were the greatest health needs among pastoralists. Officials from zonal and district government health offices and clinics—as well as non-governmental organizations involved in health care—were interviewed. Results from these interviews indicated that malaria and diarrhea were viewed as the major health problems overall. Delivery of health services was uniformly regarded as very poor for pastoralists overall and particularly ineffective for pastoral women.

On the basis of this review, researchers then focused on engaging some of the collective-action groups in three of the five districts, namely Yabelo, Liben, and Moyale. Two settlements were selected in each for a total of six study sites. Potential partners were also involved in the engagement process, including some of the district health officials noted above as well as zonal and district representatives from the Oromia Women's Affairs and Cooperative Promotion Offices. Researchers wanted as many potential stakeholders involved from the beginning.

Sixteen of such partners were trained for five days in Participatory Rural Appraisal (PRA) techniques with a focus on the health sector (Lelo et al, 2000.) The participants had no previous exposure to participatory concepts and methods.

Following the PRA training, collaborative PRA demonstration exercises were conducted in the six settlement locations. These six sites were chosen based on their ethnic diversity, distance from health centers, and ability to effectively implement community-action plans. The local community participants in each PRA assessment numbered 10-15 volunteers each. Of the 75 participants overall, 12 were men. Ethnic groups included Boran, Arsi, Somali (Gurre), and Gabra. The Gurre, Arsi, and Gabra are Muslims, while the Boran practice other traditional forms of spirituality. The PRA process relies on intensive forms of dialogue created between the practitioners and community assemblies. Each PRA took about six days of continuous effort at each site. Team members used different PRA tools including health-facility mapping, creating seasonal-health calendars, rankings of important ailments using a pair-wise matrix, development of community action plans, and formulating frameworks for participatory monitoring and evaluation. To supplement the PRAs focus-group discussions were held in four sites that involved male and female elders and traditional healers. The average size of the focus groups was eight and these discussions lasted for an average of one hour. Prompts for these meetings dealt with women's health problems and potential solutions.

Basic aspects of pastoral society and culture in southern Ethiopia are reviewed in Coppock, 1994. Social norms regarding sexual behavior and marriage provide an important backdrop for understanding women's health challenges in the region. In particular, there is a general emphasis on early marriage for young women. Pastoral men today typically have one spouse, but there are several traditions involving extensive extramarital partnerships, especially among non-Muslims (Tezera and Desta, 2008; Coppock, 1994). Researchers have observed an apparent increase in the prevalence of mosques in small towns on the Borana Plateau over the past decade, and this may reflect a growing influence of Islam.

Findings

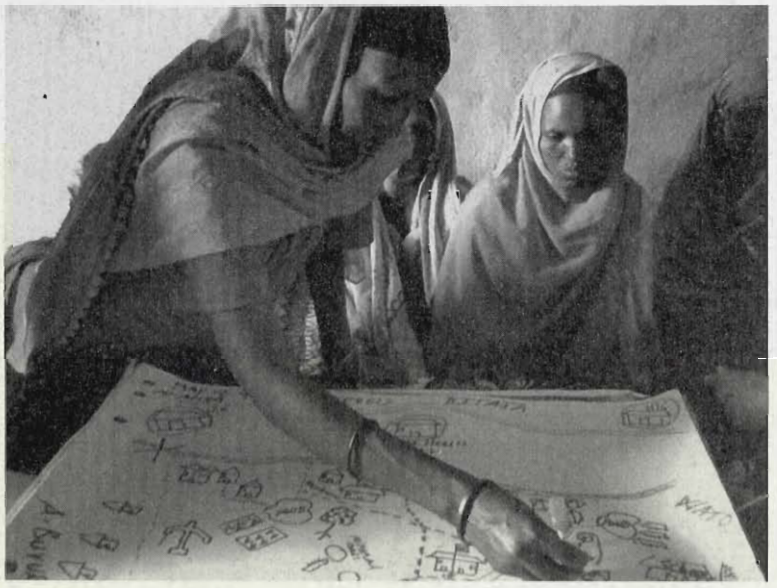
The focus group discussions with the elders and traditional healers indicated a decided lack of public health-care facilities in local towns. Health service delivery was regarded as very poor and expensive when available. The distance between pastoral settlements and town-based clinics was viewed as a major challenge. The focus group discussions indicated that considerable reliance is still placed on traditional healers to deal with health problems. Many diseases are still thought to be caused by supernatural forces. Women are also perceived to be confronted with malnutrition and overburdened with household chores during pregnancy. It was stated that women have less chance to obtain medication to treat illnesses because money has been traditionally controlled by men.

The results from the six PRA exercises were similar in terms of how women ranked their major health problems. The participants were very open about related issues of culture and health. The ranked order, from higher to lower importance overall, was as follows: (1) pregnancy-related problems; (2) sexually transmitted diseases (STDs); (3) malnutrition; (4) malaria; (5) diarrhea; (6) gastritis; (7) skin diseases; and (8) anemia.

Pregnancy-related problems include bleeding, still-birth, premature delivery, sterility, abortion, female genital cutting, and fistulas associated with birthing processes of young mothers. The STDs were dominated by gonorrhea and syphilis; STDs were regarded as rampant. Malnutrition was related to poor food intake in conjunction with heavy workloads. Mothers often feed themselves last in families where food is in short supply. Maize, whether locally grown or coming from food aid, is the dominant source of calories, and women reported that a shortage of animal-source foods, fruits and vegetables in diets also leads to malnutrition. Threats from malaria are perceived to be reduced due to recent campaigns that have distributed protective nets and sprays. Diarrhea is often associated with unclean drinking water.

The results from the PRA exercises also revealed that a general lack of health care access, and as well as the high expense of available medicines and services, compels many people to rely more on traditional healing and traditional medicines. Places other than clinics were also recognized as sources of health care and information. Muslims noted that mosques are regarded as direct and indirect contributors to physical and mental health; mosques are sanctuaries where prayer and religion soothes the spirit, relieves anxiety, and improves health. Public schools are regarded as indirect contributors to health and basic hygiene via education of children; the pastoral children in turn pass new knowledge on to their parents. Boreholes and pumps are regarded as indirect contributors to improved pastoral health via their provision of cleaner drinking water. Otherwise, people are compelled to procure water from ponds and wells that are also accessed by animals.

District location appeared to influence access to health care. For example, people living in Moyale District along the border with Kenya reported they can access better health facilities in Kenya. This involves cross-border travel and greater expense, however, as charges are higher for Kenyan health services if they are provided to Ethiopian citizens. Concern about HIV/AIDS was surprisingly low in all six



Community members from southern Ethiopia engage in a participatory mapping effort to determine the health needs of pastoral women on the Borana Plateau. Photo by Seyoum Tezera.

sites. HIV/AIDS was not mentioned as a priority problem. Most participants noted they have heard about HIV/AIDS, but as yet have not seen a person so afflicted in their communities. Given the common challenges to health and physical vigor in the area, HIV/AIDS symptoms might be difficult to detect. This relative lack of awareness poses a challenge for HIV/AIDS prevention. However, transmission of STDs is commonly recognized.

The seasonal health calendars showed that pregnancy-related problems are more apparent during the *Bonna* (long dry-season from December to March) when women face the highest workload and receive less food. Sexually transmitted diseases appear more common during the *Ganna* (main rainy season from March through May) when people have more food and are more sexually active. For one Muslim community, however, the seasonal pattern differed in that they noted that transmission of STDs is more pervasive during dry seasons when people have less food, their physical resistance is lowered, and they may endure a relapse or recurrence of symptoms. Concern about STDs appeared somewhat lower among Muslim respondents compared to non-Muslim respondents, and this might be related to a greater cultural emphasis on extramarital relations among the latter.

A generalized community-action plan (CAP) was developed for each community to deal with the top three health challenges perceived by the women, namely pregnancy problems, STDs, and malnutrition. Options to deal with each were outlined and resource requirements—both from within and outside communities—were identified. One key aspect was to improve maternal health care via investment in the training of skilled local birth attendants, as well as provision of first-aid kits. Another was to focus on awareness raising, prevention, and treatment for STDs. To carry out a monitoring and evaluation plan, community members prepared their own procedures (not reviewed here.)

Practical Implications

PARIMA's preliminary work revealed a high level of physical and mental health challenges faced by women. Poor health probably has a major effect in undermining productivity and performance of female group members. The Participatory Rural Appraisals revealed that reproductive health is currently the critical problem perceived among the women that PARIMA team members studied.

Knowledge of HIV/AIDS is minimal. Dealing with the problem of sexually transmitted diseases could indirectly mitigate the occurrence of HIV/AIDS. Awareness training and rapid intervention to arrest any spread of HIV/AIDS is essential, and PARIMA's findings suggest there is still a window of time to intervene.

There is disparity in the perceptions and prioritization of women's health problems between communities and local health officials. It is therefore essential to institutionalize participatory approaches in the rural health sector to assist in the improved identification of problems and prioritize interventions. This would involve training health extension staff on the use and application of PRA tools.

If women's health issues are not addressed, then it is likely that gains made from other development interventions associated with collective action could not be sustainable. There is a need for policy to prioritize institutional support for women's health in pastoral areas such as the Borana Plateau.

Addressing health problems based on a group or community approach is vital. It helps in implementing group decisions in addressing common health problems and assists with focusing group members to invest some proceeds from livestock sales in health care directly or through the creation of group-managed health-insurance schemes.

Traditional cultures may facilitate the spread of harmful practices and ailments among pastoral women. It is important to bring attitudinal and behavioral changes into these communities. Their openness has been encouraging. Men must also be included in the process of finding solutions for women's health problems on the Borana Plateau.

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About the Authors: Mr. Seyoum Tezera is a senior field assistant with PARIMA based in Addis Ababa. Email: S.Tezerra@cgair.org. Dr. Solomon Desta is a research associate with PARIMA through Utah State University and was based in Nairobi, Kenya, at the time of this research; he is now based in Addis Ababa. Email: S.Desta@cgiar.org. Dr. D. Layne Coppock is an Associate Professor in the Department of Environment & Society at Utah State University, Logan, Utah. Email Layne.Coppock@usu.edu.

The GL-CRSP Pastoral Risk Management project (PARIMA) was established in 1997 and conducts research, training, and outreach in an effort to improve the welfare of pastoral and agro-pastoral people with a focus on northern Kenya and southern Ethiopia. The project is led by Dr. D. Layne Coppock, Utah State University. Email: Layne.Coppock@usu.edu. Work described in this brief was undertaken with additional support from USAID/Women In Development (WID).

The Global Livestock CRSP is comprised of multidisciplinary, collaborative projects focused on human nutrition, economic growth, environment and policy related to animal agriculture and linked by a global theme of risk in a changing environment. The program is active in East and West Africa, Central Asia and Latin America.

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GLOBAL LIVESTOCK CRSP

Can Pastoral Linkages to Livestock Markets Be Sustained in Southern Ethiopia?

Getachew Gebru, Solomon Desta, and D. Layne Coppock, Utah State University; Seyoum Tezera, PARIMA-Ethiopia; and Zewdu Edea, OARI-Yabelo, Ethiopia

Pastoral Risk Management Project

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The PARIMA project has facilitated collective action, empowerment of women, and increased involvement in livestock marketing among pastoralists on the Borana Plateau since 2001. Fifty-nine collective-action groups formed by PARIMA and her partners have been recently merged into market-oriented cooperatives, consistent with government policy. We used focus groups and participatory appraisals to assess the extent that market linkages have been sustained since previously reported in 2006. The markets have been growing, but are volatile. Members report they need access to early warning and livestock market-information systems, as well as more capital, to promote trade. Export firms have imposed added conditions on animal delivery that puts cooperatives at a disadvantage versus wealthy traders. This suggests that pastoral cooperatives may be increasingly sidelined from effective market participation. Connecting pastoral producers to markets is a dynamic process, and gains achieved can be quickly eroded. To promote sustainability of market linkages we recommend that third parties monitor the cooperatives and marketing chains to identify problems and build capacity. Early-warning and livestock market information systems need to be implemented. Local researchers can identify animal production constraints that limit market supply and use action research to test interventions in partnership with communities.

Background

As with many other East African rangelands, the pastoral system on the Borana Plateau has been in a downward spiral of increasing poverty and heightened food insecurity for several decades. Because the indigenous system is no longer capable of providing a subsistence level of food production for the human population, people like the Boran must diversify their livelihoods and become more involved in livestock and grain markets in order to prosper.

Starting in 2001, PARIMA and her partners spent several years creating 59 well-trained pastoral collective-action groups across the Borana Plateau. Dominated by women, a package of interventions focused on capacity building. Groups formed rapidly and membership grew to over 2,100 people across several districts (Coppock et al., 2009; Tezera et al., 2008). The primary goal of this effort was to empower destitute people and promote livelihood diversification. By 2003, it was apparent that livestock export markets in Ethiopia were rapidly growing. In response to this opportunity, PARIMA and her partners facilitated interactions among collective-action groups, policy makers, and livestock exporting firms to create a north-bound livestock marketing chain from southern Ethiopia to Addis Ababa (Desta et al., 2006). This process helped pastoralists learn about product requirements and helped policy makers and exporters learn about the production potential of the rangelands. The PARIMA project then assisted with the establishment of business linkages among collective-action groups and export abattoirs. We monitored 11 collective-action groups that supplied sheep and goats to two export firms. Nearly 60,000 sheep and goats, 3,500 cattle, and some camels were traded by the groups from 2003-2007. This resulted in new sources of income for group members (Desta et al., 2006; Tezera et al., unpublished data).

After 2006, the PARIMA project worked with the Oromia Cooperative Promotion Office to transform the 59 collective-action groups into around 37 legally recognized cooperatives, consistent with government policy. It was anticipated that transformation of groups into cooperatives would offer members better access to services including capital from commercial financial institutions. Cooperatives were also expected to have better access to information pertaining to drought early-warning and livestock market prices. In 2009, we wanted to follow-up with the PARIMA project alumni in the cooperatives to see how they had fared in the transition process. We used five focus group discussions (Figure 1) and several Participatory Rural Appraisals (Lelo et al., 2000) to collect this information. Details on methods are provided elsewhere (Gebru et al., submitted).

Findings

The transformation of informal collective-action groups into formal cooperatives needs to be voluntary and gradual (Tezera et al., 2008). Our sources revealed, however, that this process has been mishandled in certain locations. Some groups have been merged without their consent, and continued investment in capacity building

Figure 1. Dr. Solomon Desta of PARIMA with a focus group in the Moyale District, Ethiopia. The PARIMA project has facilitated collective action, empowerment of women, and increased involvement in livestock marketing among pastoralists on the Borana Plateau since 2001. Fifty-nine collective-action groups formed by PARIMA and her partners have been recently merged into market-oriented cooperatives. These PARIMA groups have become active participants in newly created livestock export marketing chains, and thousands of dollars in local profits have been generated. Photo by G. Gebru.

Our sources indicate that livestock market demand has been growing, but it has been volatile. In previous research, it was noted that collective-action groups mostly supplied animals to exporters by trading animals procured from a variety of producers; the bulk of the supply did not come from their own small flocks or herds (Desta et al., 2006). Groups would procure animals (especially sheep and goats) from across the Borana Plateau and northern Kenya and aggregate them for exporters, a process that requires an infusion of capital. However, recent focus groups noted that the cooperatives have often been unable to access sufficient capital to acquire animals for trade. Export firms have also been imposing more stringent terms and conditions on animal deliveries. Purchase criteria have been increasingly inconsistent as well. All of these factors combined are acting to gradually sideline the pastoral cooperatives from active engagement in the livestock marketing chain. The situation gives more competitive advantages to wealthy traders. In response to such pressures, some cooperatives and individual producers are searching for alternative markets. These prominently include more domestic outlets.

Early warning information concerning drought, conflict, and livestock diseases are essential to improve livestock production and marketing. Our sources told us that the Borana pastoralists have traditional early-warning systems, but these have limitations. The cooperatives also need accurate livestock market information to function effectively. Most livestock market information, however, is still gathered via traditional means. A common approach is for an individual to visit several market locations and gather information on prices, supply, and demand before making a final decision. Pastoralists also try to triangulate information when traders are involved.

The focus group discussion participants do not have access to any formal livestock-market information system implemented by government or NGOs. This is despite several years of effort by researchers and development agents to create livestock market-information networks. Our sources said they know that marketing data have been routinely collected by various organizations, but they are not aware of how the data are used or whether the data could benefit pastoral cooperatives.

Using Participatory Rural Appraisal (PRA) tools, researchers from the Oromia Agricultural Research Institute (OARI) identified a number of community-recognized problems concerning small-ruminant production and marketing. The main production constraints for sheep and goats concern the high mortality of young stock. Health and nutrition constraints are the key factors that limit animal recruitment. Marketing constraints revealed in the PRAs were similar to the findings reported above, including price fluctuations, low prices, interference by traders, and a general lack of access to livestock market information.

Overall, we conclude that despite the challenges, there have been fundamental and positive changes in the livestock marketing environment in southern Ethiopia. Market access has dramatically improved over the past decade and livestock prices have increased. Pastoralists have also been successfully trained to better engage livestock traders and exporters, and they are managing their financial affairs more effectively.

Practical Implications

Connecting pastoral producers to markets is a dynamic process. Gains achieved can be rapidly eroded. Based on our findings, we offer five recommendations:

- Have independent third parties monitor the performance of cooperatives and advocate for the ideals of voluntary process, as well as assist in building capacity for both cooperative promotion staff and cooperative association members.

- Have independent third parties monitor linkages among cooperatives, traders, exporters, and other livestock buyers, and advocate for mechanisms that promote equity among value chain participants.

- Assist cooperatives in the generation of capital for livestock trade, whether this is acquired from local savings and investments, holding companies, or outside loans and grants.

- Implement the viable aspects of formal early warning and livestock-marketing information systems among cooperative members now.

- Have local scientists take the lead in implementing action research, in collaboration with local communities, on animal-production interventions directly connected to market incentives.

In sum, the current opportunities to enhance pastoral livestock marketing in southern Ethiopia are large. The time to act is now.

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About the Authors: Drs. Getachew Gebru and Solomon Desta are research associates with PARIMA through Utah State University and they are based at the International Livestock Research Institute (ILRI) in Addis Ababa, Ethiopia. Email: G.Gebru@cgiar.org; S.Desta@cgiar.org. Mr. Seyoum Tezera is a senior field assistant with PARIMA based in Addis Ababa. Email: S.Tezerra@cgiar.org. Mr. Zewdu Edea is a researcher at the Oromia Agricultural Research Institute (OARI), Yabello Pastoral and Agro-pastoral Research Center, Ethiopia. E-mail: Zewdu_edea@yahoo.com. Dr. D. Layne Coppock is an Associate Professor in the Department of Environment & Society at Utah State University, Logan, Utah. Email Layne.Coppock@usu.edu.

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GLOBAL LIVESTOCK CRSP

Simple Cooling Method Improves the Quality of Marketed Camel Milk in Northern Kenya

A.O. Adongo, F. Wayua, I.J. Sagalla, H.K. Walaga, and C. Amboga,
Kenya Agricultural Research Institute (KARI);
and D. Layne Coppock, Utah State University

Pastoral Risk Management Project

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Milk marketing is important for many pastoralists to generate income, especially poor households with little else to sell. Milk is accumulated at pastoral settlements and transported to local markets on foot, by pack animals, or in vehicles. Despite challenges of heat and long-distance travel, pastoralists or traders do not attempt to cool marketed milk and possibly reduce risk of spoilage. Milk spoilage is an important problem that limits urban consumer demand. Our research objective was to determine effects of water-soaked hemp (burlap), wrapped around plastic jerry cans, on reducing milk temperature and enhancing quality of marketed camel milk, a key commodity in northern Kenya. The study employed an experimental design using pairs of 3-liter jerry cans, with or without water-soaked hemp, transported by donkey and lorry on eight market runs between Kulamawe and Isiolo. Samples of milk taken at morning milkings and mid-afternoon after market arrival were analyzed for temperature and standard milk-quality parameters. Milk took 7.4 hours to travel 80 km to market. Hemp treatment significantly reduced average milk temperatures by 13% and total bacterial counts by 44%. This simple and readily adoptable intervention can therefore reduce risks of milk spoilage along this value chain under similar field conditions.

Background

Livestock production remains the economic mainstay of most pastoralists living in Isiolo District. Livestock and livestock products, notably camel milk, significantly contribute to household food and income needs, especially among poorer households. Milk intended for sale is often collected among neighboring households at pastoral settlements and mixed in plastic jerry cans. The jerry cans are then transported by people, pack animals, or vehicles to market. Transport constraints, in particular, are a big challenge for milk marketing in this region since most roads are in poor condition, vehicle traffic may be infrequent, and there is no opportunity for refrigeration. As a result, marketed milk is typically exposed to high temperatures for prolonged periods of time, increasing the risk of spoilage and imposing marketing constraints. Urban consumers in the region are often unsatisfied with locally produced milk because of the poor quality and danger to human health (Wayua et al., 2007). Some consumer groups in Moyale, Kenya, have indicated a willingness to pay at least 20% more for milk of a higher quality than what is typically found in their marketplace (Wayua et al., 2008; 2009).

Primary requirements for adequate preservation of dairy products include storing them under cool temperatures, using hygienic handling methods, and offering protection from oxygen and bacteriological contamination. Extensive work on bovine milk marketing and hygienic handling in high-potential areas of Kenya has been reported, but little attention has been given to camel milk in the lower-potential areas of northern Kenya. The objective of this study was to determine whether water-soaked hemp (burlap) wrapped around jerry cans, could help prolong the shelf life and enhance the quality of marketed camel milk. Long-distance lorry drivers in this region often use water-soaked, fabric containers to keep their drinking water cold via evaporative cooling and convection; such containers are suspended on the outside of moving vehicles. We wondered if the same simple principle could be applied to the local transport of milk.

Research was conducted in the Kulamawe milk catchment of Isiolo District. The catchment is occupied by pastoral encampments or *manyattas*. A settlement also called Kulamawe serves as a central milk collection point for the catchment. The catchment supplies milk to the residents of Isiolo town, and supply greatly varies by season. The cooler wet season is a time of greater forage and water resources for livestock, and hence a higher marketed milk supply, while the warmer dry season is the reverse. Milk is first transported by donkey from the *manyattas* to the Kulamawe settlement (Figure 1). The milk is then loaded on a lorry that travels from Kulamawe to the Isiolo market. In times of high marketed supply, milk may also travel onwards from Isiolo to Nairobi by bus.

Methods

The design employed paired 3-liter plastic jerry cans, with and without water-soaked hemp (Figure 2), on a series of eight milk runs using donkey and lorry transport methods as above. The overall distance to market from the pastoral

Figure 1. Milk being transported by donkey to the collection point at Kulamawe. Photo by H.K. Walaga.

manyatttas averaged about 80 kilometers (km), with 10 km of this distance traversed by the donkeys and the remainder by lorry. There were two sets of four containers used on any given market day. All eight containers received the same well-mixed milk from the *manyattas*. Four of the eight containers were wrapped in water-soaked hemp, while four served as the control group. The hemp-wrapped containers were soaked only once at the start of the milk transport process. All containers were otherwise identical and representative of what the people actually use to store and transport milk. Care was taken to load the paired containers in a complementary fashion on the donkey packs or in the back of the vehicle, while considering a balanced and equivalent exposure of the containers to either direct sunlight or wind associated with driving. Half of the containers were therefore categorized as either "less exposed" or "more exposed" to wind, depending on their placement.

Milk samples were taken from each container just after collection and again after the milk arrived at the Isiolo market. Milk temperatures were also taken at these times. Ambient air temperatures were taken at several times during the transportation process, as were observations of hemp moistness. There were 16 milk samples for each of eight milk runs for a total of 148 samples. Milk runs were conducted in the warm dry season, as this was thought to be the period when the hemp intervention could be most useful. Milk samples were put on ice immediately after collection and transported to a local laboratory where they were frozen until chemical analyses could be performed. These analyses included standard determinations for milk composition and quality. Statistical analyses that are shown here used ANOVA with mean separation tests from SAS. Technical details and data can be obtained from the authors.

Findings

Generally, the camels were milked between 06:00 to 08:30 AM each morning at the *manyattas*. After collection and mixing, the milk then traveled 1.5 hours by donkey to the Kulamawe settlement. The lorry would leave the Kulamawe settlement around 11:00 AM each day and arrive at the Isiolo town market by 2:30 PM. The average time between milking and market arrival was thus about 7.4 hours. The average (±SE) ambient air temperatures were 24±0.3 °C in the early morning at the *manyattas*, 28±0.3 °C at the Kulamawe settlement, 29±0.3 °C at a midway transit point (about 35 km) between Kulamawe and Isiolo, and 26±0.4 °C at the Isiolo market by mid-afternoon.

Milk temperatures are summarized in Table 1. The temperature of the control (untreated) milk did not significantly vary between the morning collection time and the market arrival time. The temperature of the treated milk (using the water-soaked hemp containers) did significantly change over the same time frame, however, with a net temperature reduction of 14%. The treated milk was also cooler than the control milk at the time of market arrival, with a net reduction of about 13%. Table 1 also shows results for total bacterial counts (TBC) of milk. The TBC values of milk destined for treatment or controls were similar at the time of milk collection, but by the time the milk arrived at the Isiolo market, concentrations had increased 4.5-fold for the control milk and 3.1-fold for the treated milk. This reduction in TBC was 44% and statistically significant. Bacterial counts for milk in this study were always high in comparison with accepted dairy standards for Kenya. This indicates that general hygiene related to milk handling at the *manyattas* is poor.

Table 1. Average temperatures (°C ± standard errors) and average total bacterial counts (TBC) per milliliter (TBCs x 10^5 ± standard errors) for camel milk collected in the morning at manyattas *in Kulamawe and after transport to the Isiolo marketplace by mid-afternoon.*

Milk	Location			
	Manyatta (early morning)		Isiolo Market (mid afternoon)	
	Temperature	TBC	Temperature	TBC
Control (traditionally transported in jerry cans)	28±0.7	60±12.6	28±0.8*	266±26.9*
Treated (transported in jerry cans wrapped with water-soaked hemp)	28±0.8	47±12.6	24±0.5*	149±26.9*

Each number is the average temperature of 37 milk samples. Asterisk (*) indicates statistical significance between values within the same columns (P≤0.05).

Other chemical tests measuring milk acidity and bacteriological quality were undertaken. The data (not illustrated here) demonstrate that control milk had accelerated acidification, souring, and bacteriological growth compared to treated milk. Results also indicated that placement of hemp-wrapped containers with respect to wind exposure is significant in mediating milk-temperature responses. The "more-exposed" containers tended to dry out after only three hours of transport, while the "less-exposed" containers stayed moist until arrival at the Isiolo market. The "less-exposed" containers would therefore tend to maintain cooler temperatures and milk quality for a longer period of time.

Practical Implications

Based on all parameters for measuring milk quality and hygiene, this study has confirmed that simple milk-cooling techniques such as wrapping jerry cans in water-soaked hemp can significantly reduce milk temperature as well as reduce the risk of milk spoilage for this particular value chain, under these ambient conditions. Overall, we have demonstrated that this soaked-hemp treatment reduced milk temperature by 13% and TBC by 44%. We recommend that local extension agents, producers, and traders conduct their own tests of this simple methodology. Hemp is readily available and inexpensive, and the water required for a one-time soaking is minimal. The ultimate test of the usefulness of the practice will be determined if and when consumers respond by recognizing the improvement in milk quality and then paying a premium for a more desirable product.

Figure 2. Close-up of hemp-wrapped and control milk containers in a lorry destined for the Isiolo market. Photo by A.O. Adongo.

Further Reading

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About the Authors: Mr. Amos Adongo and Mr. Francis Wayua are research scientists with the Kenya Agricultural Research Institute (KARI) based at Marsabit, Kenya. Email: adongoam@yahoo.co.uk, fwayua@yahoo.co.uk. Mr. I.J. Sagalla and Mr. H.K. Walaga are technical officers with KARI also based at Marsabit. Email (Walaga): hkwalaga@yahoo.com.uk. Mr. C. Amoga is a research scientist with KARI based at Embu, Kenya. Email: schasimba@yahoo.com. Dr. D. Layne Coppock is an Associate Professor in the Department of Environment & Society at Utah State University, Logan, USA. Email Layne.Coppock@usu.edu.

The GL-CRSP Pastoral Risk Management Project (PARIMA) was established in 1997 and conducts research, training, and outreach in an effort to improve the welfare of pastoral and agro-pastoral people with a focus on northern Kenya and southern Ethiopia. The project is led by Dr. D. Layne Coppock, Utah State University. Email: Layne.Coppock@usu.edu.

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GLOBAL LIVESTOCK CRSP

Costs of Implementing Collective Action and Capacity Building Among Pastoralists in Southern Ethiopia

Seyoum Tezera, PARIMA-Ethiopia; D. Layne Coppock and Solomon Desta, Utah State University

Pastoral Risk Management Project (PARIMA)

Research Brief 09-03-PARIMA December 2009

Since 2000, the PARIMA project has implemented risk-management activities among semi-settled pastoralists in southern Ethiopia. The goal has been to improve human welfare via collective action and capacity building. Outcomes include progress in income generation, asset conservation, and livelihood diversification. Fifty-nine collective-action groups were created. Dominated by women, they included over 2,000 founding members and groups have recently merged to form 37 cooperatives, consistent with government policy. Creating sustainable impacts via collective action and capacity building requires many inputs. Taking raw, illiterate volunteers and transforming them into sustainable groups took up to three years, on average. Costs of implementing this program are estimated at USD 34 per person for a target population of 13,800 direct beneficiaries, based on an exchange rate of 9.1 Ethiopian Birr per USD. This is about USD 1 per person per month. The project has generated many direct and indirect benefits for individuals and communities, but these are very difficult to quantify. We speculate, however, that there has been a large and positive net benefit from the project once costs are considered. Simply knowing potential costs is useful because it helps development agencies decide how such programs might be effectively designed and implemented.

Background

The PARIMA project has operated in southern Ethiopia since 1997. Our efforts to engage semi-settled pastoralists using participatory approaches began in 2000. Our approaches departed from top-down research traditions because we focused on more of a bottom-up, participatory process that put outreach at the front and sought to empower local people and build stakeholder partnerships. Methods and outcomes of our work are documented in detail elsewhere (Coppock et al., 2007, 2009; Desta et al., 2004, 2006; Tezera et al., 2008). The 59 PARIMA collective-action groups created over six years have proven to be sustainable, and all have been recently transformed into legally recognized producer cooperatives. This process has involved about 2,300 people overall, of whom 76% have been women. The primary goal of collective action has been defined by the people themselves, namely improving incomes and well-being via capacity building and livelihood diversification. We have also estimated that the total number of direct beneficiaries for this effort exceeds 13,800 people; these include family members associated with the founding members of collective action groups.

Use of participatory rural appraisal (PRA) methods was the foundation for identification of priority problems and potential solutions at pastoral settlements on the Borana Plateau. Problems were dominated by a scarcity of food and water, while local solutions centered on the need to increase incomes and diversify livelihoods. Inspiration for the (mostly female) volunteers to organize themselves and undertake collective action came from observations of dynamic women's groups in northern Kenya, made during a field tour when Ethiopian women were taken across the border in 2001 (Coppock et al., 2009). The successes of the Kenyans were embraced and emulated across the Borana Plateau. Once Ethiopian collective-action groups were formed, investments were made by PARIMA to build capacity of group members, who identified needs for various forms of training. PARIMA then solicited partners to create or adapt short courses for illiterate pastoralists. Interventions included proxy non-formal education (PNFE) to improve basic literacy and numeracy skills, exposure to micro-finance, small-business development, management of group dynamics, and livestock marketing. Efforts were also made to help create a northbound marketing chain linking pastoralists, traders, and exporters.

Methods used for information described in this brief are straightforward. We simply kept a record of all operating and implementation costs associated with the program over seven years. We express these costs in terms of the founding members of the collective-action groups (2,300) as well as in terms of the population of direct beneficiaries (13,800). The final results are expressed in USD using an exchange rate of 9.10 Ethiopian Birr per USD. This was the exchange rate in force throughout the capacity-building period.

Table 1. Summary of costs (USD) required for capacity building among a target population of 2,300 or 13,800 people.

Activity[1]	Total Cost	Cost per Person Based on 2,300[1]	Cost per Person Based on 13,800[1]	Percent of Target Population Engaged (2,300; 13,800)[1]	Percent of Grand Total Cost
PRAs/CAPs	$7,200	$3.13	$0.52	26%; 4%	1.4%
Training for pastoralists					
Short courses[2]	$55,618	$24.18	$4.03	17%; 3%	18.5%
Tours[3]	$63,864	$29.27	$4.63	31%; 9%	13.5%
PNFE	$13,650	$6.57	$0.99	50%; 16%	3.0%
Loan capital augmentation	$137,500	$59.78	$9.96	100%; 17%	27.5%
Monitoring and evaluation	$10,074	$4.38	$0.73	17%; 3%	2.0%
Local technical implementation and supervision	$185,350	$73.91	$13.43	100%; 17%	34.1%
Column Totals:	$473,256	$217.12	$34.29	NA	100.0%

[1]Activities, costs, and percent engagement are defined in the footnotes for Table 2.
[2]Figures averaged across the seven courses shown in Table 2.
[3]Figures averaged across the four tours shown in Table 2.

A full assessment of the usefulness of the program would require that all direct and indirect benefits be tabulated so that a net benefit in relation to the costs could be estimated. We know that by late 2007, the founding participants, overall, had accumulated cash savings on the order of USD 93,000. Over 5,150 micro-loans (96%) were repaid by this time, with a cumulative loan value over USD 647,600. We know that many groups have made considerable profits from the livestock export trade since 2003. Livelihoods have been diversified to include commercial livestock trade, shop keeping, rental house construction, sand and gravel enterprises, cash-crop production for vegetables and cereal grains, bakeries, and butcheries. It is apparent that founding members now commonly send their children to formal schooling. Despite our general knowledge of all these components, a sum total impact across all direct and indirect beneficiaries remains elusive, as the appropriate multipliers for this situation are unclear. Simply knowing the costs of project implementation is still useful, however, in helping development agencies decide how such programs might be effectively designed and implemented.

Findings

Overall, we estimated that it takes up to three years, on average, to transform raw, illiterate volunteers into functional and sustainable groups capable of solving their own problems and undertaking a gradual process of livelihood diversification (Tezera et al., 2008.) This time frame is broken out into several phases, including a group establishment phase (three to six months), a growth phase (eight to 12 months), and a maturation phase (12 to 16 months).

Table 1 aggregates and summarizes the detail costs shown in Table 2. Overall, loan capital augmentation plus technical support costs added to over half of the grand total project costs. The cost per person based on the 2,300 founding members was USD 217, and this decreased to USD 34 per person when considering the 13,800 direct beneficiaries.

Estimated detail costs for 23 activities are shown in Table 2. The activities include four efforts concerning diagnostic or information collection and evaluation, eight types of training courses, and four types of educational tours. Overall, the most expensive activities in terms of total costs were loan capital augmentation and technical support, while the least expensive activities were local tours and some of the short courses. Percent of the target population engaged was about 100% for six activities considering the 2,300 founding members, and this dropped to 16-33% when considering the 13,800 direct beneficiaries. The other activities engaged 2-26% of the founding members or less than 5% of the direct beneficiaries.

Practical Implications

Estimating such costs over a seven-year program is challenging. Our final figure of USD 34 per person for direct beneficiaries equates to about USD 1 per person per month. This uses a three-year training period for group formation, and assumes that diffusion of ideas and skills widely occurs across the target population. The USD 1 per person per month is reportedly a "typical" level of expenditure that is incurred in African rural development projects (Dr. K. Smith, USAID Ethiopia, personal communication), so it appears to be reasonable from that perspective. Recently in 2009, the Ethiopian Birr was devalued from 9.10 per USD to 12.58 per USD, a decline on the order of 40%. Development agencies that operate on the basis of USD could therefore see a major decline in the local costs to implement a program similar to what is described here.

The USD 34 per person may still be prohibitive, however, for cash-strapped national development organizations to consider. There are probably several opportunities to

Table 2. Component breakdown of costs (USD) required for capacity building among a target population of 2,300 or 13,800 people.

Activity[1]	No. Reps, Rounds, or Courses[2]	People per Rep, Round, or Course[2]	Reps/ Rounds/ Courses x People[2]	Cost per Rep[2]	Total Cost	Cost per Actual Participant[3]	Cost per Person Based on 2,300[4]	Cost per Person Based on 13,800[5]	Percent of Target Population Engaged (2300; 13,800)[6]
PRAs/CAPs	12	50	600	$600	$7,200	$12.00	$3.13	$0.52	26%; 4%
Group dynamics*	12	192	2,304	$930	$11,160	$4.85	$4.85	$0.81	100%; 16.7%
Group leadership*	4	30	120	$1,459	$5,836	$48.63	$2.54	$0.42	5%; 0.9%
Book-keeping*	3	16	48	$1,076	$3,228	$67.25	$1.40	$0.23	2%; 0.3%
Small-business management*	3	30	90	$3,686	$11,058	$122.86	$4.80	$0.80	4%; 0.6%
Livestock marketing and value chains*	3	17	51	$1,317	$3,951	$77.47	$1.72	$0.29	2%; 0.4%
Entrepreneurism*	3	15	45	$2,250	$6,750	$150.00	$2.93	$0.49	2%; 0.3%
Livestock-product processing*	5	30	150	$2,727	$13,635	$90.90	$5.93	$0.99	6%; 1.1%
Capacity building for partners—courses**	3	10	30	$2,500	$7,500	$250.00	$3.26	$0.54	NA
Kenya tours	2	30	60	$6,272	$12,544	$209.07	$5.45	$0.91	3%; 0.4%
Mentor tours	6	767	4,600	$4,500	$27,000	$11.73	$11.73	$1.96	100%; 33%
Regional tours	4	30	120	$5,000	$20,000	$166.67	$8.69	$1.45	5%; 0.9%
Local tours	10	36	360	$432	$4,320	$12.00	$1.88	$0.31	16%; 2.6%
Capacity building for partners—tours	3	10	30	$450	$1,350	$45.00	$0.57	$0.10	NA
PNFE*	65	35	2,275	$210	$13,650	$6.00	$5.93	$0.99	99%; 16%
Loan capital augmentation	2,300	1	2,300	$59.78	$137,500	$59.78	$59.78	$9.96	100%; 17%
Monitoring and evaluation—data collection	12	396 (samples)	4,752	$396	$4,752	$1.00 (per sample)	$2.07	$0.34	17%; 2.9%
Monitoring and evaluation—data entry, preliminary analysis	12	396 (samples)	4,752	$444	$5,322	$1.12 (per sample)	$2.31	$0.38	17%; 2.9%
Technical backstopping and field operating	----	----	----	-----	$50,000	$21.74	$21.74	$3.62	100%; 16.7%
Partner office operating	5	460	2,300	$11,500	$57,500	$25.00	$25.00	$4.16	100%; 16.7%
Local PARIMA field staff costs	1	2,300	2,300	$69,000	$69,000	$30.00	$30.00	$5.00	100%; 16.7%

[1]Some of the activities require clarification. The PRA/CAP denotes implementation of participatory rural appraisals and creation of community action plans. The nine activities accompanied by asterisks (*) are short courses. PNFE denotes proxy non-formal education, defined as a lower cost, more flexible classroom activity that occurs at pastoral villages. The focus is on essential skill development (literacy, numeracy) and teachers have minimum material support and are selected by the communities. Most of the other course titles are self-explanatory, and details on course content can be obtained from the authors. The item accompanied by a double asterisk (**) indicates costs associated with local development agents attending courses. The Kenya tours were conducted twice to expose 30 Ethiopian women leaders to the achievements of Kenyan women just across the border. The mentor tours brought a few Kenyan women leaders to Ethiopia on six occasions to meet with newly formed Ethiopian groups. Regional tours involved taking Ethiopian group leaders to the Ethiopian highlands to observe cooperative action among farmers and dairy producers as well as to see aspects of livestock-related value chains. Local tours involved taking Ethiopian group leaders to visit other Ethiopian groups on the Borana Plateau to exchange ideas. Capacity building tours for partners denotes costs associated with having local development agents attend tours. Loan capital augmentation represents external funds added to group savings and allow more rapid development of micro-loan extension. Monitoring and evaluation, as well as technical backstopping, involved regular data collection and group performance assessments. These efforts were largely conducted by the PARIMA team. Partner office operating represents costs associated with collective-action group offices as well as some support to offices of collaborating government agencies. Local PARIMA field staff costs include coverage for enumerators, outreach personnel, and researchers, typically on a part-time basis. The outreach field supervisor as well as the researchers had graduate and post-graduate university degrees, which elevates personnel costs.

[2]Where "rep" stands for repetition.

[3]Cost for each person directly involved in each activity.

[4]The founding number of collective-action participants was around 2,300. Not every person out of 2,300 directly participated in each activity. These figures average the costs of a given activity across the population of founding members.

[5] Given an average family size of six persons, the 2,300 founding participants each affect five other people for a total of 13,800 direct beneficiaries. Not every person out of 13,800 directly participated in each activity. These figures average the costs of a given activity across the population of direct beneficiaries.

[6]Each activity reached a different percentage of the target population. Percentages based on a target population of 2,300 are shown to the left, while those based on a target population of 13,800 are shown to the right.

reduce the cost per person, if necessary. Given we were also learning in this process, our efforts were somewhat exploratory and sometimes inefficient. Because of this, we feel that costs across the board could probably be reduced simply with added experience should the effort be repeated. In particular, class sizes could be increased, and monitoring and evaluation could be conducted in a simpler manner with less skilled staff. A commitment to a series of training courses and careful mentoring is vital, however, as investment in these aspects of capacity building yields high returns. All of the tours were immensely valuable in terms of instilling motivation and new ways of thinking among group leaders. If some tours were dropped in a cost-cutting measure, the most likely ones to delete could be the cross-border exchanges. Given there is now a strong domestic source of well-trained group leaders and entrepreneurs to teach and inspire others, there is now less of a need for foreigners in such a capacity.

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About the Authors: Mr. Seyoum Tezera is a senior field assistant with PARIMA based at the International Livestock Research Institute (ILRI) in Addis Ababa, Ethiopia. Email S.Tezerra@cgiar.org. Dr. Solomon Desta is a research associate with PARIMA through Utah State University and is also based at ILRI in Addis Ababa. Email: S.Desta@cgiar.org. Dr. D. Layne Coppock is an Associate Professor in the Department of Environment & Society at Utah State University, Logan, USA. Email Layne.Coppock@usu.edu.

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GLOBAL LIVESTOCK CRSP

Eleven Years of PARIMA Activities in North-Central Kenya: Impacts on Egerton University and Neighboring Communities

Abdillahi Aboud[1], Mark Mutinda[1], Stellamaris Muthoka[1], and D. Layne Coppock[2]
[1]Egerton University; [2]Utah State University
Pastoral Risk Management Project

Research Brief 09-04-PARIMA December 2009

The PARIMA project was created to improve the well-being of pastoralists and agro-pastoralists in northern Kenya and southern Ethiopia via risk-management research, training, and outreach. The project began to collaborate with Egerton University's Department of Natural Resources in 1998 and many joint activities were undertaken over the next 11 years. Among them were regional household research on pastoral risks and their management, a training program for Egerton teaching staff to obtain post-graduate degrees, facilitation of Egerton faculty and staff to attend professional meetings, and provision of computer hardware and software that led to the creation of a GIS teaching and research laboratory at the Njoro campus. One of the most significant impacts from the project, however, has been the recent emergence of participatory action research that has quickly led to positive impacts on the well-being of some agro-pastoral communities in Baringo District. The approach has also affected the academic culture in Egerton's Faculty of Environment and Resource Development (FERD). In summary, this long-term relationship forged by PARIMA has been based on the exchange of knowledge, methodologies, and technology. It has inspired a new vision at Egerton that focuses more on the use of practical research to directly engage rural communities and change lives.

Background

The Improving Pastoral Risk Management on East African Rangelands (PARIMA) project of the GL-CRSP was created to improve the well-being of East African pastoralists and agro-pastoralists using risk management principles. This involved research to discover new knowledge pertaining to risk, training of students and community members, and use of active outreach to facilitate the timely application of new information. Risk management can help people better buffer themselves against system shocks and create new economic opportunities. In the context of East African pastoralism, risk management can positively contribute to wealth conservation, reduction in conflict, and improved food security. Risk-management interventions may include diversification of income and assets, improved use of information, and increased access to external resources.

The natural resources focus of Egerton University primarily serves the Baringo District of north-central Kenya. Baringo has endured decades of natural resource degradation and high rates of human population growth. Traditional systems of natural resource management have broken down long ago. Provision of food relief has been common for several decades, and extreme poverty is pervasive. Many development organizations have failed to arrest the downward slide in the human condition here.

The PARIMA project began to collaborate with Egerton University's Department of Natural Resources in 1998. A number of activities were then undertaken during the next 11 years that have affected the university and neighboring communities in Baringo District. Here we summarize these activities and reflect on major achievements.

Summary of Activities and Achievements

Regional survey research. Work began with regional household research on risks affecting pastoralists. Using a survey approach, studies were initiated in 11 sites in northern Kenya and southern Ethiopia and carried out over several years. Some of these sites were in the Baringo and Samburu Districts of north-central Kenya, in closer proximity to Egerton University. Others were in the Marsabit District as well as on Ethiopia's Borana Plateau. The survey began with a baseline conducted in March, 2000. Three hundred and thirty (330) households were engaged in the survey. Individuals were interviewed quarterly from June, 2000, to June, 2002. Numerous risk-related variables were in the surveys, including household socio-economic characteristics (such as income, education, etc.), livestock assets (their status, productivity, market interactions, losses to drought and disease, etc.), other aspects of livelihoods, and the types, nature, and exposure to risks as related to climate, insecurity, disease, etc. Other research modules were fielded to supplement the main survey research. A full description of the approach, codebook, and data are available online (http://aem.cornell.edu/special_programs/ AFSNRM/ Parima/ projectdata.htm).

An important impact of the regional household survey has been in terms of providing baseline data which have been

used by NGOs in their efforts to introduce interventions and for planning long-term development projects for communities. Another significant user of these data is a new project entitled "Natural Resource Management and Biodiversity Conservation in the Dry Lands of Eastern and Central Africa," funded by the USAID-sponsored Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA). This research will analyze the socio-economic and biodiversity characteristics in northern Kenya and southern Ethiopia and map them as one means to attract development attention towards pastoralism and the dry lands. We anticipate that considerable new information will emerge from this research that will continue to inform training objectives and curriculum design at Egerton University. Equally important is the fact that availability of baseline data offers opportunities for researchers to avoid duplication of past work and wasting limited resources.

Egerton staff development. While Egerton was minimally involved in the main PARIMA survey research, through the launch of other parallel survey work in Baringo and Samburu Districts, the Faculty was able to develop a number of post-graduate degree projects. These projects constituted a key component of PARIMA capacity building for university staff in the Department of Natural Resources. Five Egerton teaching staff received research-based, post-graduate degrees overall, with four at the master's level and one at the doctoral level. All of these trainees were promoted internally to lecturer or assistant lecturer positions at Egerton. Three of the four master's students have subsequently enrolled in doctoral programs at Egerton, Colorado State University (USA), and the University of Witwatersrand (South Africa).

Five other post-graduates were matriculated through the program who were not Egerton staff. These included two Ethiopians and three Kenyans. Funds from PARIMA and Egerton supported these students and thus enhanced the mentoring opportunities for Egerton faculty. The students received four master's degrees and one doctoral degree. One of the master's students is now completing a Ph.D. in Norway and will begin an academic post at an Ethiopian university. The others have subsequently done local consulting or taken professional positions with international NGOs, FAO (in Sudan), and at Kabarak University in Kenya.

Topics of theses and dissertations have been varied, but in general they focused on social science or human ecology. They included themes such as conflict management, influences of formal education and gender on risk management, livelihood diversification, viability of indigenous institutions, livelihood risks as related to natural resource degradation, prospects for natural resource rehabilitation, and some issues pertaining to refugee populations residing in pastoral areas. Overall, work from the theses and dissertations has been turned into five publications in peer-reviewed outlets. Several other manuscripts have been recently submitted to peer-reviewed journals. Two former students also won small educational grants.

In addition to degree-based training, other forms of non-degree training were pervasive. Egerton faculty and staff were supported, for example, to attend numerous conferences and present oral papers and posters. Egertonians were privileged to attend the International Rangeland/Grassland Congresses in Townsville, Australia (1999), Durban, South Africa (2003), Dublin, Ireland (2005), and Hohhot, China (2008). Sponsorship was also provided for attendance at GL-CRSP meetings in Washington DC (2002) and Naivasha, Kenya (2009). These experiences, overall, have instilled a heightened sense of professional connectedness and confidence among departmental participants. Finally, Egerton faculty and staff gained experience hosting a study-abroad experience for six American students, both undergraduate and post-graduate, in June and July of 2007. Egerton faculty and staff collaborated with American faculty to create and implement a field course focused on the varied management and development challenges found at several adjacent Rift Valley lakes (Naivasha, Nakuru, and Baringo).

Technical capacity building: GIS research and teaching laboratory. Besides staff development, the PARIMA project has also supported the department's academic mission by providing equipment including computers, an LCD projector, a scanner, GPS units, and digital cameras. But the most significant aspect of technical capacity building has been the establishment of a Geographical Information System (GIS) research and teaching laboratory within the Faculty of Environment and Resource Development (FERD). Beginning in 2002, PARIMA began gradually procuring computer hardware and paying for an Egerton instructor to receive advanced training in GIS and remote-sensing techniques through a short-course in Nairobi. From a small office space housing 12 computer work stations, the GIS facility has grown to a new, fully renovated 1,800 square-foot room that can accommodate up to 50 work stations, with full-time attendants assigned to oversee the lab.

Today, the lab is used to train people on GIS and remote sensing methods, general computer literacy, and in the use of statistical analysis programs such as SPSS and SAS. The lab is also fully utilized for literature and data searches as well as manuscript preparation. It is hoped that the lab will eventually evolve into a "Regional Center of Excellence in GIS and Remote Sensing for East Africa." Since 2002 the GIS lab has spurred collaboration among five academic departments at Egerton. To date, the number of faculty or staff receiving professional training in the lab has been 25. As of December 2009, 670 post graduate and 1,910 undergraduate students have completed courses in the facility.

Participatory action research. Perhaps the most innovative change at Egerton that has been derived from the PARIMA project has been the recent emergence of participatory action research (PAR), a methodology forming the foundation for the identification of priority problems and potential solutions in rural areas. In just two years, the PARIMA PAR - combining research and outreach - has had positive impacts on the livelihoods of several agro-pastoral communities in Baringo District, and it is also beginning to affect Egerton academic curricula.

PAR, in general, differs from classical research in that partnerships for problem solving are developed among researchers, community members, and development agents. Classical research is often top-down; the issues are conceived by the researchers, information is extracted from communities, and work is published with the hope that real-world problems will be solved as a result. The reality is that connecting such research to real change on the ground is difficult, especially in situations where extension support is lacking and where there are few incentives for researchers to carry research findings all the way to result in demonstrable impact. With participatory approaches, communities and researchers jointly discover problems and may even collect and interpret data together. Funds are gathered to help communities solve the problems in an iterative process. Ultimately, research can then tell the overall success story. The transaction costs of participatory action research can be high (Coppock et al., 2009), but researchers gain by knowing that their efforts have indeed led to tangible impacts in addition to the publications and conferring of academic degrees.

The PARIMA project first pioneered the use of PAR among the semi-settled pastoralists of southern Ethiopia. The approach is founded on the value of collective action for helping remedy some of the problems of the rural poor. The value of collective action in a rangeland setting was first discovered by PARIMA among women's groups in northern Kenya back in 2000. Cross-border tours were used to diffuse the ideas to Ethiopian women, and this ignited a wave of change across the Borana Plateau. Impacts of this work are now well documented—the lives of thousands of Ethiopians have been improved and the project is poised to tell the whole story (Tezera et al., 2008; Coppock et al., 2009).

Key PARIMA team members who made this process work then came to Kenya in 2006 to train local communities and Egerton staff in the PAR methodology. Egerton researchers embraced the approach. Details regarding the application of PAR in Baringo, Kenya, have been previously summarized by Mutinda et al. (2007). In short, an interdisciplinary faculty team identified two groups for research representing the Tugen and Il Chamus. Local entrepreneurs were then recruited and trained, tours were conducted for Baringo entrepreneurs to observe peer successes at nearby Mwingi District, and livelihood diversification schemes in Baringo were initiated and monitored. Participants from the two groups implemented the activities (Mutinda et al., 2007). Overall, the PARIMA project contributed 21% of initial costs while the communities contributed the balance. Most of the activities only required a short period of time to observe benefits. The success of the groups has, in turn, attracted other participants and outside funding sources, including the USD 359,352.00 award associated with the previously mentioned project supported by ASARECA.

The key principles in PAR are based on re-invigorating community hope and ambition, linking producers to markets while adding value to their products, promoting financial sustainability via micro-finance interventions, expanding the numbers of participants through peer-to-peer learning, and simply building human capacity via training initiatives. Prior to implementing this new approach, these communities were fatigued and irritated by the surveys which were rampant in Baringo District. They felt that the survey approach yielded no benefits for them. With the new approach, the communities have experienced a form of physical and spiritual renewal. The Egertonians who have been involved in this process have also been "renewed." First and foremost, it is up-lifting to see practical outcomes from professional efforts.

Practical Implications

Overall, the Department of Natural Resources at Egerton University has been fundamentally changed through its partnership with the PARIMA project. The institution's capacity to conduct innovative, impact-generating research and teaching has been greatly expanded both through financial and technical support of faculty and staff, and through the provision of resources and equipment. Yet the success of the PARIMA-Egerton collaboration is in part due to PARIMA's initial impact on pastoral and agro-pastoral communities through the innovative and effective PAR methodology. PARIMA's collective action achievements in southern Ethiopia enabled and inspired the adoption of participatory action research by Egerton, and Egerton was then able to successfully replicate the methodology in Baringo. The PAR methodology can enhance academics as it leads to a new body of enquiry providing a more efficient and useful alternative to the household survey approach. Rather than just speculate about the practical implications of research, real-world outcomes provide hard proof for documentation. A continual process of human development can now be observed and studied with opportunities to monitor and redress problems as necessary. Furthermore, the approach has the potential to constitute a development model, where processes can be learned and researched effectively, as initial baseline surveys are used by the Egerton team to assess the impact of development activities considering the level of resource mobilization and

degree of livelihood diversification. In summary, this long-term relationship forged by PARIMA has been based on the exchange of knowledge, methodologies, and technology. It has inspired a new vision at Egerton that focuses more on the use of practical research to directly engage rural communities and change lives.

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About the Authors: Professor Abdillahi A. Aboud is a senior faculty member in the Department of Natural Resources at Egerton University, Njoro, Kenya. Email: aboud.egerton@gmail.com. Mr. Mark N. Mutinda is a doctoral student and lecturer in the Department of Natural Resources at Egerton University. Email: lnmutinda@yahoo.com. Stellamaris K. Muthoka is a doctoral student and lecturer in the Department of Human Nutrition and Pre-Clinical studies at Egerton University. Email: skaveni@ yahoo.com. Dr. D. Layne Coppock is an Associate Professor in the Department of Environment & Society at Utah State University, Logan, USA. Email: Layne.Coppock@usu.edu.

The GL-CRSP Pastoral Risk Management Project (PARIMA) was established in 1997 and conducts research, training, and outreach in an effort to improve welfare of pastoral and agro-pastoral people with a focus on northern Kenya and southern Ethiopia. The project is led by Dr. D. Layne Coppock, Utah State University, Utah State University, E-mail: Layne.Coppock@usu.edu.

The Global Livestock CRSP is comprised of multidisciplinary, collaborative projects focused on human nutrition, economic growth, environment and policy related to animal agriculture and linked by a global theme of risk in a changing environment. The program is active in East and West Africa, and Central Asia.

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GLOBAL LIVESTOCK CRSP

Empowering Afghan Herders to Build Peace and Improve Livelihoods

M. J. Jacobs[1], I. Naumovski[2], C. A. Schloeder[1] and R. M. Dalili[3]
[1]Texas A&M University, [2]Afghanistan PEACE project,
[3]Sanayee Development Organization
PEACE project

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The Pastoral Engagement, Adaptation, and Capacity Enhancement (PEACE) Project has been working to increase extensive livestock production in Afghanistan since 2006. The project is institutionalizing technologies with both the Range and Livestock Production Departments within the Ministry of Agriculture, Irrigation and Livestock, that will facilitate better management of Afghanistan's rangelands. Transhumant populations commonly referred to as Kuchi are the primary extensive livestock producers in Afghanistan. They comprise about 8% of Afghanistan's population, but are responsible for approximately 75% of all livestock supplied to Afghanistan's major livestock markets. Like other transhumant livestock producers, land tenure issues and insecurity are major challenges and 30 years of war has completely changed the social landscape for herders. Good rangeland management is essential but if extensive producers cannot reach important mountain rangelands in summer, management becomes less relevant. The PEACE project has been working to develop conflict resolution and peace building capacity within the Independent Department of Kuchi (a department directly under the President). In collaboration with Sanayee Development Organization, a local NGO experienced in delivering conflict resolution training, PEACE has assisted in training 138 Kuchi Provincial Directors and Kuchi leaders in 26 provinces to date. In addition to these leaders, over 300 representative leaders from the Kuchi and various villages have undergone joint training workshops that aimed to promote constructive and peaceful working relationships among communities. Working within the context of the Kuchi's organizational structure and culture, the project has employed multiple methods to empower these leaders to develop a large cohort of Kuchi leaders who understand how, and have the tools necessary, to solve their land access problems peacefully.

Background

Transhumant populations in Afghanistan are commonly referred to as Kuchi. Currently and historically, it is the Kuchi who have been the primary extensive livestock producers in Afghanistan despite representing just 8% of Afghanistan's total population. Research by the PEACE project has determined that the Kuchi are responsible for approximately 75% of all livestock reaching Afghanistan's major livestock markets (PEACE Project, 2009). The Kuchi also provide dairy products, hides and karakul products essential to Afghanistan's economy, yet their provision of wool and carpets is deemed their most significant economic contribution. The Afghan carpet industry alone is estimated at $187 million USD per year and extensive livestock production supports thousands of jobs associated with this industry. Despite their economic importance, the Kuchi, like other transhumant livestock producers, face land tenure issues and insecurity as major challenges on a daily basis. Thirty years of war have completely changed the social landscape in Afghanistan and herders now experience frequent issues in moving their animals from traditional wintering lowlands to summer mountain grazing areas, due to the conversion of large tracts of rangelands to rain-fed agriculture. The Kuchi now move their animals by truck to bypass these areas or pay exorbitant fees to travel through what were once traditional migration corridors. Villages are also expanding into what were once deemed public rangeland areas, particularly in wintering areas, challenging traditional land-use arrangements between herders and the villagers. Further complicating navigation of Afghanistan's countryside, are the presence of criminals, and ex-military commanders and warlords in certain areas, adding an additional security risk to an already complex web of land-use, land tenure, and social collapse issues encountered by the Kuchi.

The Afghan central government is still weak in the rural areas of Afghanistan, offering very little or no control over land-use disputes and rural conflict. The Kuchi, perceived as "outsiders", find even less support when they are in conflict with a villager or ex-commander. These factors all contribute to a decline in livestock production and extensive environmental degradation in a large number of areas throughout the country. Programs aimed at improving management of Afghanistan's rangelands and extensive livestock production are also seriously impeded when producers find they cannot reach important summer grazing areas.

The Pastoral Engagement, Adaptation, and Capacity

Enhancement (PEACE) project has been working to increase extensive livestock production in Afghanistan since 2006. PEACE is institutionalizing technologies with both the Range and Livestock Production Departments within the Ministry of Agriculture, Irrigation and Livestock (MAIL), that will facilitate management of Afghanistan's rangelands. Through the transfer of these technologies, PEACE is incorporating the GL-CRSP Livestock Early Warning System and Livestock Information Network and Knowledge System (LEWS/LINKS), active in East Africa and Mongolia, into MAIL's country-wide surveillance and monitoring program to assist with proactive management of Afghanistan's rangeland issues. The LEWS/LINKS technologies are also intended for use as rangeland management tools designed to assist in production and management decisions at the herder level. However, their benefits are limited if the Kuchi are unable to reach summer grazing areas. To address this issue, the PEACE project has been working to develop conflict resolution and peace building capacity within the Independent Department of Kuchi, a department directly under the President.

Conflict resolution has always been a component in the PEACE project but it became more important given how critical the land access situation was in Afghanistan. The PEACE project's approach to conflict resolution is very simple: 1) understand how the Kuchi, as a culture, organize themselves; 2) understand their traditional means of solving problems; and 3) begin to deliver training in ways that incorporate lessons learned from the first two approaches and that facilitates peaceful resolution of conflicts at the community level.

Major Findings

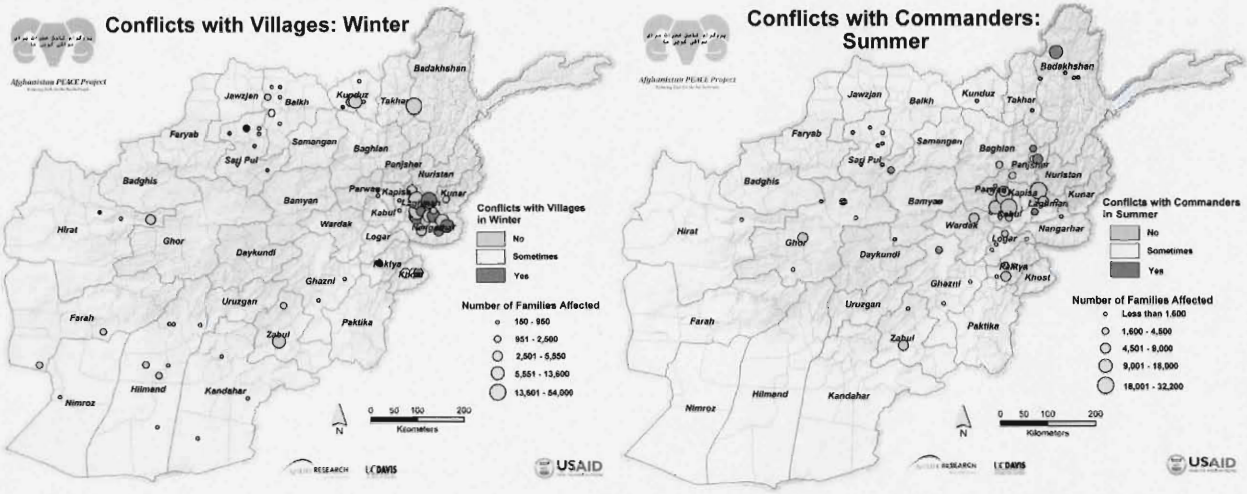
The Kuchi are organized into clans with a clear leadership structure. In 2006, the Independent Department of Kuchi (IDK) was established. It operates as a governmental quasi-ministry and a representative body of the Kuchi. The IDK is responsible for addressing all social, economic, and political issues affecting the Kuchi across Afghanistan. This newly formed department has little capacity or capital to really help the Kuchi, particularly the herder majority. The Department has 30 provincial directors and PEACE has identified several interested in improving extensive livestock production and gaining conflict resolution skills. In Afghanistan, *shuras* are the "assemblies of leaders" that Kuchi and other groups use to solve problems and settle disputes. *Shuras* are comprised of the most powerful and respected leaders in a province or district. The *shuras* and traditional decision-making assemblies are estimated to account for more than 80% of conflict-based cases settled throughout Afghanistan (UNDP/Human Development Index 2007). After understanding the nature of the traditional Kuchi problem-solving context, PEACE began providing training to 26 Kuchi Provincial Directors. To provide training in local languages, PEACE partnered with the Sanayee Development Organization (SDO), an Afghan NGO experienced in delivering conflict resolution training both Dari and Pashto.

In June 2008, the PEACE project also began facilitating monthly Kuchi *shuras* in 10 Provinces. Because the Provincial Directors had no budget to hold these meetings, PEACE project support enabled the peace and negotiation messages to reach more Kuchi leaders. In addition, by supporting these meetings, PEACE was able to collect information about the Kuchi on a wide range of topics by clan and by season. The PEACE project is now supporting *shuras* in 13 provinces in collaboration with the IDK.

The next step in the peace-building and conflict resolution process was to increase the capacity of the Kuchi, at the Provincial level, to resolve conflicts independently. Provincial Directors that demonstrated a commitment to peaceful resolution of conflicts during the *shuras* were asked to select leaders from their provinces for this program. Nine leaders from three provinces participated in one-month long training programs emphasizing conflict resolution strategies and negotiation methods. Since this training, the nine leaders have participated in numerous mediation and conflict resolution exercises, and have worked to develop multi-ethnic Peace *Shuras*. The PEACE project is actively monitoring the impact of this training effort through continual feedback. In addition, the same nine Kuchi leaders recently held their own conflict resolution workshops passing on some of the conflict resolution skills that they had been taught during the month-long training course to 51 additional Kuchi leaders.

As the word spread about the trainings provided by the project, PEACE began to receive requests for similar trainings, including one directly from President Karzai's office through his Advisor on Tribal Affairs, Wahidullah Sabawoon. He requested that the project develop trainings aimed at resolving long-standing land disputes between the Kuchi and Hazara communities. Since 2008, the PEACE project has brought together over 300 Kuchi and non-Kuchi leaders from five regions to engage in joint conflict resolution workshops. Ten Peace Ambassadors (PAs) (i.e., 5 Kuchi and 5 Hazara) were selected to work at the community level to seek common ground and to resolve the Kuchi / Hazara conflicts over access to rangelands in the Hazarijat region (i.e., Besud). The PEACE project PAs are still engaged in this exercise with reports suggesting that a positive resolution is possible at the community level for many of the conflicts (Jacob et al., 2009).

The effectiveness of PEACE project accomplishments to date are directly related to its partnership with SDO. SDO's ability to deliver peace-building messages within



Traditional annual migration routes bring the Kuchi into contact with rural villages and villagers, often resulting in competition for grazing lands. The PEACE project has been facilitating and providing support for monthly shuras in 13 provinces. The shuras serve to open up dialogue and mitigate conflict. In addition, the PEACE project collects season-specific survey data at the shuras and visually presents the data using maps. The maps provide information by season on conflicts with villages, commanders, and other Kuchi as well as resource availability for water and veterinary services. Maps courtesy of the PEACE project. Additional maps can be found at www.afghanpeace.org.

the context and culture of the Afghan people was a critical component in training the Kuchi and other participants. By organizing these peace-building programs at the community level, SDO was also able to strengthen the capacity of community institutions of key district government offices, while promoting and encouraging the building of positive relationships among the actors. Moreover, because SDO focuses their own programs at the same levels (village and district for the community-based peace building program) both PEACE and SDO have mutually benefited from a partnership enabling efficient use of a research institution with NGO field-based strengths.

Practical Implications

PEACE conflict resolution workshops demonstrate that training and providing support to a few leaders has a multiplier effect as these leaders go on to train others in their own communities. Both at the community and governmental level, the interest in peaceful conflict resolution has been demonstrated and more widespread conflict resolution training is both possible and welcomed. The PEACE project's investment in training and on-going support for *shuras* has proven to be an effective way to open up dialogue and encourage sustainable peace.

Livestock production, especially in extensive systems, is often complex and multi-faceted, and dependent on many components. To address improvements in livestock production in Afghanistan, the PEACE project is focusing primarily on information management through early warning and market information systems, conflict resolution, and capacity building. With a firm foundation now established in these areas, PEACE has begun the search for funding for a second phase and an additional four years of project activity. *Phase 2* of the PEACE project is intended be more comprehensive, and will include intervention and development activities related to the risk management, economic diversification, and livelihood enhancement needs of the Kuchi.

PEACE recognizes, however, that there can be "no development without peace, and no peace without development." All proposed activities targeting livestock production therefore, will continue to be enhanced and enabled through critical peace-building and conflict resolution workshops in partnership with SDO. Working within the context of the Kuchi's current organizational structure and culture, PEACE and SDO have integrated existing and new methods to empower Kuchi leaders, attempting to build a large cohort who understand how and why it is best to solve problems peacefully and constructively. This comprehensive approach will allow PEACE to improve the social, economic and political environment in Afghanistan for the people, and through the people.

While village and Kuchi elders are in agreement that peaceful resolution is possible, greater emphasis should be placed on educating and influencing younger members of these groups to encourage appreciation for the benefits of peace and to give them the tools to mitigate conflicts. Further research is needed on how best to engage these younger members of Afghan society. The PEACE project's model for conflict resolution has the capacity to be scaled-up to other areas experiencing violent conflict and should be expanded in order to better evaluate the model's potential for replication.

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About the Authors. Michael J. Jacobs is a Rangeland Ecologist and Chief of Party for the Afghanistan PEACE project through Texas A&M University. Email: mjacobs@cnrit.tamu.edu. Igor Naumovski is a Conflict Resolution specialist and worked with Kuchi and Hazara leaders for the Afghanistan PEACE project. Email: inaumovski.af@gmail.com. Catherine Schloeder is an Ecologist working for the Afghanistan PEACE project though Texas A&M University. Email: cschloeder@cnrit.tamu.edu. Raz Mohammad Dalili is the Executive Director of Sanayee Development Organization, an NGO devoted to Peace Building and Education in Afghanistan. Email: dalili_kabul@hotmail.com. Web: http://www.afghanpeace.org.

The Afghanistan PEACE project's goal is to reduce the social and economic risks associated with extensive livestock production through better rangeland management information and peaceful resolution of land access issues. The PEACE project was established in 2006 and is led by Dr. Montague Demment, University of California, Davis, email: mwdemment@ucdavis.edu and Dr. Michael Jacobs, email: mjacobs@cnrit.tamu.edu.

The Global Livestock CRSP is comprised of multidisciplinary, collaborative projects focused on human nutrition, economic growth, environment and policy related to animal agriculture and linked by a global theme of risk in a changing environment. The program is active in East and West Africa, Central Asia and Latin America.

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GLOBAL LIVESTOCK CRSP

Peace Ambassadors: An Innovative Approach to Community-level Conflict Resolution in Afghanistan

M. J. Jacobs[1], I. Naumovski[2], C. A. Schloeder[1] and R. M. Dalili[3]
[1]Texas A&M University, [2]Afghanistan PEACE Project,
[3]Sanayee Development Organization
PEACE project

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The Kuchi, a transhumant pastoralist population, account for approximately 75% of Afghan livestock production. But this productivity is critically diminished due to conflicts over grazing land access and migration. Several conflicts between the pastoral Kuchi herders and village communities dominated by an ethnic group known as the Hazara have ended in violence and fatalities in recent years. In an effort to reduce the social and economic risks associated with land access issues, the PEACE project, in collaboration with Sanayee Development Organization and the Afghan Government, has instituted joint training workshops involving the Kuchi and various village communities. Community elders and scholars of the Kuchi and Hazara communities were trained separately on conflict resolution and peace-building strategies, before coming together to discuss disputes and seek possible solutions. In one area where land access conflicts have been particularly violent, the joint workshop culminated with the selection of five Kuchi and five Hazara leaders to act as "Peace Ambassadors," (PAs) to their respective communities. The combined efforts of the PAs from this particular workshop have resulted in over 250 community meetings across Wardak and Ghazni Provinces, where PAs share conflict management training, and provide a forum for the discussion and mediation of disputes. PAs have found an overwhelming readiness among villagers and herders to work together to find peaceful resolutions to conflict and have reached over 300 community leaders to date. Community members have indicated that the accomplishments of the PAs in four short months have exceeded the conflict resolution efforts by the government over the past three years. Preliminary evidence demonstrates that PEACE project PAs are a simple and direct solution to seemingly protracted and difficult issues including land access, and may be a potentially successful model for other areas experiencing violent conflicts, including additional areas within Afghanistan.

Background

In 2006, the Afghanistan Pastoral Engagement, Adaptation, and Capacity Enhancement (PEACE) project initiated activities to reduce both the social and economic risks associated with extensive livestock production through better rangeland management information. The primary extensive livestock producers in Afghanistan are the Kuchi, transhumant herders who are frequently subjected to land access conflicts along migration corridors. Land tenure issues and insecurity are major risks faced by the Kuchi. Thirty years of war have changed the social landscape of Afghanistan, and herders experience frequent issues moving their animals from traditional wintering lowlands to summer mountain grazing areas, recently due to the conversion of large tracts of rangelands to rain-fed agriculture.

Some of these areas have been sites for armed conflict and violence between the Kuchi and village communities, which are dominated by the Hazara. In 2007, PEACE began a series of widely attended conflict mitigation workshops for Kuchi leaders in an effort to reduce the social and economic risks posed by land access issues. Following these workshops and at the request of the Afghan government in 2008, PEACE expanded the Kuchi conflict resolution program to include Hazara village leaders in areas where violence arising from land access issues presents significant risks to the Kuchi. With Global Livestock CRSP support, these activities culminated in a multi-ethnic workshop attended by both Kuchi and Hazara leaders for Wardak and Ghazni Provinces, where fighting between Kuchi and Hazara villagers is especially intense and often fatal.

In collaboration with the local peace-building Non-Government Organization Sanayee Development Organization (SDO) and with the assistance of the Tribal Affairs Office to President Karzai, PEACE initiated a series of separated and joint eight-day workshops attended by 30 Kuchi and 30 Hazara leaders to produce constructive dialogue as a first step towards cooperative conflict resolution. Workshops began with participants separated into two groups by ethnicity, where they were provided with basic problem-solving and negotiation skills. The second phase, joint workshops, brought the two groups together to focus on developing a sense of trust, as Kuchi and Hazara leaders discussed issues and initiated inter-group communication. Participants were then asked to self-select 10 representatives who

would continue discussions of peace building and conflict resolution throughout their respective communities. These nominated representatives were entitled "Peace Ambassadors" a term developed by the Advisor on Tribal Affairs to the President. As a result, five Kuchi and five Hazara Peace Ambassadors (PAs) were appointed to continue the conflict resolution dialogue in community meetings across Wardak and Ghazni Provinces.

Major Findings

The most significant outcome of the conflict resolution workshops was the mutual qualitative conflict assessments disclosed by the Kuchi and Hazara, in which leaders from both groups identified several critical points of agreement. Both Kuchi and Hazara leaders described a substantial governmental role in creating problems of land tenure and use of public rangelands. Participants advocated for the Office of Tribal Affairs to the President to become more active in seeking solutions to these problems, and agreed that given 30 years of war, resolution of issues related to land access could not be achieved quickly. Both groups shared the sentiment that political leaders do not allow them to settle land access issues at the community level, instead reporting that Kuchi and Hazara government leaders have perpetuated conflicts to further political agendas. Regarding their own history of conflict, participants widely agreed that fighting has not helped to solve conflicts, and should therefore be discouraged. Despite progress made during the workshops, neither the Kuchi nor Hazara could agree on a definitive solution to their disputes. However, the selection of Peace Ambassadors was a welcomed initial step, as the PAs vowed to transport the dialogue and skills obtained during the workshops to other communities.

Over a period of four months, these PAs returned to their communities to educate community members on workshop conflict resolution and negotiation techniques and to learn about other community-level conflicts within their ethnic group, striving to mediate and achieve solutions. In total, the 10 PAs organized and participated in over 250 community meetings, with as many as 60 participants per meeting.

Following these community meetings, Kuchi PAs reported that most community members wanted to live together peacefully with the Hazara. Kuchi elders insisted that peace was possible because Kuchi and Hazara had lived together peacefully in the past. Kuchi PAs reported that younger generations, however, have been greatly influenced by political leaders advocating for armed conflict over land. Hazara PAs reported that community members recognized the presence of foreigners to help Afghanistan stabilize, and did not want to waste an important opportunity to achieve peace, advocating for immediate pursuit of resolution agreements. Hazara communities expressed concern that if conflicts could not be resolved mutually with the Kuchi, a third party could intervene, causing both groups to lose access to disputed lands. In general, Hazara community members found the meetings informative, and commented that the PAs had accomplished more in four months than the government had accomplished in the last three years.

According to accounts from each of the 10 PAs, contact with the communities was overwhelmingly positive. Unanimously, the PAs reported that members of both the Kuchi and Hazara were happy to learn of attempts to address the conflict issues existing between the groups. While some PAs did report negative sentiments regarding compromises, the PAs agreed that the majority of

Following the success of conflict resolution training of the Kuchi, the PEACE project initiated a multi-ethnic joint training workshop with 30 Kuchi and 30 Hazara. At the conclusion of the workshop, 10 Peace Ambassadors were selected by the participants to educate community members on the conflict resolution and negotiation skills. The Peace Ambassadors have organized over 250 community meetings during the first four months of the program. Photo by Michael Jacobs.

The joint workshops were the first step in bringing together the Kuchi and Hazara. The joint sessions revealed critical points of agreement as well as disputes. Elders pointed out that the two groups had lived peacefully in the past. During one session, a Kuchi and Hazara participant spoke of how their grandfathers had been very close friends and how sad it was that they were not friends like their grandfathers. The time at the workshop did not erase all the mistrust and conflicts of the past, but the Peace Ambassador program provides the opportunity to continue dialogue and strive for resolution. Photo by Michael Jacobs.

community members simply wanted to work towards joint resolution. Following the community meetings, Kuchi and Hazara PAs consented that the resolution of land conflict issues on a case-by-case basis would be the most constructive path forward, with joint conflict resolution commencing through the resolution of less contentious issues for immediate impact and experience. Resolution of greater disputes could naturally follow thereafter. In terms of sustaining the peace process and progress made through the workshops, PAs discussed establishing a neutral provincial-level office where Kuchi and Hazara leaders could mediate land conflict issues, potentially within the Ministry of Agriculture Irrigation and Livestock (MAIL).

Practical Implications

To date, PEACE conflict resolution efforts focused on community workshops and the Peace Ambassadors have reached hundreds of community leaders, enhancing the Kuchi and Hazara's capacity to resolve a broad variety of conflicts in a way that encourages sustained peace. However, the reported claim by both the Kuchi and Hazara that the Afghan government is either not helpful or directly detrimental to the peaceful settling of disputes is a significant barrier to sustaining the peace process beyond the community level. The negligent role of government in this process may be partly due to a lack of incentives for government officials to actively seek conflict resolution as opposed to using conflict for the advancement of a political agenda. To respond to this policy level obstacle, the Kuchi and Hazara must be encouraged to jointly and formally address the Office of Tribal Affairs to the President with concerns about government policies for land-use conflict resolution, while the Office of Tribal Affairs should be encouraged to create neutral offices where disputes can be heard and resolved peacefully.

The most important outcome of the conflict workshops is the nomination and training of Peace Ambassadors in achieving relatively rapid impact in the peace process. Peace Ambassadors have proven to be a simple and direct solution to seemingly protracted and difficult issues at the community level, with the interest demonstrated by members of both Kuchi and Hazara in peaceful conflict resolution suggesting that more widespread training is both possible and welcomed. Given the importance and success of the PA model, it is recommended that other willing PAs should be identified and trained to conduct conflict resolution workshops and to scale-up the program. Training of the trainer programs have been widely successful in rapidly expanding the capacity needed to address technical and social issues, and are well suited for community-level applications (Bunn, et al., Forthcoming).

It is evident, however, that further research addressing conflict between the Kuchi and other groups is needed. While village and Kuchi elders appear to be in agreement that peaceful resolution is possible, greater emphasis should be placed on educating and influencing younger members of these groups. PAs offer an excellent opportunity to reach this demographic, and it is possible that the community Peace Ambassador model could be successfully modified to include a younger set of PAs working directly with young people. In conclusion, support of monthly *shuras* and the PEACE Peace Ambassador as a viable community conflict mitigation tool should be expanded. The resulting achievements will further the goal of increasing confidence of Afghans in their government.

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About the Authors. Michael J. Jacobs is a Rangeland Ecologist and Chief of Party for the Afghanistan PEACE Project through Texas A&M University. Email: mjacobs@cnrit.tamu.edu. Igor Naumovski is a Conflict Resolution specialist and worked with Kuchi and Hazara leaders for the Afghanistan PEACE Project. Email: inaumovski.af@gmail.com. Catherine Schloeder is an Ecologist working for the Afghanistan PEACE Project though Texas A&M University. Email: cschloeder@cnrit.tamu.edu. Raz Mohammad Dalili is the Executive Director of Sanayee Development Organization, an NGO devoted to Peace Building and Education in Afghanistan. Email: dalili_kabul@hotmail.com. Web: http://www.afghanpeace.org.

The Afghanistan PEACE Project's goal is to reduce the social and economic risks associated with extensive livestock production through better rangeland management information and peaceful resolution of land access issues. The PEACE Project was established in 2006 and is led by Dr. Montague Demment, University of California, Davis, email: mwdemment@ucdavis.edu and Dr. Michael Jacobs, email: mjacobs@cnrit.tamu.edu.

The Global Livestock CRSP is comprised of multidisciplinary, collaborative projects focused on human nutrition, economic growth, environment and policy related to animal agriculture and linked by a global theme of risk in a changing environment. The program is active in East and West Africa, Central Asia and Latin America.

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GLOBAL LIVESTOCK CRSP

Cashmere Marketing: A New Income Source for Central Asian Livestock Farmers

Carol Kerven, Serik Aryngaziev, Nurlan Malmakov,
Hilary Redden, Aidos Smailov
WOOL Project

Research Brief 05-01-WOOL April 2005

Native goats of Kazakstan, Kyrgyzstan and Tajikistan produce good quality cashmere that is recently being bought by international processors. Central Asian producers are not equipped to take full advantage of these new marketing opportunities. Lacking prior experience, Central Asian producers are unable to distinguish good from poor cashmere. International markets reward quality with higher prices. Producers and local traders lack global market information on demand and prices. Producers also lack skills in harvesting and sorting cashmere according to international quality standards, and sell individually to traders rather than pooling to gain higher prices. Consequently Central Asian producers receive much lower prices than Mongolians and Chinese. Strong international demand continues for cashmere. Central Asian countries could learn from Mongolia's experience, where herders now gain their main income from cashmere sales. Enabling Central Asian farmers to realize the full value of their cashmere output requires development of missing elements in the marketing chain:

- *Improved goat breeds and farmers' breeding selection*
- *Updating national researchers and extension agents on international cashmere standards and assessment methods*
- *Develop farmers' capacity to harvest cashmere and assess according to quality*
- *Increase market information flow and improve connections to international markets*
- *Support farmer marketing cooperatives*

Background

Some indigenous goats of the Central Asian republics produce good quality cashmere (Millar 1986). During the Soviet period in Central Asia, animal breeders crossed native goats with Russian and Angora breeds to raise the output of fiber per animal (Dmitriev and Ernst 1989). The resulting crossbreeds were widely introduced onto state farms. However, the fiber from these crossbred goats is not true cashmere and has a much lower price on world markets. In many regions of Central Asia, the genetic impact of introduced exotic breeds remains.

Raw cashmere requires particular processing techniques by industrial processors who have tight specifications for quality based on a number of parameters. The most important are: mean fiber diameter (fineness), the diameter distribution of fibers in the fleece, degree of crimp and lustre. The finest quality cashmere in demand by international processors has a mean fiber diameter of less than 16.5 microns and length of 28-42 mm post-dehairing (a technical process to remove coarse outer hair from the cashmere down). Average quality cashmere of up to 19 micron is acceptable by some processors, but they will pay up to 3.5 times higher prices for the best quality.

Major Findings

Starting in 2000, a research investigation has revealed that some indigenous goats in Kazakstan and Tajikistan are still retained by shepherds in remote locations, and these goats produce good quality cashmere, tested by international standards.

Goats from one of the GL-CRSP study areas in Kazakstan have a mean fibre diameter of 15.2 micron, ranging from 14 to 16 micron and good characteristics for processing. Likewise, goats in parts of Tajikistan have cashmere with average mean fiber diameters between 14-15.3 micron and other positive characteristics for processing.

Marketing of cashmere in Central Asia is a new business starting only about five years ago. Buyers from China, Mongolia, Iran and Europe have been purchasing cashmere from Central Asian producers through local traders. Farmers as well as national development workers, livestock specialists and officials do not know what cashmere is or how valuable it is when marketed properly.

Prices offered by traders are quite low in comparison to the neighboring producer countries of Mongolia and

China. In 2004, Mongolian farmers received on average $22/kg for raw combed and sorted cashmere while in 2003 the price rose as high as $48/kg by the end of the season. Chinese farmers got on average $31/kg in 2004.

Until a year ago, producers in the highlands of Tajikistan had been bartering cashmere goatskins for bars of soap. In 2004, Chinese traders started to pay Tajik goat farmers up to $2.50/kg for combed cashmere while farmers in southern Kyrgyzstan received up to $7/kg. In southern Kazakstan, traders searching for combed cashmere offered farmers between $11-$19/kg, but few farmers are able to supply this. Combing the fine down out of the rough outer coats is now a virtually unknown practice in many areas of Central Asia. One or two generations ago, women used to comb down from their goats to spin and knit into garments for the family.

Farmers now generally sell the whole sheared fleece, including rough outer hair with cashmere down. In southern Kazakstan they received from $2-3/kg and in southern Kyrgyzstan $1-2/kg for fleeces in 2004, as traders and processors then have to manually sort and extract the cashmere. Local village traders do not know the difference between good and bad quality goat fibre. They just try to buy everything regardless of quality and sell to bigger traders who make more profit by sorting the cashmere before selling to industrial processors. One medium-size trader with experience of the Mongolian cashmere industry remarked about Kazak farmers: "If only they knew how much money we make by sorting their fiber." A farmer who recently emigrated from China to a desert village in Kazakstan commented, "In China, this goat down is very expensive but here in Kazakstan people don't know about down so they shear, mix together and sell everything at a low price."

Mongolian goat owners have been trained how to comb and sort their cashmere, and receive information on weekly regional market prices by radio and newsletter, through a USAID-sponsored ACDI/VOCA programme. That is why they can get much higher prices than Central Asian farmers, though the quality of Mongolian cashmere is not better than the best cashmere in Central Asian countries.

The main reasons why Central Asian farmers receive low prices:

- They are unaware of changing world prices for cashmere and therefore in an extremely weak bargaining position when selling to traders.
- Producers do not bulk up their cashmere to sell collectively, but instead sell individually to itinerant traders.
- Most producers shear their goats and sell the whole fleece to traders. The resulting cashmere fibre length is often too short to be classified as high quality.
- Neither producers nor local traders have the skills to sort raw cashmere into quality classes; the final buyers therefore are not prepared to pay premium prices

Goats Assist in Poverty Alleviation

Central Asian goats reproduce faster than sheep, often producing twins and kidding twice a year. They also cost less to feed over winter than fine wool sheep. Poorer farmers in remote mountainous and desert regions tend to have more goats than sheep. This was also found by earlier Small Ruminant CRSP research in Brazil and Peru. In Kazakstan, goat populations have been rising over the past ten years since independence, from 700,000 in 1992 to 1.4 million in 2003. Goats are preferred by poorer farmers trying to restock since the reduction of sheep numbers from 34 million in 1992 to 10 million in 2003. Similar trends are noted in the poorest dry mountain regions of Kyrgyzstan and Tajikistan.

Incomes of small-scale livestock farmers can be substantially increased by annually harvesting high value cashmere. This is especially applicable in the upland and desert regions where alternative income sources are extremely scarce. Local goat breeds thrive in the semi-arid low shrub ecology that dominates Kazakstan's rangelands. If in 2004 Kazak farmers in the semi-arid regions could have sold combed raw cashmere for $19/kg, this is a sharp contrast with the price of $0.20/kg for coarse sheep wool produced by the local breeds kept in the same regions.

Based on 2004 prices and the respective amounts of cashmere and wool produced, one Kazak goat could have yielded an income of approximately $4.75, while income from a coarse-wooled sheep would be $0.50. A farmer in the semi-arid rangelands would need 90 sheep to gain the same annual income as from ten cashmere goats. In the wetter regions of Kazakstan and Kyrgyzstan, fine wool sheep can be kept and their wool has recently been selling at over $1.00/kg, yielding more than $3 per head of sheep. These more grassy regions are less ecologically suited for goats, and farmers are better off concentrating on fine wool sheep.

Demand for Cashmere

Demand for the best quality cashmere normally exceeds supply. Over the longer term, cashmere prices are volatile, depending on fashion, weather and production trends. China is the world's main source of cashmere, and the main buyer of Central Asian cashmere. Recent Chinese government policies have restricted the populations of goats and removed tax rebates on exporting cashmere. The result has been a rise in the price of non-Chinese cashmere in two other major producing countries, Mongolia and Iran, as well as in Central Asia. China's demand for cashmere is

expected by the World Bank to rise, following entry into the World Trade Organization (WTO) which increases access to developed country markets.

Mongolia's Cashmere Development Example

Mongolia provides a model for how improved cashmere production and marketing can increase incomes for livestock-keepers. The World Bank has concluded that cashmere is "a principal source of livelihood for Mongolia's poor" and that "the best way of improving the livelihoods... and reducing poverty will be by increasing the price margin obtained by herders compared to international prices" (World Bank 2003, i and iv).

The former Soviet states of Kazakstan, Kyrgyzstan and Tajikistan have much in common with Mongolia: extensive rangelands, pastoral populations, indigenous cashmere goats and a shared experience of transition from a central to market economy.

Since market liberalization in Mongolia during the early 1990s, cashmere sales have become herders' main income from livestock. In 2002, sales of raw cashmere by all livestock-owning households averaged $303 per year or about $8 per goat given a mean household ownership of 37 goats. For the poorest herders (70%) with less than 100 livestock, income from cashmere sales provided 20% ($125) of total income with their main sources of income being pensions. For the one third of all livestock owners who have between 100-500 total livestock, 47% of their total income was derived from cashmere sales, yielding $575 per household in 2002.

Foreign direct investment and donor support, particularly from USAID[1], has also boosted the Mongolian cashmere industry. The sector has contributed 6.5% of GDP over the past decade and is now the third main export earner after minerals, earning from 9-17% of export earnings per year. USAID and GTZ in Mongolia have supported herder cooperative marketing and training schemes, market information bulletins and local market auctions where cashmere producers and processors can learn about each other's needs and constraints.

Practical Implications

Production and marketing of cashmere in Kazakstan, Kyrgyzstan and Tajikistan is at an early stage at which development lessons can be learned from Mongolia's cashmere industry. Quality of cashmere production is the key to profitable and sustainable sales to world markets for this luxury good. The local research and extension base in Kazakstan, Kyrgyzstan and Tajikistan will need targeted capacity-building to include:

- Breeding improved bucks for sale to farmers
- Technical training on objective laboratory assessment of cashmere to international standards
- Methods of providing extension advice

To be able to take full advantage of the new market opportunities, farmers need:

- To purchase good quality goat bucks.
- To obtain extension advice on breeding selection and management, to improve and stabilize their output based on quality differentials of cashmere.
- To be informed on how and when to harvest the cashmere.
- To be trained on simple subjective methods for manual and visual assessment of quality differences, without access to high technology and expensive testing centers.
- Improved access to market information to be able to respond to signals on world production trends and quality requirements by processors.
- To be supported in creating marketing pools, as bigger traders will pay more per kg for cashmere that is sorted into different qualities and bulked up into larger amounts.

Footnotes

[1]The Competitiveness Initiative (TCI) is a 3-year project funded by USAID in Mongolia to improve the supply of raw materials by providing detailed industry information to herders, with a focus on the quality requirements of cashmere companies, http://www.tcimongolia.org. ACDI/VOCA's *Cashmere Breed Improvement Project*, also funded by USAID, was designed to improve the growth, size and fiber quality of Mongolian cashmere goats. It helped create a national cashmere breed registration system, establish high quality private breeding farms, and train herders in culling, selection, record keeping and cashmere goat marketing. Mercy Corps International (MCI) is also working to improve cashmere goat quality in Mongolia.

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About the Authors: Carol Kerven is a Research Associate at Macaulay Institute, Aberdeen, UK. She is a socio-economic anthropologist specialising in pastoralism, and has worked with several GL CRSP projects in Central Asia since 1997. She can be contacted through her email address, Kerven_Behnke@compuserve.com.

Serik Aryngaziev is Deputy Director and Nurlan Malmakov is the Head of Reproduction Laboratory at the Mynbaevo Sheep Breeding Institute, Kazakstan Scientific Centre for Livestock and Veterinary Research, Almaty, Kazakstan

Hilary Redden is Head of the Animal Fibre Evaluation Laboratory at Macaulay Institute, Aberdeen UK.

Aidos Smailov is a Research Assistant working with Department of Pasture and Fodder, Kazakstan Scientific Centre for Livestock and Veterinary Research, Almaty, Kazakstan.

The GL-CRSP Capacity Building for Sheep and Fiber Marketing Project (WOOL) was established in 2003 and was developed from research conducted through the GL-CRSP small grants program. The project is gathering information on wool and cashmere marketing chains from producers to international processors in Kazakstan, Kyrgyzstan and Tajikistan. Researchers are providing training to farmers, distributing market information to traders and farmers, and assessing the quality of wool and cashmere. The project is led by Dr. Robert Stobart, University of Wyoming. He can be contacted at bstobart@uwyo.edu.

The Global Livestock CRSP is comprised of multidisciplinary, collaborative projects focused on human nutrition, economic growth, environment and policy related to animal agriculture and linked by a global theme of risk in a changing environment. The program is active in East Africa, Central Asia and Latin America.

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Design by Susan L. Johnson

GLOBAL LIVESTOCK CRSP

Cashmere in Kazakhstan: A Marketing Update

Carol Kerven, Berik Aryngaziev,
Hilary Redden, Aidos Smailov
WOOL Project

Research Brief 06-01-WOOL August 2006

Marketing of cashmere – the fine downy undercoat produced by goats in climates with cold winters – has progressed rapidly in Kazakhstan since 2004 (see Kerven et al. 2005). In the semi-arid southwest rangelands, local goats yield quality cashmere comparable to the world standard of Chinese and Mongolian. But the quality of cashmere varies across the country. The high quality of cashmere available is a strong basis on which to expand processing and improve producer prices. European buyers have already expressed interest in purchasing this premium material.

The increase in cashmere prices from 2004 to 2005 suggests that the income from cashmere sales will have been proportionally greater for poorer households that have more goats than sheep in this region. Improvement of cashmere marketing is a development instrument:

- *Driven by commercial interests for profit, and requires a minimum of government inputs*
- *Targeted at the poorest people in the most geographically-marginal regions*
- *Diversifies income sources for people with few alternative income streams apart from livestock*
- *Adds value in processing, benefiting the wider economy*

Background

Livestock owners from southwest Kazakhstan have recently received higher prices for their cashmere from traders, who are paying more for superior quality. The first cashmere processing factory in the country started in 2005. International organisations are seeking ways to support cashmere development as a niche commodity. Cashmere sales bring much-needed income to the poorest rural households - with few animals, no cropland or employment options. The structure of livestock ownership and sales in these dryland areas indicates that goat ownership, and the income from their cashmere, is particularly significant for the poorest households as defined by livestock wealth.

In the international cashmere industry, fiber diameter of less than 16.5 micron is considered best and is in demand, with very fine cashmere attracting higher prices. Livestock owners in Mongolia in 2005 sold raw cashmere of less than 15.5 micron diameter for $33 per kg compared to $21 per kg for cashmere between 17.6 and 19 micron (Lecraw 2005). Upscale European fashion houses seek alternative sources of quality material in short supply worldwide.

Major Findings

Quality of cashmere from southwest Kazakhstan. Cashmere has been sampled from goats in four different regions of Kazakhstan. Goats (72) sampled in 2005 in the southwest districts of Zhane Kurgan and Shieli in Kyzl Orda Oblast (province) produced high quality cashmere with a mean fiber diameter of 15.4 micron (The Fibre Lab, Aberdeen, 2005).

Ten samples from neighbouring south Kazakhstan Oblast were coarser with a mean fiber diameter of 16.8 micron and 40% were classified as greater than 16.5 micron diameter, with lower international prices (ST Group Laboratory 2006 and The Fibre Lab 2006). Twenty goats from two regions in the southeast (Almaty Oblast) had mean fiber diameters of 16.8 micron and 18.2 micron; the latter would attract much lower prices – about 30% of the price for cashmere under 16 micron. Samples from the southern Oblast of Jambul and from northwest Kostanai Oblast were of inferior quality, below the international standard.

In 2004, Kazakh cashmere exporters reported that a constraint was the absence of technical equipment and skills in Kazakhstan for assessing cashmere quality and thus setting price brackets. However, a new animal fiber analysis laboratory, with staff trained in analyzing cashmere, began operating in 2005 in Almaty at ST Group, a Kazakh wool and animal fiber company.

The first Kazakh cashmere processing factory started scouring (washing) and dehairing[1] raw cashmere in 2005, in Chimkeynt city, south Kazakhstan. The factory

processed material from southwest Kazakhstan and from surrounding countries of Iran, Afghanistan, Uzbekistan and Kyrgyzstan. According to the factory owner, buyers in China prefer cashmere from southwestern Kazakhstan provinces of Aral and Kyzl Orda as it is finer (less than 16.2 micron) compared to the other regions of Kazakhstan and neighbouring countries. After the final dehairing stage carried out in China, this Kazakh cashmere is bought by Chinese factories at $60 per kg, $10/kg more than Afghan cashmere.

Prices have risen as traders compete and pay more for better quality. In 2005, producers in southwest Kazakhstan received an increase of up to 140% over prices in 2004. Small-scale rural traders are now competing for market share of this business. They bid up prices offered to producers as the cashmere harvesting season advances, increasing prices by 20% to 80% between the beginning and end of the season. The market is relatively open, limited only by access to a mode of transport (including motorbikes) and sufficient liquidity to buy from villagers before selling onto large-scale wholesalers in the Kazakh trading city of Turkistan. The first level of traders has learned that certain types of cashmere are more highly sought after and will receive better prices from wholesalers. Prices offered to producers now vary according to the amount of contamination with vegetable matter and by the color and quantity of cashmere within the fleece. However, small-scale traders are not yet able to distinguish the fineness or other quality criteria of cashmere. They are keen to learn.

Contribution of cashmere sales to poorer livestock-owning households. A household survey was conducted in 2004 of 50 randomly-selected livestock producer households in three villages in Zhane Kurgan district, Kyzl Orda Oblast in the semi-arid rangelands (precipitation of less than 150 mm/year) set back from the irrigated rice-growing belt along the Syr Darya River. The questionnaire covered 2003-2004 with questions on income obtained from sales of live animals and livestock products.

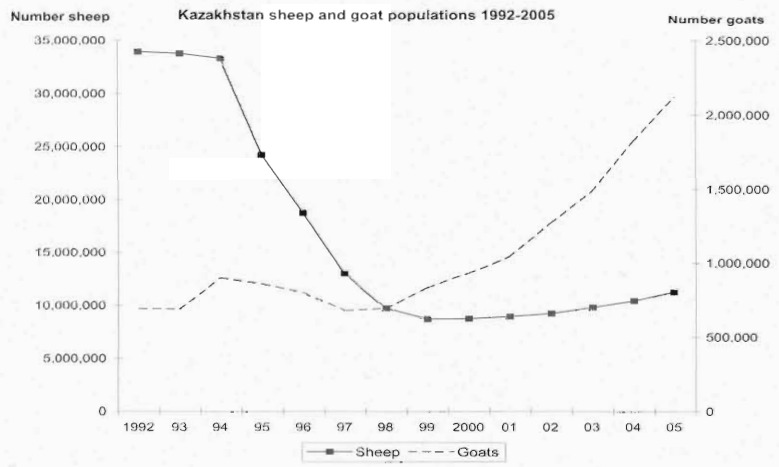
Half the survey households owned less than 40 smallstock, while one-third of these poorer households owned only goats, compared to the richer households, among whom 11% have only goats. Overall, goats made up 22% of the smallstock in the three sampled villages. The mean number of sheep owned by households was 67, with a median of 25 head and a maximum of 600 head. Mean numbers of goats owned was 27 with a median number of 20, and a maximum of 120 head. Households in these drylands cannot grow any crops. Employment is limited to a few local government positions as teachers or village administrators. Remittances and state pensions are an important source of income for the poorest households.

The poorest households with between 1-20 smallstock obtained 32% of their livestock cash income from goats, with 11% (mean $21) of cash income from selling cashmere. Seventy percent of households had medium-sized flocks with 21-100 smallstock and obtained 38% of their cash income from goats, with $63 from cashmere sales. Large flock owners with 101-500 smallstock obtained the bulk of their cash income - 60% - from selling sheep, and a mean of $49 from selling cashmere. Households with the largest flocks of more than 500 smallstock gained 74% of their income from selling sheep and $154 from cashmere sales.

Value of goats to rural economy. Goats are important to poorer rural households quite apart from cashmere income. Goat populations are increasing faster than other livestock species, as people are restocking after great losses of livestock in the mid 1990s following privatization of state farms. Current smallstock numbers in Kyzl Orda are 10% of the population in the early 1990s. Goats reproduce faster – kidding twice a year and often producing twins - than the other livestock species, and are therefore a means of building livestock holdings. Sheili district in 2005 had 60,000 goats compared to 50,000 sheep, according to the district agricultural office, with around 74,000 people. Nationally, as Figure 1 shows, the trend since 1998 has been for a much steeper rise in the numbers of goats compared to sheep.

The scale of Kazakhstan's cashmere production. Development of a new manufacturing industry must be based on the quality and quantity of the raw material. Cashmere from southwest Kazakhstan is of world

Figure 1. National trend in sheep and goat populations since 1992 (on two different scales)



Source: FAOStats http://faostat.fao.org/

Table 1. Potential value of Kazakh cashmere to the economy.

Kazakhstan 2005 prices (Kyzl Orda and South Kazakhstan)

	Output price/kg	Value added/kg
Raw/greasy	$9-23	
Scouring/dehairing *(50% yield; one kg greasy gains $5-13 after this process)*	$22-57	$7-10
Dyeing/spinning (95% yield)	$66-90	$8-16
Knitting	$80-150	$12-40
Total value added to knitted garment stage per kg		$27-66
Percent value increase over raw price of $9 or $23/kg = 17% - 633%		

standard. But private investors and development agencies also require assurance that sufficient quantity is available, before embarking on new ventures.

It may be assumed that of the country's present population of 2.2 million goats, one million produce cashmere that meets the international standard (personal communication, S. Aryngaziev, 2005). Each goat produces on average 170 gm cashmere (Mynbaevo Sheep Breeding Institute cashmere flock data). Therefore current annual cashmere production from one million goats is an estimated 170 tonnes. Much of the coarser quality from the remaining 1.2 million angora crossbred goats is also sold to China. This places Kazakhstan among the largest cashmere producers after Afghanistan and Iran, the biggest producers following China and Mongolia (UNDP 2005). Cashmere from Afghanistan and Iran is generally of lower quality than Kazakh cashmere. It can be predicted that goat numbers will continue to increase in Kazakhstan, in part due to attractive prices for their cashmere. This happened in Mongolia, where goat numbers more than doubled since 1991, in response to rising demand for cashmere.

Potential added value and contribution to the national economy. Until very recently, Kazakhstan's cashmere production was exported raw, as there were no processing facilities in Kazakhstan. In 2005, the factory in South Kazakhstan exported about 70 tonnes of Kazakh washed and partly dehaired cashmere. Exporting raw or partially processed materials represents a loss of added value, employment and export revenue from high-value finished goods. Knitted cashmere sweaters made in Mongolia sell for $70 to several hundred dollars each and are mainly exported to the USA. Cashmere processing factories in Mongolia employ several thousand skilled and unskilled workers. What might be the trajectory of developing a Kazakh cashmere industry?

Producer prices in Kazakhstan in 2005 were $9 to $23/kg. The total value of producer sales of 170 tonnes at $9,000 - $23,000 tonne would be $1.53 million to $3.91 million, accruing directly to livestock-owners mostly located in southwest Kazakhstan.

The potential added value if all the raw cashmere was scoured, dehaired, dyed and knitted in Kazakhstan would be 17% to 633%, equal to $1.79 million to $24.75 million (based on figures from Mongolia in Lecraw 2005). Investment in processing cashmere to the final stage, as is done in Mongolia, would give an annual value to Kazakhstan's national economy (to producers plus added value) of between $3.32 to $28.66 million.

Practical Implications

- In a global competitive market for cashmere, Kazakhstan has an advantage of already producing high quality material from unimproved local goats.
- Information about the quantity and quality available must be spread to domestic and international investors and buyers.
- Village-based livestock owners require training and market information in order to reap their share of benefits from higher prices in future.
- Policy-makers in Kazakhstan must be alerted to the potential for cashmere development to alleviate poverty among some of the most geographically-marginalized rural families, who lack alternative livelihood options.

Footnote

1. Mechanically removing the coarse outer goat hair from the fine cashmere down.

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About the Authors: Carol Kerven is a Research Associate at The Macaulay Institute, UK. She is a socio-economic anthropologist specialising in marketing of livestock products from pastoral regions. She can be contacted through her email address, Kerven_Behnke@compuserve.com. Berik Aryngaziev is a goat researcher and head of the Wool Laboratory at the Mynbaevo Sheep Breeding Institute, Scientific Centre for Livestock and Veterinary Research under the Ministry of Agriculture, Kazakhstan. Hilary Redden is an animal fiber specialist who directs a testing company, The Fibre Lab, in Aberdeen, UK. Aidos Smailov is the project's liaison manager in Kazakhstan and also works as a community development project manager at the Eurasia Foundation, Kazakhstan.

The GL-CRSP Developing Institutions and Capacity for Sheep and Fiber Marketing in Central Asia project (WOOL) was established in 2003 and was developed from research conducted through the GL-CRSP small grants program. The project is gathering information on wool and cashmere marketing chains from producers to international processors in Kazakhstan and Kyrgyzstan. Researchers are providing training to farmers, distributing market information to farmers and traders, and assessing the quality of wool and cashmere. The project is led by Dr. Robert Stobart, University of Wyoming. He can be contacted at bstobart@uwyo.edu.

The Global Livestock CRSP is comprised of multidisciplinary, collaborative projects focused on human nutrition, economic growth, environment and policy related to animal agriculture and linked by a global theme of risk in a changing environment. The program is active in East Africa, Central Asia and Latin America.

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