

GL-CRSP Annual Report 2000

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2. Title of Project: Improving Pastoral Risk Management on East African Rangelands

3. Narrative Summary: This project is focused on helping pastoral and agropastoral people better cope with the droughts and economic deprivation that have become commonplace on the east African rangelands. The overall situation is indeed one of crisis with famine relief, violence, and poverty in this area continuing to make world headlines. Our problem model deals with improving pastoral risk management, namely the provision of a self-help capacity to enhance prospects for household economic diversification and community investment. A core concept is whether we can promote a new and virtuous cycle of more timely livestock sales, savings of proceeds, and investment to the betterment of pastoral peoples and the remote towns and settlements on which they depend.

This was the third year of work for this project. We had five major targets for research, outreach, training, and administration and were able to meet all of these. The year was best characterized by the following achievements: (1) Success in renewing our project for the next three years; (2) success in the continued implementation of a household-level quarterly survey throughout our study area; (3) continuation of a dynamic outreach capability; (4) steady progress in the academic programs for seven graduate students based in Kenya and the United States; and (5) procurement of nearly \$260,000 in leveraged and other USAID funds to supplement our core grant. We have remained true to our original problem model. Work plans and outputs for the third year are almost exactly on track with our original project proposal. Team members have been very productive, with 13 new publications in print or in press and six professional presentations.

4. Research

Activity 1: Regional Assessment of Risk Variability for Communities and Households, led by Christopher Barrett and Peter Little with Participation from Kevin Smith, John McPeak, Michael Fleisher, Getachew Gebru, Paul Box, Cheryl Doss, and Others.

Problem Statement and Approach. One of the core issues in this project surrounds the extent to which pastoralists share a common perception and experience of risk. Since drought, floods, violence, and disease epidemics commonly draw donor and government attention to the plight of east Africa's pastoralists, the common, albeit unstated, assumption is that most risk is common to most pastoralists (i.e., is "covariate" risk rather than household- or individual-specific, i.e.,

“idiosyncratic” risk). Such a hypothesis has crucial implications for the way in which interventions should be structured. When risk is highly covariate, external resources are essential to recovery from shocks and rural financial, marketing and social insurance systems are prone to failure. When risk is more idiosyncratic, systems have greater capacity to manage risk internally so long as basic physical and institutional infrastructure is in place. So one of the project’s first activities has been to explore the intra-regional variability in risk exposure and risk perceptions. Two different research efforts over the past year have contributed substantively to this activity. We started in 1998-9 by using a participatory risk assessment method to canvass our entire study region. One hundred and twenty groups were surveyed in an opportunistic fashion, and data were geo-referenced. This was followed-up in the past year by a more detailed quarterly survey administered across 11 communities (six in Kenya and five in Ethiopia) and 330 households using a cluster sampling approach. Launched during March, 2000, and repeated in June/July and September/October, the quarterly survey is largely aimed at pinning down how individual pastoralists perceive and respond to risk. The communities have been stratified and purposively chosen so as to capture important differences in agroecology, access to towns and infrastructure, and ethnicity. We are fielding individual-level surveys not only of household heads, but also of a randomly selected junior male and female adults from each household in order to gain solid evidence on gender and generational differences that condition risk exposure and response. The survey instruments capture information on household structure, asset holdings, activities, consumption, mobility, livestock transactions, experience with raiding, risk assessments, past risk exposure, etc.

Progress. Preliminary results from participatory risk mapping have been documented in previous annual reports. As summarized in Smith et al. (2000) and Smith et al. (in press), these results reveal considerable structural heterogeneity in the risks faced by pastoralists, suggesting a major idiosyncratic component. For example, only lack of food and poor access to water were cited as common risks by half of the respondents. The poor and wealthy worry about distinctly different things, as do men and women, agropastoralists and pastoralists, and town-dwellers and nomads. Econometric and GIS analysis of these data (Table 1) corroborate that gender, wealth, location, and principal livelihood heavily influence risk assessments. Our participatory method has recently been adopted by the World Bank for village assessments in Africa because it gets respondents to focus more on sources of risk rather than on outcomes that could result from several factors. It also gets respondents to focus on the totality of their livelihoods, not just on their animals.

These findings are consistent with a second, entirely different sort of econometric analysis of Desta’s (1999) detailed data on cattle dynamics among the Borana of southern Ethiopia. Even after controlling for covariate rainfall and stocking rates, Lybbert et al. (2000) find that household-specific factors account for the vast majority of the predictable component of livestock mortality among Borana households. These results also suggest the existence of an important “stochastic dynamic poverty trap” wherein households with herds below a certain minimum threshold (of about 20 animals) face a high probability of losing their herds within 10 years. As McPeak and Barrett (in press) propose that such stochastic dynamic poverty traps arise and persist because weak financial and marketing systems in pastoral areas force herders to rely on mobility. However, location, social capital, labor, and livestock endowments matter a great deal to how mobile one herder can be. This can leave some herders more exposed to

potentially catastrophic risk, and better cope with shocks, than others. Some of these differences arise because of differences in the local quality of rangeland resources. For example, poorer households may be forced to reside nearer to towns and settlements, and these locations may be more degraded than areas further away [McPeak, submitted (a)]. Social insurance in the form of informal loans and transfers between households prove relatively ineffective in cushioning the blow of livestock deaths, as shown by data from both the Gabra [McPeak, submitted (b)] and the Borana (Desta, 1999; Lybbert et al., 2000).

Our quarterly survey of risk management is obtaining information during a current drought and will yield important results concerning how herders respond to climatic variability and a myriad of other risks. The research questions for the study derive, in part, from issues identified during Phase I of our project in 1998-9 and are reflected in a number of project publications [Little, in press; Little et al., in press (a,b); Smith et al., in press (a,b)]. In Little et al. [in press (b)], the key importance of herder mobility in successfully responding to climate shocks was noted and initial findings from our on-going field research confirms this (McPeak, personal communication). The conceptual model of Little et al. [in press (b)] mainly looks at one important decision—to move or not to move animals in response to the onset of drought—but shows how such decisions are closely related to choices about livestock sales, veterinary services, and water inputs. The model highlights the complexity of two related decisions that herders face in the context of a drought: (1) should they move animals back to dry season range or to other areas not normally used during wet seasons?; and/or (2) should they increase sales of livestock in anticipation that the drought may worsen and change from a local to regional drought? Other decisions, such as the slaughtering of animals or migration for employment, are also options. The presence of multiple risks and economic pressures that restrict herder mobility aggravate the effects of climatic variability, and our on-going field research seems to point in this direction. Indeed, a case might be made that just the single factor of mobility explains why certain herding groups fare relatively well during extreme climatic variation, while others do not. The on-going field study of risk management will continue to address this.

The issue of economic diversification is explored in Little et al. [in press (a)] and raises an important question: How can the demands of mobile pastoralism be integrated with income and asset diversification that at certain times of the year may concentrate populations and herds? The on-going field study addresses some of the ways that diversification allows herders to better cope with the region's high levels of economic, political, and ecological risk. Considerable intra-community differences add to the complexity, in that motivations for diversification vary considerably along both wealth and gender lines. Rich and poor herders pursue diversification for different reasons, and risk may not be the most important factor for both groups [Little et al., in press (a)].

In areas of mobile pastoralism, diversification issues are especially complex and some diversification strategies may directly compete with labor for herding and reduce herder mobility, an occurrence that can have negative social and ecological impacts. Until our current research, however, most studies have not paid sufficient attention to differences in non-pastoral income activities and what these mean for the herder, environment, and production system. Nor have they acknowledged that certain diversification strategies may not always lead to sedentarization. Indeed, a herder family with a member(s) engaged in a lucrative off-farm job can help the family maintain a pastoral livelihood through remittances, as well as provide capital to rebuild herds after a disaster. These questions are currently being addressed in on-going field research.

Data from the quarterly surveys are currently being entered and cleaned, but some preliminary observations can be reported here. One that is particularly striking is the variation in the change in herd size as a result of drought. The drought hit our communities in Baringo and Samburu, Kenya, particularly hard. These communities suffered mean loss of animal numbers between the first (March/April) and second (June/July) survey rounds of 45 and 35%, respectively. In contrast, however, in the more northern Kenyan sites—where no rain fell during the “long rains” period—mean herd sizes appeared almost unchanged, falling by only 1% in North Horr and increasing 5% in Kargi. This provides evidence that even severe, regional drought does not have uniform effects, underscoring our earlier findings about the intra-regional variability in risk exposure, perceptions and experience. To the best of our knowledge, such detailed empirical evidence does not exist among pastoralists anywhere in the world, especially at the level of the individual. This gives us the opportunity to tease out important intra-household variation critical to gender-sensitive programming in the rangelands. So if allowed to run its planned two-year course, these data should be invaluable inputs to the frontier of empirical research in range science, cultural and economic anthropology, agricultural and development economics for many years to come.

Activity 2: Local Case Studies of Risk and Change for Communities and Households, with Participation from Solomon Desta, Abdillahi Aboud, Layne Coppock, Peter Little, Chris Barrett, and Others.

Problem Statement and Approach. A comprehensive understanding of pastoral risk and pastoral risk management interventions can be supplemented through case studies of local situations. Such studies are especially appropriate as training projects for graduate students. In contrast to the comparative survey approach outlined above, each case study has a unique character that reflects local issues as well as priority interests of students and their supervisors. The studies covered here variously examine risk as related to system change, conflict, formal education, marketing behavior, and economic diversification. Approaches are fundamentally based on household survey methods for each study.

Progress. Five studies are briefly noted below. An analysis of the Borana production system in southern Ethiopia was completed by Desta in 1999. He is an Ethiopian national who received his doctoral degree from Utah State University, with partial funding support from the GL-CRSP. Other studies have been completed more recently by Ethiopian (Shibru) and Kenyan (Esilaba, Lenachuru, and Tangus) master’s students enrolled in the Department of Natural Resources at Egerton University, Kenya, with support from the GL-CRSP and the USAID Kenya Mission. These students worked among the Boran, Samburu, and Il Chamus ethnic groups. Their theses will be submitted and defended in early 2001.

Asset Diversification, System Dynamics, and Change among the Boran of Southern Ethiopia. Results from this PhD dissertation (Desta, 1999) have been cited in previous annual reports. We have emphasized the economic losses (i.e., hundreds of millions of USD) that have been incurred by the Boran due to cattle mortality over the past two decades. Cattle mortality has routinely been at least an order of magnitude greater than net sales. The risk of cattle dying is high enough that opportunities for households to diversify their assets should be considered to mitigate loss of wealth. We have also reported results from a comprehensive risk

and return analysis involving various asset combinations of cattle and simple savings accounts in local banks. The results indicated that improved access to savings accounts and cattle markets could allow people like the Borana to conserve more of their wealth compared to the current situation where cattle are the main option for investment. Manuscripts documenting these findings include Desta and Coppock (submitted) and Desta et al. (in preparation).

Additional perspectives have been generated this year as a result of further manuscript development, and these have not been previously documented in an annual report. These include a test of non-equilibrium theory and a synthesis of change for the Borana production system covering 10 years.

A paper by Ellis and Swift (1988) challenged range management dogma by asserting that some African pastoral systems operate on a non-equilibrium basis. That is to say that there are cases where annual rainfall is so variable that it alone drives vegetation change, and frequent drought keeps livestock populations well-below densities at which they could affect system dynamics. This theory is important because it suggests that foundation concepts such as carrying capacity are at best not very useful, or at worst irrelevant and detrimental to pastoral development because they encourage destocking in the name of reversing environmental degradation caused by livestock. If degradation is not caused by livestock, then destocking really serves to pauperize rural people. Desta and Coppock (submitted) used 17 years of cattle herd dynamics in Borana generated from interviews of 56 households to test non-equilibrium theory. Non-equilibrium theory predicts that herd dynamics would be “erratic and volatile” and wholly controlled by rainfall dynamics. Results indicated that the cattle herd dynamics exhibited a “boom and bust” pattern often observed in other semi-arid pastoral systems. The pattern was characterized by periods of gradual herd growth punctuated by drought-induced crashes of 37 to 42% in 1985-6 and 1991. We interpret this pattern to not be volatile, however, but rather evidence that the regional herd attempts to track a carrying capacity in an intermittent fashion (Figure 1). Cattle losses of over 60% in 1998-9 documented by Shibru (below) complete a picture of remarkable regularity in herd crashes, with an interval of 6 to 8 years since 1985. Interestingly, inter-annual change in cattle numbers shows no significant correlation with inter-annual change in rainfall when data are aggregated for the region (Figure 2). We believe that the interval between crashes is fundamentally defined by the herd growth rate, especially in recent years given the system is increasingly bounded by other ethnic groups and it is getting more difficult for livestock to roam in search of forage and water when shocks occur. Once the herd grows to a density of around 30 head per square kilometer, it then becomes vulnerable to feed shortages that can be induced with even modest dips in annual rainfall. The crash of the early 1990s illustrates in particular that only a 14% drop in annual rainfall—when compared to a long-term average—can still result in massive livestock mortality. We then speculate that the magnitude of any given crash is related to the size of the rainfall deficit in relation to stocking rate. A large rainfall deficit and a high stocking rate will produce a much larger crash compared to that created by a small rainfall deficit and a modest stocking rate. We conclude that both abiotic and biotic factors interact to limit the cattle population on the Borana Plateau. Although most mortalities indeed occur during a dry or drought year, the system is predisposed to crash based on stocking rate. This has important development implications. It suggests that in a general sense, the risk of cattle crashes is predictable. It is much more likely when cattle numbers exceed 30 head per square kilometer than at other times. This therefore provides a window of opportunity for planning asset diversification based on timely livestock sales, should that be desired by pastoral

households. Other secondary data also indicate that grazing pressure is linked to bush encroachment and soil erosion in this system (Coppock, 1994). Overall we feel the evidence for the Borana Plateau does not support the proposition that non-equilibrium dynamics prevail.

Synthesis of system change on the Borana Plateau over the period 1987 to 1997 by Desta and Coppock (in preparation) illustrates important changes in food security and resource use. Overall, food security appears to be declining and resource use is becoming increasingly contested (Table 2). The Borana appreciate the need to adapt to changing circumstances, but the traditional pattern of income generation from livestock remains dominant (Table 3). The overall pattern of change is driven by human population growth on a finite base of resources. Net growth in the pastoral population has been estimated by at 2.2% per annum (CSA, 1996), suggesting a doubling time of about 30 years. As the ratio of people to cattle increases, it results in milk deficits for human diets. Given milk has been the traditional mainstay for human nutrition, this spurs pastoralists to cultivate and enter the market economy to purchase food. As dry-season grazing gets usurped for maize plots, increased competition then starts to lead to restricted use of feed reserves in the form of bush-fenced calf paddocks. Pressure thus clearly creates challenges with a heightened specter of privatized use of key resources. Another way for the pastoralists to address change is to diversify livestock holdings. For the Borana the main pattern appears to be a swing in favor of more browsing camels, as the camel population has risen from 15,000 to 75,000 head since 1987, although this remains a minor emphasis compared to the half million head of cattle. We anticipated growth in small ruminant populations relative to cattle, but this was not observed. In summary, the patterns of system change observed on the Borana Plateau are remarkably similar to patterns documented for the Kajiado Maasai a generation ago. This suggests that there is some degree of predictability in terms of overall trends for pastoral systems that are bounded in terms of resource use and largely denied major development investments. This has several important implications for research and development. For research it illustrates that despite the recent importance placed on understanding livestock and vegetation dynamics in the context of non-equilibrium theory (as above), it is the human population trend—often ignored—that drives socioeconomic change. For development it suggests that as a system changes through time, the portfolio of relevant development interventions also must change. For example, risk management in the form of savings, alternative investment, and economic diversification becomes pre-eminent once food security and traditional forms of resource tenure start to be jeopardized.

Pastoral Resource Use and Conflict Resolution among the Samburu of Kenya. This work investigated the role of conflict resolution related to resource use on risk management for pastoral communities in Samburu District (Esilaba, in preparation). The study notes the types, frequency, and timing of conflicts, the stakeholders involved in conflict resolution, and the impacts of conflicts on household production systems. A structured questionnaire was administered to 240 randomly sampled households in Kerisia, Lorroki, and Baragoi Divisions. Oral interviews and focus group discussions were also conducted. Preliminary research findings indicate that the major forms of resource-based conflict are cattle rustling (affecting 65% of households), wildlife damage to crops (60% of households), and conflict over grazing rights (39% of households). The main response to resource-based conflict is meetings involving elders and local administrators. The effectiveness of response in dealing with conflict is mixed. For example, up to 30% of cattle raids have no response. Cattle rustling is viewed as the single most detrimental form of resource-based conflict. Nearly 70% of households indicated that cattle

rustling has reduced food production and hence exacerbated poverty and food insecurity. Cattle rustling is most common during and immediately following droughts. The insecurity associated with cattle rustling has also negatively influenced the ability of children to regularly attend school—many have even been forced to drop-out.

Cattle Marketing and Decision Making among the Borana of Southern Ethiopia.

This study investigated factors that contribute to the low and highly variable rates of cattle sales among Borana pastoralists (Shibru, in preparation). It examines the extent to which marketing problems, multiple objectives in livestock holding, lack of investment opportunities, and growing impoverishment contribute to restricted supply of animals to market. Primary and secondary data were collected. Primary data were collected using a structured questionnaire with 89 randomly selected households in the vicinity of Mega on the Borana Plateau. Secondary data such as cattle prices were mainly collected from records of governmental and non-governmental organizations. Several key factors limiting cattle sales were identified. These include: (1) a decline in numbers of cattle per household; (2) a poorly diversified cattle herd structure; (3) traditional values remain oriented towards livestock accumulation; (4) lack of markets and market information; and (5) lack of knowledge of, and access to, alternative investments to livestock.

Enterprise Diversification and Risk Management among the Samburu of Kenya.

This study investigated the occurrence of and factors encouraging asset diversification among Samburu pastoralists (Tangus, in preparation). A survey was administered among 112 randomly selected households in the Lorroki, Kirisia, and Wamba Divisions. Preliminary findings indicate a high level of adult illiteracy (80%), with only 45% having any exposure to formal education. Most respondents have few assets apart from livestock. The average livestock holdings (n=112) were 20 goats, 15 sheep, 15 cattle, and 3 camels. Other assets included bicycles (held by 10% of households), deeded plot of land (9%), automobile (4%), and ownership of a flourmill (3%). The ability to diversify into non-pastoral enterprises varies greatly in accordance with cattle holdings. Those wealthier in cattle are able to engage in some degree of non-pastoral asset diversification.

Influence of Formal Education on Livestock Investment and Asset Diversification among the Il Chamus of Kenya. This research addressed the extent to which formal education has affected risk management behavior for the Il Chamus pastoralists of Baringo District, Kenya (Lenachuru, in preparation). A relatively small ethnic group in our study region, the Il Chamus were relatively unexposed to formal education until about 20 years ago. During the past generation this has changed, however, as many Il Chamus have responded positively to improved access to primary and secondary schools in the region. The objectives of this work were to document the occurrence of formal education among the Il Chamus, and see if formal education has indeed changed the household economy. It was expected that formal education would be associated with more non-traditional economic behavior including non-pastoral asset diversification and increased income from non-pastoral sources. These behaviors, in turn, would improve risk management for more diversified households as compared to traditional, less diversified households. Two surveys were conducted among 175 randomly selected households stratified across three locations. One was used to collect baseline data on household education and economy for 145 households, while another 30 were used to collect more detailed, open-ended information from 30 respondents.

Forty percent of households had no exposure to formal education. The distribution for the remaining households, however, was: (1) Only primary school (34%); (2) up through secondary school (11%); and (3) up to university (15%). About 80% of households had an

educated member in the labor market, and 28% of households received remittances, with about half on a monthly basis. These remittances were important in promoting food security during recent droughts and reduced household vulnerability to the effects of livestock raiding. Investment in education influences levels of investment in livestock and also the types of asset diversification strategies that are pursued. Educated people invest much less in livestock than non-educated people.

Activity 3. Special Topics on Enabling Systems to Mitigate Risk—Focus on Livestock Marketing and Property Rights—led by Chris Barrett and Peter Little with Participation from John McPeak, DeeVon Bailey, Nancy McCarthy, Francis Chabari, and Others.

Problem Statements and Approaches. One of the persistent puzzles of pastoralist behavior is why—in the face of mortality rates typically averaging 10-20% of herd size per annum—marketed off-take of livestock is typically <5%. It would seem that pastoralists would stand to benefit enormously from salvaging some value through sales, even at discounted prices, of animals that would otherwise perish. The project previously estimated enormous wealth losses due to animals that died rather than getting sold (Desta, 1999). Understanding pastoralist marketing behavior and the performance of livestock markets is thus an essential prerequisite to designing interventions to remedy this apparent source of wealth loss in the east African rangelands. One potential reason for pastoralists to shun marketing of animals is risk aversion. Analysis of a uniquely rich set of transactions-level data (>63,000 observations) collected by GTZ from two key livestock markets in our study region, Marsabit and Moyale, has been conducted using econometric methods. Another key issue contributing to pastoral risk is property rights, namely how the security of tenure affects sustainable development opportunities. Our project is using data collected in the repeated quarterly survey (see Activity 1 for approach) to make some assessments as to how local variation in property rights affects pastoral risk management.

Progress. An analysis of market records by Barrett et al. (in preparation) shows remarkable price volatility that depends a great deal on rainfall and the presence or absence of animal disease quarantines. Producer price risk in this setting aggravates yield risk associated with disease and mortality. As shown in Tables 4 and 5, there is considerable variation across sites, species, and animal gender in the effect of drought and quarantine on animal prices, with cattle generally facing the steepest declines in value. Most of these price changes come about through increased conditional variance in prices that increase the (negative) risk premiums in pricing livestock in these markets, resulting in lower expected prices fetched by pastoralists. Given increased price volatility and lower expected prices in time of greater disease or lower rainfall, it may be that present market incentives encourage pastoralists to take their chances on keeping animals alive. Research we expect to get underway in the coming year will pursue questions of market structure and source(s) of livestock price volatility in greater depth.

Team member Dr. Nancy McCarthy was the lead editor of “Property Rights, Risk, & Livestock Development in Africa,” published in January, 2000, by the International Livestock Research Institute (ILRI) and the International Food Policy Research Institute (IFPRI). This volume documents the proceedings of an international symposium aimed at improving understanding of how environmental risk affects the use and management of resources under

various property rights regimes and what policy and other external interventions might help communities make desirable transitions toward sustainable development. McCarthy's contributions to that volume focus on conceptual modeling of how strategic interactions among livestock owners under environmental risk and heterogeneous production costs affect stocking rates (McCarthy, 2000). Goodhue and McCarthy (2000) further explore how the possibility of non-cooperation over use of rangeland resources—characterized by overlapping and potentially competing claims—affects spatial mobility, risk exposure, and costs of overgrazing. These papers signal the important role of property rights in providing de facto insurance services in the absence of well-developed rural financial systems. Ongoing work by Nancy McCarthy, John McPeak, and Chris Barrett will use data collected on water-point use and mobility histories from the quarterly survey (see Activity 1) to provide an empirical follow-up to this conceptual work.

Activity 4: Training for US-Based African Graduate Students, led by Chris Barrett and Peter Little.

Problem Statement and Approach. Training of African nationals in risk-related issues will help fill important gaps for professionals in academia and service for government and non-governmental organizations. We have thus recruited several Africans to undertake doctoral programs. Coursework and research proposal preparation is undertaken in the United States, while field research is performed in East Africa.

Progress. Ms. Winnie Luseno, Kenyan, is in the second year of her Ph.D. program in agricultural economics at Cornell University. She receives most of her research support from the GL-CRSP. She has completed her course work and is preparing for the theory qualifying exam in June, 2001. She has formed a dissertation committee comprised of Chris Barrett (chair), Ralph Christy (agricultural marketing), and David Easley (economics). She plans to focus her research on understanding how transaction costs (associated with search and bargaining) and price risk affect pastoralist marketing behavior. She also plans to address how the institutional structure of markets (dyadic versus auction-based systems) affect the conditional price distributions faced by pastoralists, how market and climate information might affect pastoral marketing behavior, and how frictions in market systems affect the value of climate and market information.

Mr. Amare Teklu, Ethiopian, is also a second-year doctoral candidate in agricultural economics at Cornell University. He receives no support from the GL-CRSP and is funded by Cornell University. Mr. Teklu has completed his course work and is preparing for theory qualifying exams in June, 2001. His dissertation committee consists of Chris Barrett (chair), Jon Conrad (resource economics), and Alice Pell (animal science). Mr. Teklu plans to conduct dissertation research on crop-livestock integration in the study region, exploring the role of limited livestock herds in ameliorating poor soils and illiquidity for the poor who have been driven off the rangelands and forced to live in or near towns and settlements. Teklu wishes to explore the role of livestock in soil nutrient cycling in these settings, enabling the production of high-value, nutrient-demanding cash crops like fresh vegetables, and how land tenure conditions the possibilities for crop-livestock integration in southern Ethiopia.

Another Cornell doctoral student, Mr. Travis Lybbert (American), has worked with data generated by the project and produced a paper, even though he is not financially supported by the GL-CRSP. Mr. Lybbert presented the paper in August, 2000, at the annual meeting of the

American Agricultural Economics Association.

Hussein A. Mahmoud, Kenyan, is a doctoral candidate in the Department of Anthropology at the University of Kentucky. Mr. Mahmoud has completed his coursework and will be taking qualifying exams during December 2000. He will begin his field research in east Africa by January 2001, and this will take about one year. His project will examine the social relations of livestock trade and trader networks in northern Kenya and southern Ethiopia. It will broadly explore how trust: (1) operates in the context of economic and other uncertainties; (2) affects certain kinds of social relationships including those based on ethnicity; (3) facilitates or constrains livestock trade; and (4) affects market transaction costs. The study will also address how livestock trade could be improved to enhance rural livelihoods in the project area. Based primarily in livestock markets in northern Kenya and Nairobi, the study will collect both quantitative and qualitative data to analyze the complex network of trader relations that characterize livestock trade. It will contribute to an increased understanding of risk management strategies by traders in an environment of extreme ecological and political volatility, and will fill an important gap in the anthropological literature on African pastoralism.

Activity 5: Case Studies and Action Research in Support of Pilot Risk Management Interventions, led by Solomon Desta and Layne Coppock with Participation by Abdillahi Aboud, Chris Barrett, Peter Little, and Others.

Problem Statement and Approach. Ultimately we want our project to lead to useful intervention concepts that can improve the livelihoods for pastoralists in East Africa. Basic survey research can provide important information to this end, but it is also desirable to supplement basic research with observations of what pastoralists actually want to improve their lives and identify the best-bet interventions that can be implemented in a sustainable fashion. It is also important to identify policy constraints that could hinder the potential success of interventions at the grass-roots level. We therefore propose a new series of case studies and action research that is closely linked to an outreach activity that is more fully described in section 7 below. Our approach is multi-layered and starts with the identification of communities that are suitable for pilot interventions, followed by subsequent observation, monitoring, and impact assessment. This work is fundamentally based on participatory processes starting with Participatory Rural Appraisal (PRA). This research allows us to test predictions. For example, our problem model suggests that if risk management is indeed a key issue for pastoralists, when unprompted they should identify risk management problems as pre-eminent in their lives and desire interventions that ultimately focus on a process of economic diversification and improved efficiency of resource use. We will learn a lot by comparing desired interventions and true development aspirations versus the portfolio of expectations that are embodied in our problem model. Once key interventions are implemented, we see great opportunity for case studies and action research that document lessons learned and identify constraints for sustainability. The process then ends with an impact assessment phase beginning the final year of our project.

Progress. We have made substantial progress in outreach during the past year (see below), and this sets the stage for this research activity. We have not, however, moved research plans much beyond the conceptual stage.

5. Gender Analysis

Gender dimensions of our project are reflected in terms of: (1) How our team is organized; (2) research questions being pursued; (3) how training benefits are allocated; and (4) types of people participating in our outreach network. For example, we have two female scientists on our team, namely Dr. Cheryl Doss of Yale University and Dr. Nancy McCarthy of ILRI. Both are economists. We are studying how risk affects female pastoralists differently from males. It is well known that perturbations in our study region often result in female-headed households being established nearer to towns and settlements. These are often the poorest households with few assets. These women heads of households are often forced to diversify their income-generating activities to survive. These women are a major focus of our research and outreach efforts. We have given various forms of support to female trainees in our project. During this year a Kenyan woman (Ms. Winnie Luseno) has continued in her PhD program in economics at Cornell. For our outreach network we have included roughly 52 organizations, with 25 in Ethiopia and 27 in Kenya. Senior women represent nine of these organizations in the network. We have also initiated a 10-member Outreach Review Panel (ORP) to help guide outreach efforts. There are currently two senior women on this review panel including Ms. Miriam Cherogony, a Kenyan specialist in rural finance, and Ms. Allyce Kureiya, a Kenyan pastoral development specialist working with an NGO in Isiolo. We want to replace a female Ethiopian who departed the ORP this year to bring the total number of women on the ORP to three.

6. Policy

We recognize that policy constraints are important in the process of improving pastoral risk management on east African rangelands. In previous GL-CRSP Annual Reports we have given examples of potential policy constraints that could negatively affect pastoral risk management.

We have two main goals regarding policy on our project. The first goal is for us to identify key policy constraints for pastoral risk management in the course of conducting research and outreach. The second goal is for us to have a positive effect on policy formulation for pastoralists by engaging key policy making people and entities in Kenya and Ethiopia. Importantly, our approaches to meet these goals are always evolving. As we are currently configured, our main approach to identify policy constraints will be through action research described above. This is because policy constraints may be most easily isolated using a bottom-up view when trying to implement risk management interventions with communities. We are using several approaches to engage policy makers. We have focused on public relations by distributing hundreds of copies of color brochures, workshop proceedings, and issues of the GL-CRSP newsletter *Ruminations* to decision-makers in both countries. We will also engage decision makers directly by inviting them to workshops, and indirectly by supplying our research and outreach results to pastoral advocacy groups. We believe that policy is important. To reflect this, it is noted that our Outreach Coordinator has been assigned the task of routinely identifying key policies and policy makers that affect pastoralists in addition to his other duties.

7. Outreach

Our project has always recognized the importance of outreach. We see the PARIMA project as a potentially effective means to catalyze innovative pastoral development in our study region. During the first two years of our project the outreach effort has largely consisted of

dissemination of information to a network of some 52 organizations through workshops, brochures, publications, and a web site. In this past year, however, we hired a full-time Outreach Coordinator (Solomon Desta) who is based in East Africa. Desta's mode of operation is to travel between Kenya and Ethiopia on a regular basis. Desta was initially charged with two main tasks.

The first was to undertake a preliminary reconnaissance of southern Ethiopia and northern Kenya and begin a gradual and reiterative process that included public relations, community identification, and community needs assessment. Our partners in this reconnaissance effort in Ethiopia have included the Oromia Agricultural Development Bureau (OADB), the Oromia Cooperative Promotion Bureau (OCPB), Norwegian Church Aid (NCA), and SORDU (Southern Rangelands Development Unit). Our partners in Kenya have included the Arid Lands Resource Management Project (ALRMP) and the bilateral Marsabit Development Project (MDP/GTZ) in Kenya. About 20 communities or social groups were visited, with 12 in Kenya and eight in Ethiopia. Most were visited twice during the year. Focus groups were assembled in each case and they varied from 30 to 70 participants. The initial agenda dealt with fostering open discussions about change in their production systems and how they could better cope. Felt needs were listed in every case, and they echoed our predictions that issues of marketing, efficient use of natural resources, and need for education and economic diversification would be paramount (Desta, unpublished data). The focus groups greatly varied in character. Some in Kenya (particularly women's groups) were highly organized and well-versed in risk management principles of timely livestock sales, saving of proceeds, and investment for economic diversification. For some focus groups in Ethiopia, in contrast, it was apparent that our meetings were the first time people had gotten together to openly debate livelihood issues. This reconnaissance process has largely confirmed that our problem model is on track and gave us ideas as to how to further develop outreach activities. We were convinced that broad-based community participation was a foundation for effective interventions.

The second task was to follow-up on the creation of a structure and protocol for outreach at the grass-roots level. The structure now consists of about two-dozen governmental (GO) and non-governmental (NGO) pastoral development partners distributed throughout our study region. Each partner covers a domain that is home to various pastoral and agropastoral communities. The PARIMA project interacts with outreach partners through the Outreach Coordinator and the Outreach Review Panel (ORP). The ORP is an elected body of 10 distinguished African development professionals that guides outreach activities. The ORP is chaired by the Outreach Coordinator. Our outreach protocol has the following steps: (1) Involve outreach partners in local orientation workshops where they are briefed on risk management issues, the PARIMA approach, and are encouraged to provide feedback; (2) provide training opportunities for partners in Participatory Rural Appraisal (PRA) methods and related topics on an as-needed basis; (3) have partners select local communities for risk management pilot projects based on PRA, needs assessment, and the likelihood of success; (4) partners then submit proposals—jointly prepared with communities—for funding consideration by the ORP; and (5) projects are funded and results monitored for impact assessment. Funds for pilot projects would come from sources outside the GL-CRSP (see Leveraged Funds Section below).

We consequently began to strengthen partnerships with governmental and non-governmental organizations. Particularly strong relationships have been fostered between PARIMA and OADB, ALRMP, and VOCA.

8. Development Impact

Perspectives on developmental impact remain the same as noted in previous GL-CRSP Annual Reports. These are summarized below.

Environment. The benefits of our project to the environment tend to be indirect rather than direct, and longer-term rather than shorter-term. Our basic position is that improved risk management will help mitigate asset loss and poverty among pastoralists and agropastoralists. When poverty is mitigated, risk to the environment will lessen. For example, one tenet of our approach is that pastoralists need to make more pre-emptive moves to mitigate drought-induced crises. One tactic is to sell some animals before a crisis occurs and use the proceeds as household savings and community investments. The success of this depends on well-functioning markets, credit union formation, education, etc. The idea is that if such a tactic can be successfully used throughout a society, the rate of growth in stocking rates would be mitigated. This would reduce the specter of heavy stocking rates during years of lower-than-average rainfall, which is the key window of time when range vegetation could be degraded. The "boom and bust" in the cattle cycle (Desta, 1999) would also be dampened as a result. The build-up in non-livestock capital and investment could then permit societies to begin to diversify their economies. This diversification could spur growth of urban job opportunities and mitigate the incidence of poverty among pastoral and agropastoral households. Mitigating poverty would then reduce the specter of poor people becoming engaged in potentially destructive activities such as charcoal making, harvesting of green fuel wood, and opportunistic cultivation.

Agricultural Sustainability. A sustainable agriculture is one where interventions are: (1) beneficial—or at least neutral—for the environment; (2) socially acceptable; and (3) economically profitable. The premise behind our project is that, left to their own devices, traditional pastoral or agropastoral livelihoods in our study region are unsustainable. For example, there is a loss of grazing land to population growth and environmental degradation. There is an unraveling of the traditional social order in some cases, which can often be traced to competition for limited resources. There is abundant evidence that whether due to poor demand, lack of infrastructure, and/or inadequate marketing strategies of producers, pastoralism in the region is typically unprofitable. Evidence of unsustainability includes things like the chronic need to feed tens of thousands of people in the region each year, the re-location of poor households nearer to towns and settlements where they engage themselves in petty trade to stay alive, and the increasing poverty and declining living standards of pastoralists in general. By coming up with risk management tools, which in part should allow pastoralists and agropastoralists to save and invest outside of their traditional sphere, the resulting investment surge for education and entrepreneurial activity in towns and settlements should primarily lead to growth of local economies with benefits for the environment, social order, and pastoral economy. As outlined immediately above, our risk management interventions range from neutral to positive for the environment, which conforms to the first criterion of sustainable agriculture. Accumulation of wealth and efforts to mitigate social conflicts should allow the social fabric to heal—poverty is bad for the maintenance of traditional cultures. This fits the second criterion. The third criterion is dealt with by several economic outcomes that vary in terms of the relevant time scale. Short-term benefits would include an expansion of local markets for pastoral products. Longer-term benefits would include allowing more pastoralists to emigrate out of the traditional sector due

economic diversification and increased employment opportunities in towns and settlements. Facilitation of emigration is the ultimate humanitarian solution to the risk-management dilemma for pastoralists. This is because population growth reduces resources per capita and therefore increases vulnerability of populations to ecological and economic shocks.

Contributions to United States Agriculture. The main contribution of this project to United States agriculture is primarily in terms of providing a "wake-up call" for research and extension professionals to recognize the importance of risk management for the small to average-sized livestock producer. As will be noted below, the need for risk management by American producers may be increasing as profit margins get slimmer and the social and economic complexity of agriculture increases. It is fair to say that a commodity perspective has been pre-eminent in agricultural research and outreach in the United States. This has contributed to a lack of a relevant systems approach that could better integrate academic disciplines and deal more-effectively with real-world problems. Risk management can be an important contribution in this regard. Risk management is simultaneously economic, social, and ecological. The ability to better manage risks is an important attribute of successful farmers and ranchers (Peterson and Coppock, in press). While livestock producers in the United States are under no imminent threat of starvation or extreme destitution comparable to pastoralists in east Africa, there are commonalities in terms of how risks interact to cause problems. For example, it has been forwarded by Holechek et al. (1994) that beef producers in New Mexico should diversify their assets and investments to mitigate economic downturns that repeatedly result from cyclic fluctuations in beef prices. This is exactly the same concept that we have for East African pastoralists. Education and access to investments are the main constraints for New Mexico ranchers—similar to that for East African pastoralists. The predictability of drought cycles, and the influence of phenomena like El Niño on precipitation regimes, is a core issue for agriculture in the United States as well as that for East Africa. Global trade affects the United States beef producer and the East African pastoralist. The advent of the North American Free Trade Agreement (NAFTA) could serve to dampen peak prices received by American cow-calf operators because of increased importation of cheaper Mexican beef. Research remains to be done that could confirm this widely held view. The specter of NAFTA, however, probably influences behavior of American producers by increasing their perceived risk on prices and possibly discouraging production investment. Currently, the cross-border flow of live cattle is officially restricted between Ethiopia and Kenya. We do not know the rationale for this restriction, nor its effects on household economics on either side of the border. Answers to this will be provided by applied research on the GL-CRSP, which may shed new light on the costs and benefits of free trade in general—even as applicable to agriculture in the United States. Our project will communicate such findings and influence the American research community, and hence the United States agricultural community, through a variety of research and outreach publications.

Contributions to the Host Countries. Contributions to our host countries will mostly be felt through our outreach activities (described above) and training of host-country nationals. Outreach will primarily have impact on project beneficiaries—pastoralists and agropastoralists—but it will also have impact on development professionals and their organizations that link to us directly. In the training sphere our past contributions have also included computers, books, sponsorship for

people to attend international conferences, and other technical support for our main partner in Kenya, Egerton University.

Linkages and Networking. This has been previously covered in our section on outreach.

Collaboration with IARCs and Other CRSPs. We collaborate with the International Livestock Research Institute (ILRI) in both Ethiopia and Kenya. We typically hold our workshops at ILRI conference facilities. Some administrative and logistical support for fieldwork is provided to us by ILRI. We have a link to the Livestock Policy Analysis Programme (LPAP) headed by Dr. Simeon Ehui. Dr. Nancy McCarthy is an economist affiliated with LPAP and the International Food Policy Research Institute (IFPRI), and she is a member of our GL-CRSP team. We have been strengthening ties in the past year to the Crisis Mitigation Project, created under the auspices of the Association to Strengthen Agricultural Research in Eastern and Central Africa (ASARECA), headed by Dr. Jean Ndikumana of ILRI-Kenya. We also have new research links to an animal health group, also at ILRI-Kenya, led by Dr. Tom Randolph. For this linkage we see collaboration in terms of shared interests in animal health that can be pursued in the context of community surveys in our project area.

The other CRSP we link to is the BASIS CRSP. Drs. Peter Little and Christopher Barrett, Co-PIs on the GL-CRSP, and Prof. Abdillahi Aboud, regional co-leader of the GL-CRSP, are also co-leaders on the BASIS CRSP. The GL-CRSP and BASIS CRSP share an interest in policy and economic issues that deal with cross-border relations and agricultural markets.

9. Other Contributions

Support for Free Markets and Broad-Based Economic Growth. Interventions that will be advocated by our project will be harmonious with support of free markets and promotion of broad-based economic growth. Some of these themes have been previously described. Our interest in this area prominently involves linkages between markets and formation of voluntary marketing and savings and credit cooperatives to help empower pastoralists at the local level.

Contributions to, and Compliance with, USAID Mission Objectives. Our project contributes to and complies with Mission objectives in Kenya and Ethiopia by dealing with food security, economic growth, the environment, and privatization issues. Both Missions are currently giving more attention to pastoralism and pastoral issues, and that is encouraging for us. We have solid contacts with prominent people in both the Ethiopian and Kenyan Missions.

Concern for Individuals. Our project incorporates a concern for individuals in several ways. One is through technical and advanced training opportunities, with a focus on host-country nationals at the master's and Ph.D. level. Training details are given in a subsequent section. Other evidence is provided by how we have organized our applied research and outreach. For research, we realize that improved risk management will ultimately occur at the level of the individual (see Activity 1). For outreach, priorities like public education, conflict mitigation, and formation of voluntary, benefits-oriented cooperatives in appropriate circumstances are a testimony to the value we place on helping individuals improve their lives by being able to better deal with risk.

Support for Democracy. Voluntary, benefits-oriented producer cooperatives are one form of grass-roots democracy in action. We have also been asked by our outreach partners to help pastoralists in pilot projects to better communicate their needs and desires to local politicians.

Humanitarian Assistance. Our program of applied research and outreach is the embodiment of humanitarian assistance. Outreach will, in large measure, help set an agenda to guide more research as well as outreach. Research will therefore vary relevant to solving problems in the study region.

10. Leveraged Funds and Linked Projects

The International Livestock Research Institute (ILRI) has contributed USD 4,000 this year to our project in accommodation costs. Egerton University has contributed about USD 7,200, and this includes one month of salary support for both Aboud and Lusenaka (total = USD 1,600) as well as the fact that Egerton waived USD 4,000 in tuition for the four master's students in the Department of Natural Resources. They also have provided USD 1,600 in stipends for the Kenyan students. The grand total leveraging of non-USAID funds is thus USD 12,200 for 1999-2000.

Team members Nancy McCarthy and Chris Barrett, along with Dr. Rachel Goodhue of the University of California-Davis, secured a \$17,000 USAID Linkage Grant through ILRI for empirical work on questions of natural resource tenure and risk management in the project region. These funds supported preliminary field reconnaissance, the development of a survey module, data collection, and development of an analytical approach to testing hypotheses about the nature of resource access restrictions and their role in risk management.

Team members Abdillahi Aboud and Layne Coppock secured a \$30,000 grant from the USAID Mission in Kenya to provide support for the master's training program at Egerton University. This has provided funds for student stipends, faculty supervision, student field research, and special coursework.

Team member Layne Coppock secured a \$200,000 grant from the USAID Mission in Ethiopia. This will provide operating funds for community outreach in southern Ethiopia in fiscal year 2000-01.

Our project is linked to other efforts dealing with outreach and research. For outreach, we are developing connections to a variety of local, grass-roots development projects in southern Ethiopia and northern Kenya. Prominent organizations in this network include the Oromia Agricultural Development Bureau (OADB) in Ethiopia, GTZ (in Maralal, Marsabit and Negele), Save the Children/USA (SC/USA), Norwegian Church Aid (NCA), and the Arid Lands Resource Management Project (ALRMP) in Kenya. For research, our project has a bridge to several other projects. Prof. Abdillahi Aboud and Drs. Peter Little and Chris Barrett, all project co-leaders in the GL-CRSP, also work with the BASIS CRSP. Dr. Nancy McCarthy is primarily associated with the Property Rights Project in the Livestock Policy Analysis Program (LPAP) at ILRI and IFPRI. In the United States, our project is linked to an effort at Utah State University led by Dr. Paul Box entitled "A GIS-Based Cellular Automata and Individual-Based Model Simulation Environment." This project will provide us with a GIS framework and spatial modeling capability. Our project is also linked to an older effort at Utah State University funded by USDA-SARE led by Layne Coppock since 1995. This involves identification of prominent

threats to the sustainability of Utah ranching operations. The need that Utah producers have for improved risk management is a major issue emerging from this work, and provides an important conceptual link between SARE and the GL-CRSP.

11. Training

Long-Term Training

Completed:

Barbara Cellarius. PhD, 1999. Development anthropology. University of Kentucky, Lexington, Kentucky, USA. (Partial support from the GL-CRSP).

Michael Fleisher. Post-doctoral associate, 1999-2000. Social anthropology. Utah State University, Logan, Utah, USA. (Full support from the GL-CRSP).

In progress:

John Tangus. MS, with graduation expected in 2001. Natural resource social science. Egerton University, Kenya. (Partial support from the GL-CRSP).

Clement Isiah Lenachuru. MS, with graduation expected in 2001. Natural resource social science. Egerton University, Kenya. (Partial support from the GL-CRSP).

Mulugeta Shibru. MS, with graduation expected in 2001. Natural resource social science. Egerton University, Kenya. (Partial support from the GL-CRSP).

Moses Esilaba. MS, with graduation expected in 2001. Natural resource social science. Egerton University, Kenya. (Partial support from the GL-CRSP).

Hussein A. Mahmoud. PhD, with graduation expected in 2002. Development anthropology. University of Kentucky, Lexington, Kentucky, USA. (Full support from the GL-CRSP).

Winnie Luseno. PhD, with graduation expected in 2003. Agricultural economics. Cornell University, Ithaca, New York, USA. (Full support from the GL-CRSP).

Amare Teklu. PhD, with graduation expected in 2003. Agricultural economics. Cornell University, Ithaca, New York. (Full support from Cornell University).

Nancy McCarthy. Post-doctoral associate, 1998- present. Economics. ILRI, Nairobi, Kenya, and IFPRI, Washington, D.C. (Partial support from the GL-CRSP).

John McPeak. Post-doctoral associate, 1999-present. Economics. Cornell University, Ithaca, New York. (Full support from the GL-CRSP).

Solomon Desta. Post-doctoral associate, 1999- present. Outreach. Utah State University, Logan, Utah, USA. (Partial support from the GL-CRSP).

Getachew Gebru. Post-doctoral associate, 2000- present. Animal production systems. Utah State University, Logan, Utah, USA. (Full support from the GL-CRSP).

Short-Term Training/Meetings Attended:

Third Annual Planning Meeting for the GL-CRSP Project “Improving Pastoral Risk Management on East African Rangelands.” Held July 10-11, 2000, at Egerton University, Njoro, Kenya. (Attended by a majority of PARIMA team members, post-doctoral associates, and Egerton-based graduate students).

Workshop on the “Southern Tier Initiative” for Ethiopia. Held April 12-14, 2000, at Nazret, Ethiopia. Sponsored by USAID and the Ethiopian Ministry for Economic Development and Cooperation (MEDaC). (Attended by Solomon Desta).

Training course on Participatory Rural Appraisal (PRA) methods, undertaken by Solomon Desta during August 6-10 at Egerton University, Njoro, Kenya.

Field assessment of the potential for cooperative development in the southern Ethiopian rangelands, undertaken during September 7-14 by USAID, Volunteers for Overseas Cooperative Action (VOCA), the Livestock Marketing Authority, Oromia Cooperative Promotion Bureau (OCPB), and the Oromia Agricultural Development Bureau (OADB). (Solomon Desta represented PARIMA).

12. Primary Collaborators

United States:

Dr. Deevon Bailey, Professor, Department of Economics, Utah State University.

Dr. Chris Barrett, Associate Professor, Department of Applied Economics and Management, Cornell University.

Dr. Paul Box, Assistant Professor, Department of Geography & Earth Resources, Utah State University.

Dr. Layne Coppock, Associate Professor, Department of Rangeland Resources, Utah State University.

Dr. Cheryl Doss, Assistant Professor, International Relations, Yale University.

Dr. Peter Little, Professor, Department of Anthropology, University of Kentucky.

Ethiopia:

Dr. Simeon Ehui, Head, Livestock Policy Analysis Program, International Livestock Research Institute.

Ms. Janet Paz-Castillo, Project Development Officer, USAID-Ethiopia.

Ato Dadhi Amosha, Technical Expert, Oromia Agricultural Development Bureau (OADB).

Ato Werqu Mekasha, Country Director, Volunteers in Overseas Cooperative Action (VOCA).

Dr. Tafesse Mesfin, Head, Pastoral Development Unit, Federal Ministry of Agriculture.

Dr. Fisseha Meketa, Senior Staff Member, Save the Children USA.

Ato Sora Adi, Senior Staff Member, Borana Lowlands Pastoral Development Project/GTZ

Ato Aliyu Hussen, Research Coordinator, Oromia Agricultural Development Bureau (OADB)

Kenya:

Prof. Abdillahi Aboud, Associate Professor and Dean, Faculty of Environmental Studies and Natural Resources, Egerton University.

Mr. Frank Lusenaka, Lecturer, Department of Natural Resources, Egerton University.

Dr. Daniel K. Too, Senior Lecturer and Chair, Department of Natural Resources, Egerton University.

Dr. P.K. Rono, Lecturer, Department of Sociology, Egerton University.

Dr. W.S.K. Wasike, Senior Lecturer and Chair, Department of Economics, Egerton University.

Ms. Miriam Cherogony, Senior Staff Member, Kenya Rural Enterprise Project/Financial Services Association

Ms. Alycce Kureiya, Senior Staff Member, SNV Regional Office--Isiolo.

Mr. Guyo Doyo, Senior Staff Member, Arid Land Resource Management Project

Mr. Boru Halake, Senior Staff Member, Arid Lands Resource Management Project

Mr. Mahmoub Maalim, National Coordinator, Arid Lands Resource Management Project

Dr. Francis Lelo, Faculty of Environmental Studies and Natural Resources, Egerton University.

Mr. Francis Chabari, Team Leader, Marsabit Development Project/GTZ

13. Primary Collaborating Institutions

United States:

Departments of Rangeland Resources, Geography & Earth Resources, and Economics at Utah State University, Logan, Utah 84322. The main contact is the Department of Rangeland Resources: Zip 84322-5230, telephone: 435-797-2503, fax: 435-797-3796.

Department of Anthropology, University of Kentucky, Lexington, Kentucky 40506-0024. Telephone: 606-257-6923; fax: 606-323-1959.

Department of Applied Economics and Management, Cornell University, Ithaca, New York. 14853-7801. Telephone: 607-255-4489; fax: 607-255-9984.

Kenya:

Department of Natural Resources, Egerton University, P.O. Box 536, Njoro. Telephone: 254-37-61464; fax: 254-37-61213.

Crisis Mitigation Project, International Livestock Research Institute (ILRI). P.O. Box 30709, Nairobi. Telephone: 254-2-630-743; fax 254-2-631-481.

Arid Lands Resource Management Project (ALRMP). P.O. Box 53547, Nairobi. Telephone: 254-2-227-496; fax: 254-2-227-982.

Kenya Rural Enterprise Project/Financial Services Association. P.O. Box 39312, Nairobi. Telephone: 254-2-572-323; fax: 254-2-711-645.

Department of Livestock Production, Ministry of Agriculture and Rural Development. P.O. Box 30028, Nairobi. Telephone: 254-2-721-005; fax: 254-2-721-983.

Ethiopia:

Livestock Policy Analysis Program, International Livestock Research Institute (ILRI). P.O. Box 5689 Addis Ababa. Telephone 251-1-613-215; fax: 251-1-611-892.

United States Agency for International Development (USAID) Mission to Ethiopia, P.O. Box 1014, Addis Ababa. Telephone: 251-1-510-088; fax: 251-1-510-043.

Oromia Agricultural Development Bureau. P.O. Box 8770, Addis Ababa. Telephone: 251-1-155-303; fax: 251-1-515-905.

Oromia Cooperative Promotion Bureau. P.O. Box 8648, Addis Ababa. Telephone: 251-1-158-737; fax: 251-1-515-905.

Norwegian Church Aid (NCA). P.O. Box 1248, Addis Ababa. Telephone 251-1-512-922; fax 251-1-518-167.

Southern Rangelands Development Unit (SORDU). P.O. Box 20, Yabelo.

Volunteers in Overseas Cooperative Action (VOCA). P.O. Box 548, Code 1110, Addis Ababa. Telephone: 251-1-510-508; fax: 251-1-531-530.

14. Publications (*denotes GL-CRSP work cited but published prior to FY 1999-2000. **denotes citations of non GL-CRSP publications)

Aboud, A. 2000. Kenya's Egerton University initiates post-graduate studies through pastoral risk management component. Pages 5-7 in Ruminations, Newsletter of the Global Livestock Collaborative Research Support Program (Winter Issue).

**Central Statistical Authority (CSA). 1996. The 1994 population and housing census of Ethiopia: Results for Oromiya Region. Vol. I, part I: Statistical report on population size and characteristics. Published by the Central Statistical Authority, Addis Ababa, Ethiopia.

**Coppock, D.L. 1994. The Borana Plateau of Ethiopia: Synthesis of pastoral research, development, and change, 1980-91. International Livestock Center for Africa (ILCA), Addis Ababa, Ethiopia.

*Desta, S. 1999. Diversification of livestock assets for risk management in the Borana pastoral system of southern Ethiopia. PhD dissertation, Utah State Univ., Logan, Utah.

**Ellis, J.E., and D.M. Swift. 1988. Stability of African pastoral ecosystems: Alternate paradigms and implications for development. *Journal of Range Management* 41:450-459.

Goodhue, R., and McCarthy, N. 2000. Fuzzy access: Modeling grazing rights in sub-Saharan Africa. In: McCarthy, N., Swallow, B., Kirk, M., and P. Hazell (eds), *Property Rights, Risk & Livestock Development in Africa*. International Food Policy Research Institute (IFPRI), Washington, D.C., and the International Livestock Research Institute (ILRI), Nairobi.

**Holechek, J.L., J. Hawkes, and T. Darden. 1994. Macroeconomics and cattle ranching. *Rangelands* 16: 118-123.

Little, P.D. 1999. Comment on “Are East African pastoralists truly conservationists.” *Current Anthropology* 40(4):642.

Little, P.D. In press. Living in risky environments: The political ecology of pastoralism in East Africa. In: *African Development in the 21st Century*. S. Taylor, G. White, and E. Fratkin, eds. University of Rochester Press, Rochester, NY.

Little, P.D., K. Smith, B.A. Cellarius, D.L. Coppock, and C.B. Barrett. In press (a). Avoiding disaster: Diversification and risk management among East African herders. *Development and Change*.

Little, P.D., H.A. Mahmoud, and D.L. Coppock. In press (b). When Deserts Flood: Risk Management and Climatic Processes Among East African Pastoralists. *Climate Research*.

Lybbert, T., Barrett, C., Desta, S., and D.L. Coppock. In press. Pastoral risk and wealth-differentiated herd accumulation patterns in southern Ethiopia, selected paper abstract, 2000 American Agricultural Economics Association annual meeting, Tampa, Florida. *American Journal of Agricultural Economics*.

Mahmoud, H.A., and P.D. Little. 2000. Climatic shocks and pastoral risk management in northern Kenya. *Practicing Anthropology* 22(4):11-14.

McCarthy, N. 2000. An economic analysis of the effects of production risk on the use and management of common-pool rangelands. In: McCarthy, N., Swallow, B., Kirk, M., and P. Hazell (eds), *Property Rights, Risk & Livestock Development in Africa*. International Food Policy Research Institute (IFPRI), Washington, D.C., and the International Livestock Research Institute (ILRI), Nairobi.

McCarthy, N., Swallow, B., Kirk, M., and P. Hazell. Eds. 2000. *Property Rights, Risk & Livestock Development in Africa*. International Food Policy Research Institute (IFPRI), Washington, D.C., and the International Livestock Research Institute (ILRI), Nairobi.

McPeak, J., and Barrett, C. In press. Differential risk exposure and stochastic poverty traps among East African pastoralists. *American Journal of Agricultural Economics*.

**Peterson, R., and D.L. Coppock. In press. Economics and demographics constrain investment in Utah private grazing lands. *Journal of Range Management*.

Smith, K., Barrett, C. and P. Box. 2000. Participatory risk mapping for targeting research and assistance: An example using East African pastoralists. *World Development* 28 (11): 1945-59.

Smith, K., Barrett, C., and P. Box. In press. Not necessarily in the same boat: Heterogeneous risk assessment among East African pastoralists. *Journal of Development Studies*.

15. Abstracts and Presentations

Barrett, C., Chabari, F., Bailey, D., Coppock, D.L., and P.D. Little. 2000. Livestock pricing in the northern Kenyan rangelands. Seminar presented at the International Livestock Research Institute (ILRI), Nairobi, Kenya. 12 July.

Desta, S. 2000. Project overview: Improving pastoral risk management on east African rangelands. Seminar presented at the annual planning meeting for the Arid Lands Resource Management Project (ALRMP), Nairobi, Kenya. 15 May.

Desta, S. 2000. Pastoralism and natural resource management. Invited paper for a symposium entitled "Pastoralism or agropastoralism, which way forward?" Tenth Annual Meeting of the Ethiopian Society for Animal Production, Addis Ababa, Ethiopia. 24 August.

Little, P.D. 1999. Living in risky environments: The political ecology of pastoralism in East Africa. African Development in the 21st Century: A Symposium in Honor of Gwendolen Carter. Smith College, Northampton, Massachusetts. 24-26 September.

Little, P.D. 2000. Herder welfare and herd reconstitution: Restocking models and realities for post-drought recovery in East Africa. Workshop on "Restocking after Disasters." United States Agency for International Development, Washington, D.C. 20 September.

Lybbert, T., Barrett, C., Desta, S., and D.L. Coppock. 2000. Pastoral risk and wealth-differentiated herd accumulation patterns in southern Ethiopia, selected paper presented at the Annual Meetings of the American Agricultural Economics Association, Tampa, Florida, 15 August.

Appendix

Out of five major targets for research, outreach, training and administration we met all of them in 1999-2000. The targets are described in the narrative summary.

Table 1. Variability of risk factors in relation to livelihood, gender, distance to towns, and wealth for respondents in northern Kenya and southern Ethiopia. Tabular entries are doubly-censored regression results. Source: Smith et al. (in press).

Risk Factors →	Animal Disease	Livestock Prices	Pasture Availability	Water Availability	Crop Failure	Wildlife Crop Damage	Human Disease	Violent Conflict
Correlates								
Constant	0.211 (0.394)	0.650* (0.375)	0.668 (0.960)	1.080‡ (0.333)	0.431 (0.296)	0.012 (0.034)	0.208 (0.301)	0.346 (0.281)
Agropastoralist	0.006 (0.289)	-0.349 (0.280)	-0.546 (0.877)	0.004 (0.294)	-0.344 (0.530)	0.418 (0.434)	-0.277 (1.331)	-0.650 (0.657)
Crop Producer	-0.742* (0.383)	-0.687* (0.377)	0.199 (0.917)	0.454 (0.302)	0.538‡ (0.055)	0.972‡ (0.366)	-0.377‡ (0.178)	-0.863 (0.814)
Female	-0.516‡ (0.231)	-0.698‡ (0.255)	-0.555‡ (0.159)	-0.442‡ (0.211)	-0.625 (0.427)	-0.185 (0.339)	-0.173 (0.118)	0.407‡ (0.051)
Km from town	0.028‡ (0.008)	0.014‡ (0.007)	-0.009 (0.021)	0.004 (0.006)	-0.020* (0.012)	-0.041‡ (0.017)	-0.074* (0.045)	-0.060‡ (0.021)
Poor	0.174 (0.375)	0.018 (0.339)	-0.125 (0.972)	-0.402 (0.314)	-0.244‡ (0.057)	-0.870 (0.658)	0.916‡ (0.109)	0.621‡ (0.301)
Middle wealth	0.439 (0.312)	0.713‡ (0.351)	-0.622 (0.578)	-0.502 (0.329)	-0.658 (0.431)	-0.618 (0.414)	0.091 (0.122)	-0.297 (0.584)
# left censored (R=0)	65	92	112	34	111	107	96	97
# right censored (R=1)	21	3	2	41	0	2	9	11
# uncensored	34	25	6	45	9	11	15	12
Mean log likelihood	-0.948	-0.563	-0.247	-1.034	-0.387	-0.367	-0.404	-0.610

The dependent variable, R, ranges from zero (not cited as a risk factor) to one (ranked as the most serious risk faced). See Section II or Smith et al. (2000) for greater detail on the data collection and index construction methods. Except for kilometers from town, the other regressors are all categorical variables equal to one when the respondent fits the variable title and zero otherwise.

Standard errors in parentheses.

*, †, and ‡ indicate significantly different from zero at the ten, five, and one percent levels, respectively.

Table 2. Trends in the Borana pastoral system as perceived by 317 herd owners.* Source: Desta (1999) and Desta and Coppock (in preparation).

Feature	Perceived Trend (% Who Agree)		
	Decreasing	Increasing	No Change
Access to grazing land**	91	7	2
Milk for people	97	1	2
Milk for calves	97	1	2
Standard of living	55	11	32
Grain in markets	22	76	0
Pastoral grain consumption	1	99	0
Pastoral dairy sales	29	71	0
Human population	0	98	0
Need for cash income	0	99	1
Cattle production	24	74	2
Sheep production	74	24	2
Goat production	59	38	3
Camel production	14	84	2

*Some rows may not add to 100%, and this is due to some respondents having “no opinion.

** Seventy-five percent of respondents felt that a gradual privatization of key lands due to creation of fodder reserves and cultivation, and increasing restrictions in access to the deep wells for poorer households, was reducing mobility of livestock herds (Desta, 1999).

Table 3. Ranked sources of income for 56 pastoral households on the north-central Borana Plateau, 1996-7.* Source: Desta (1999) and Desta and Coppock (in preparation).

Rank	Income Source**						
	Livestock	Dairy	Wages	Grain	Gold	Salt	Other
1	43	0	2	2	1	1	5
2	4	13	1	5	6	3	4
3	3	4	3	6	1	2	0
4	0	7	1	2	0	0	0

*Failure of some rows to add to 56 indicates “no opinion” or missing data (Desta, 1999).

**Where “grain” implies home-grown cereals (largely maize) that were sold. Gold was typically mined from sites to the north, while salt was mined from volcanic craters to the south. “Other” income sources included cattle trading, gum arabic collection, small-scale entrepreneurial activities in towns, etc. (Desta, 1999).

Table 4. Estimated effects of drought on livestock prices for northern Kenya. “Drought” is defined as a year having 300 mm less precipitation than the norm. Source: Barrett et al. (in preparation).

Percent change		Males	Females
Camels	Marsabit	-4.4	-5.4
	Moyale	-4.2	-11.6
Cattle	Marsabit	-19.6	-50.1
	Moyale	-31.2	-44.0
Goats	Marsabit	-15.3	-20.1
	Moyale	-11.7	-16.6
Sheep	Marsabit	-15.3	-35.3

Table 5: Estimated effects of disease quarantine on livestock prices for northern Kenya. Source: Barrett et al. (in preparation).

Percent change		Males	Females
Camels	Marsabit	-7.3	-9.0
	Moyale	-9.7	-2.1
Cattle	Marsabit	-28.4	-11.6
	Moyale	-11.1	-6.6
Goats	Marsabit	-1.5	-5.4
	Moyale	-0.8	-1.1
Sheep	Marsabit	-4.3	-2.6

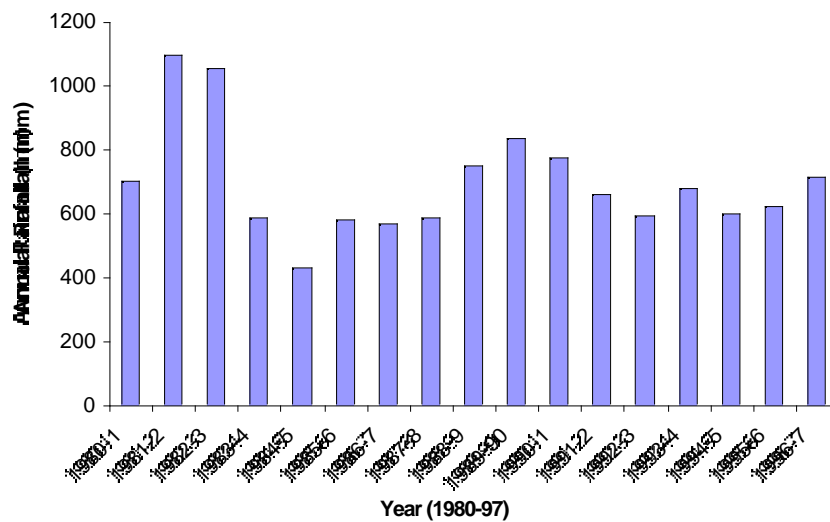


Figure 2. Annual rainfall variability for the north-central Borana plateau, 1980-97.

Source: Desta (1999).

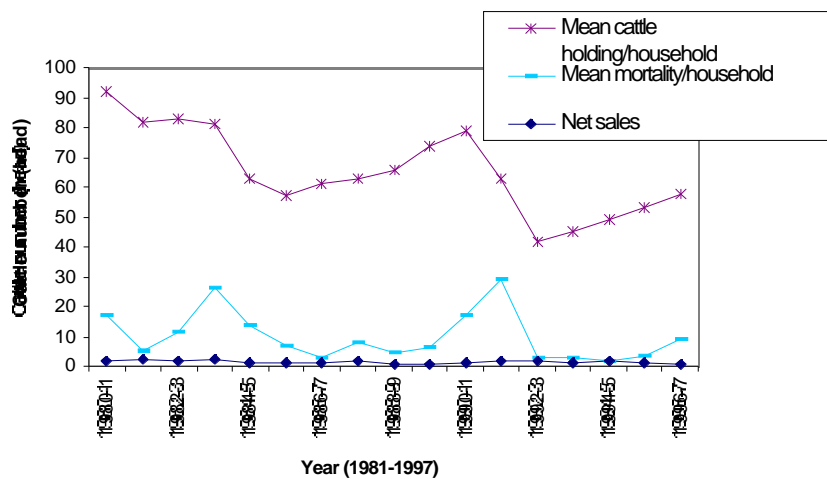


Figure 1. Patterns of cattle dynamics aggregated for 56 pastoral households on the Borana Plateau, 1980-97. Source: Desta (1999).

