

# Improving Pastoral Risk Management on East African Rangelands

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## Narrative Summary

Year 19 of the SR/GL-CRSP was the first year of work for this project. We began by establishing administrative links among primary collaborating institutions [i.e., Utah State University (USU), Egerton University (EU), University of Kentucky (UK), the World Council of Credit Unions (WOCCU), and the International Livestock Research Institute (ILRI)]. We also hired a post-doctoral associate, Dr. Kevin Smith, and prepared Smith for a year in the field with a two-week workshop held during February at Logan, Utah. Research began by wrapping-up a long-term field assignment by Solomon Desta in southern Ethiopia in October funded by USU, GL-CRSP, ILRI, and the Rockefeller Foundation. New field work began in March in both Ethiopia and Kenya with key roles played by Smith, Abraham Ndofor of WOCCU, and Dr. Jon Moris of USU. Smith began a broad reconnaissance of our study region to create a participatory risk map and study the status of support services. Ndofor did a two-week consultancy to evaluate rural finance in southern Ethiopia, while Moris performed a four-month survey of relevant policy issues in Kenya and Ethiopia. A research planning workshop chaired by Abdilahi Aboud et al. was held at EU in June where a review of research and training activities occurred. Two outreach workshops, variously chaired by Layne Coppock and Solomon Desta, were subsequently held in Addis Ababa and Nairobi to begin a process of organizing a strong group of development agents who could work with the project in setting outreach priorities for risk-management interventions and conceive collaborative pilot projects. Color brochures that describe the project have been widely distributed in Kenya and Ethiopia. Electronic communication has been set up with outreach participants via e-mail and a project web page. Two master's students, one Ethiopian and one Finnish and affiliated with Norwegian Agricultural University, received strategic support from the SR/GL-CRSP and began field work among the Gugi people in southern Ethiopia in August. Five other Kenyan and Ethiopian master's candidates were matriculated at EU under the tutelage of Aboud and Frank Lusenaka, and these students are envisioned as field assistants in the next research phase of the project. A Kenyan Ph.D. candidate was recruited to begin studies at UK, and prior to departure for the USA in August he conducted a survey of trader networks in the study area under the supervision of Peter Little. Other efforts in East Africa and the USA included completion of a literature review on pastoral natural-resource management and field data collection pertaining to property rights and production risks in southern Ethiopia led by Brent Swallow et al. at ILRI, a detailed literature review on pastoral economic diversification by Peter Little et al. at UK, and a review of livestock marketing literature and statistical analysis of thousands of records of livestock prices in northern Kenya led by Deevon Bailey and Christopher Barrett at USU. Development of a GIS template for the study area was begun by Paul Box et al. at USU, which is also linked to the on-going risk mapping activity.

We believe our first year has been a success. We were able to meet 28 of 30 targets for administration, research, and outreach despite potentially destabilizing events in both Kenya and Ethiopia. We were even able to address three additional targets that were not

explicit in the workplan. All research results are preliminary and are reviewed in the following pages. Research results aside, our key achievements include: (1) Creation of an effective and dynamic outreach capability involving 52 organizations with all indications being that we can play a very important role in improving communication and coordination among outreach participants, and consequently positively affect lives of project beneficiaries; (2) recruitment and/or support to 14 research trainees in a variety of master's, Ph.D., and special studies projects; and (3) creation of a strong team culture of research, intellectual freedom, and collegiality.

## **Research**

***Activity 1: Diversification of Livestock Assets for Risk Management in the Borana Pastoral System of Southern Ethiopia, led by Solomon Desta and Layne Coppock with key participants including Christopher Barrett and Simeon Ehui.***

### **Problem Statement and Approach**

Observations in the semi-arid Borana pastoral system have been interpreted to suggest that the cattle population dynamics exhibit a "boom and bust" pattern of rapid growth followed by precipitous crashes. It has also been contended that death losses of cattle due to starvation are very high and induced by equilibrational interactions between stocking rates and rainfall. Such losses have also been thought to constitute a large economic loss for the society overall, and the degree to which they are (or are not) predictable is important. The objectives of this activity are to confirm phenomena posed above as well as to quantify the risks and returns to cattle rearing. Once risks and returns to cattle rearing are identified, the features of complementary alternative (non-pastoral) investments can be known in terms of their maximum risk and minimum return characteristics. One subsequent goal is to prescribe a more risk-tolerant combination of assets that can help pastoralists mitigate economic losses and result in poverty alleviation. We also anticipated, however, that the Boran were not very diversified at present and had few economic links to towns other than occasional trips to market. Our approach involved survey of 336 Boran households within 35 km of the towns of Yabelo, Mega, Arero and Negele. History of cattle dynamics at the household level over the past 17 years was reconstructed based on 56 group interviews. Data were to be analyzed using descriptive statistics, factorial ANOVA (Analysis of Variance), and quadratic programming.

### **Highlights of Preliminary Results**

About 11,590 households distributed among 222 villages or encampments occurred in the sampling regions. A stratified random sample of 336 was selected for study. Of these 336 households 7% were classified as wealthy, 39% as middle class, and 54% as poor. Women headed 15% of all households. The vast majority of respondents perceived that their production system was in a downward spiral in terms of standards of living and human support capacity. Needs for grain for human consumption, and money to purchase food, were increasing. Ninety-one percent of respondents indicated that traditional pastoralism could no longer support the society. There is a strong desire among the population to diversify into non-pastoral economic activities, but the poor felt they had insufficient livestock assets to diversify while the middle class and wealthy felt that a lack of information on options was their major constraint. Few households had any business interests in town. Most of the major forms of diversification focused on cultivation and petty trade. About 82% of respondents knew about local banks and 30% had used banks at least once. The Boran were interested in using banking services

if they were more accessible. Informal financial institutions outside of family loaning of livestock were virtually non-existent. The rate of illiteracy among household heads was about 82%.

The average household lost 147 head of cattle over 17 years. The overall pattern resembled a cycle of "boom and bust" as the major cattle losses occurred during 1983-5 and 1990-1. The period 1983-5, in particular, was a time of severe drought. Cattle holdings per household appeared to ratchet downwards over the 17 years. A net downward trend was evident, from about 125 head of cattle per household in 1980 to 90 head per household in 1997. The total asset loss over 17 years totaled about USD 9,000 per household and USD 380,000,000 for Boran society at large, which was comprised of about 42,465 households. This confirmed that the economic losses due to cattle wastage and deaths has been extremely high for this society.

Factorial ANOVA were conducted to analyze eight cases of cattle herd dynamics involving four study areas (i.e., Yabelo, Mega, Negele, and Arero) and two classes of cattle (mature and immature). Two sets of eight ANOVA were conducted. One set dealt with the occurrence of mortality (i.e., yes or no cattle mortality happened in that year for that household) and the second set dealing with the magnitude of mortality once it occurred (i.e., if cattle mortality occurred, how great was it?). Data had to be analyzed in this fashion because there were many instances of zero mortality for households over the years and large numbers of zeros violated ANOVA assumptions. The data base for each of the eight ANOVA consisted of 14 households per study area. Results indicated that main effects of both stocking rate and rainfall significantly influenced ( $P < 0.05$ ) occurrence of cattle mortality for immatures in all four study areas, and significantly influenced ( $P < 0.05$ ) occurrence of mortality for matures in two of the four study areas. In the other two cases for matures (i.e., Negele and Mega) only rainfall had a significant effect ( $P < 0.05$ ) on occurrence of mortality. In contrast to results on occurrence of mortality, rainfall deficits alone affected ( $P < 0.05$ ) the magnitude of mortality in seven of eight ANOVA. Significant interactions between stocking rate and rainfall on cattle mortality were only observed in one of sixteen ANOVA.

This lack of statistically significant interactions between stocking rate and rainfall, contrary to our expectations, was attributed to the great variability among households in cattle mortality year to year, imprecision with recall data, and our contention that 17 years is actually a relatively short period of time to observe some types of important, yet rare, interactions. It is also possible that other factors such as disease epidemics and periodic animal losses to insecurity complicated cattle herd dynamics and made interpretation of results more difficult.

Nonetheless, it is clear that high stocking rates and low rainfall predispose the system to an increased occurrence and magnitude of cattle mortality. This quite simply implies that high stocking rates of cattle have an economic cost in terms of the risk they pose for contributing to crashes in cattle numbers. Stocking rate is a community management factor that could conceivably be managed to diversify assets, reduce grazing pressure, and mitigate losses of livestock capital in a comprehensive risk management approach. Rainfall operates more as an uncertainty factor that influences the magnitude of animal losses. Work continues on the risk and return aspects of cattle asset management, including simulation modeling. We are also pursuing the goal of prescribing viable investment alternatives that complement livestock, and these together with livestock could yield a more risk-tolerant portfolio for wealthy, middle-class, and poorer households.

***Activity 2: Participatory Risk Mapping for Targeting Research and Assistance, led by Kevin Smith, Christopher Barrett, and Paul Box.***

## **Problem Statement and Approach**

Pastoralists in southern Ethiopia and northern Kenya face a myriad of risks including droughts, food shortages, animal losses, disease epidemics, banditry, ethnic strife, border closures, land loss to environmental degradation, population growth, or land annexation, and price volatility for the livestock commodities they sell. It is important to get a broad understanding of the patterns of risks. We undertook this research as an efficient and inexpensive means to canvass an exceedingly large and diverse region. Results help us to confirm or refine hypotheses and stratify sites for future, more-intensive research at the community and household levels. Our approach was to have our post-doctoral associate crisscross the study region repeatedly and solicit views of people encountered regarding identifying and ranking the sources of risk they routinely face. Although certainly subjective and non-random, the method can result in establishing the behavioral or welfare effects of risk exposure and providing reasonable information per unit effort. Data are then geo-referenced with a hand-held GPS unit. Data can then be processed as a GIS layer easily depicted on maps and incorporated into other spatial databases. Data can be analyzed for spatial patterns of risk occurrence and degree of severity.

## **Highlights of Preliminary Results**

This work is in progress. The 82 interviews conducted by August, 1998, have yielded 219 total ranking points for 13 risk factors as volunteered by pastoralists. The ranking points reflect the number of times particular risk factors were mentioned as well as their ranking. Here data for men and women are combined, but we will segregate data by locale and gender for the final analysis. Trends in the data are interpreted to suggest that the dominant problem in the study region is food security (45 ranking points or 20% of the total), followed by poor livestock markets (39 ranking points or 18% of the total), water shortages (35 points or 16%), and animal disease (22 points or 10%). Other risks mentioned have included crop failures, conflicts and insecurity, wildlife damage to crops, and poor forage resources. It is hoped to double or triple the data base by early 1999 in year 2.

***Activity 3: Status of formal rural financial institutions serving the southern Ethiopian rangelands, led by Abraham Ndofor (consultant) with key participants including Christopher Barrett and Layne Coppock.***

## **Problem Statement and Approach**

One basic tenet of our project is the idea that pastoralists need local opportunities to save and invest money, and that this can create a virtuous cycle of economic growth in the region. Grass-roots community credit unions are one way to try to achieve this, because branches of national banks are often limited in accessibility. Credit unions also offer the means for communities to control the processes of savings mobilization and loans to help retain funds locally. We commissioned a short-term study by A. Ndofor, a regional expert with the World Council of Credit Unions (WOCCU), to examine the situation in the southern Ethiopian rangelands with respect to possibilities for credit union formation. The approach Ndofor used was interviewing a wide variety of pastoralists, development agents, and finance professionals over a period of two weeks. The terms of reference for Ndofor included evaluation of rural finance policy, assessment of local demand for rural financial services, and determination of whether there were social or economic features of the Boran that could mitigate against credit

union formation.

## **Highlights of Results**

With regards to finance policy the situation in Ethiopia is dynamic. Ethiopia has some credit unions already, but these are employer-based and located in major cities. There were, however, no federal laws to permit formation of community credit unions when Ndofor visited in March. Legislation was thus still required to allow formation of appropriate regulatory bodies that could oversee community credit union formation in rural areas. Ndofor noted, however, that some entities in-country were already pushing for the relevant federal legislation to be approved. Relatively few pastoralists in the south use formal financial services at present a general ignorance on this topic prevails. Opinions were mixed concerning the utility of informal financial systems in the area. Despite these obstacles, Ndofor reported that there was a genuine interest among pastoralists and local administrators towards savings mobilization. There was also the realization that the pastoral world was changing rapidly in the south and need for financial services would arise in the near future. Although the vast majority of the local population is illiterate (see above), Ndofor concluded that there was enough of a critical mass of educated people who could manage credit unions. In addition, the Boran culture was deemed as a very positive attribute in that it gives rise to the types of cohesive community values important for successful credit union formation. Finally, Ndofor proposed a highly decentralized structure for a community credit union network that reflects the spatially dispersed nature of pastoralism. He concluded that the basic elements were favorable for community credit union formation, assuming that relevant legislation was passed. A pilot approach was recommended whereby different forms of credit union implementation could be tested and evaluated. A major initial step would also include a broad-scaled community education program regarding financial services and their uses. Constraints in livestock marketing would also need to be overcome. Periodic bottlenecks for selling livestock routinely occur in the southern rangelands, and this in turn constrains monetization, economic security, and use of financial services provided by credit unions.

## **Addendum**

In August it was revealed that the appropriate legislation already exists to permit community credit union formation in the State of Oromia, irrespective of federal legislation. In addition, local experts in Addis Ababa predicted that federal legislation endorsing formation of community credit unions throughout the nation would be approved during 1999.

***Activity 4: Preliminary Assessment of Policy Environments for Pastoralists in Ethiopia and Kenya, led by Jon Moris.***

## **Problem Statement and Approach**

Understanding the policy environment for pastoralism is important because policy affects opportunities and constraints for development processes. Our approach involved interviews with decision makers and review of appropriate documentation in Kenya and Ethiopia during March to June.

## **Highlights of Results**

General similarities between the two countries: Compared to highlanders, pastoral

lowlanders in both countries have been marginalized in terms of development. They occupy borderlands which are often politically sensitive. Despite social and ecological stresses, human population growth in the rangelands has been significant. During the past 20 years a network of settlements has emerged based on continual distribution of food relief and has contributed to a "desert urbanization of the poor." General differences between the two countries: Both countries have attempted (Kenya) or are attempting (Ethiopia) to transfer more power of governance to local levels, but this has taken different forms Kenya began with a "District-level focus" in 1984 and Ethiopia is now implementing a federal system. The Kenya effort at decentralization has waned somewhat over time, however, and most power is still found in Nairobi. Kenya has an advantage over Ethiopia in that pastoralists in Kenya have been more exposed to rural education in some cases for over 20 years and Kenyan pastoralists appear more aware of the commercial economy. Ethiopia is more pre-occupied with building schools and getting pastoralists to send their children to school, while Kenya's problem appears more to be finding a sustainable way to finance the existing educational operations and infrastructure and getting better performance out of pastoral children who attend school. More provision of pastoral services is provided by NGOs in Kenya compared to that for Ethiopia. Kenya has encouraged and used NGOs to help capture more external funding for development, while Ethiopia has recently been more strict with NGOs and has compelled NGOs to conform and contribute more to governmental priorities for development. In Kenya there is somewhat less diversity in official languages used by government (i.e., Kiswahili, English) compared to that for Ethiopia (i.e., Amharic, Oromic, Tigrinya, English). Government in Ethiopia has been subjected to huge upheavals and change during the past 30 years, while Kenya government has been relatively stable, especially at the district level where continuity has been maintained in some rural areas for up to 70 years.

In terms of past policy interventions, there are many similarities between the two countries including: A commonly unsatisfactory experience with technical interventions in pastoral regions, which has contributed to disillusionment among pastoralists and agency personnel; overly optimistic development projections by planners; and unhappy donors. From the 1950s to 1980s development programs in both countries have commonly included grazing blocks, veterinary campaigns, range planning, water development, marketing infrastructure improvements, breeding ranches, and various forms of pastoral associations. Ethiopia has continued with large-scale range projects under the auspices of World Bank and African Development Bank financing, while Kenya has tended to refrain from such continued involvement on a broad scale, except for the Arid Lands Resource Management Project financed by World Bank. In the 1990s more typical interventions are localized, small-scale, and participatory including drought mitigation, re-stocking, women's programs, improvement of goats and camels, etc.

There is variation between Kenya and Ethiopia in the process of how policies are forwarded, debated, processed, and approved. Major policies in Ethiopia appear to be crafted in general and idealistic forms, while those in Kenya appear to be more detailed and technocratic. In Ethiopia policies appear to be used more for mobilizing a population that is still trying to learn about policy implications. In Kenya, proclamations are often highly specific about investment commitments to various sectors. Investments may not always be delivered, but the Kenyan population appears generally better informed and knowledgeable about policy implications. Ethiopia at present is more sensitive to intrusion by donors or other outsiders in debates over key policy issues, while in Kenya many draft policies and background papers are viewed as not particularly sensitive and are even prepared with donor assistance. Government structure in Ethiopia is dynamic at state and federal levels given the massive changes in

Ethiopia over the past 30 years this is not surprising. Government structure in Kenya, however, is relatively stable and even outlined in the Nairobi phone book.

**Other features of Ethiopia include:** A national early warning system is run by the federal Disaster Prevention and Preparedness Commission (DPPC); agricultural field bureaus, run by the various states tend to be weak and have insufficient resources; NGOs are experimenting with local paravets, but drug supplies are a problem; the status of livestock marketing infrastructure is unclear some resources are in the process of privatization; revenue generation occurs through annual taxation at the household level as administered through peasant associations; pastoral lands are still held by the state, but can be leased to commercial operators; government allows pastoralists the freedom to own guns; bush encroachment is a threat to carrying capacity for range livestock, and privatization is an issue commonly manifested at a local level.

**Other features of Kenya include:** District-based, early warning systems are coordinated from the Office of the President; the Ministry of Agriculture and Livestock Development still carries out a reduced set of technical and participatory activities at the District level; NGOs are also experimenting with paravets; status of marketing infrastructure is unclear much has deteriorated and is no longer used; revenue generation solely by fees raised by County Councils on commercial activity; pastoral lands are still held by the state, with some group ranch legislation still in effect uncertainty for the future of land tenure in some areas prevails; government only officially condones that pastoralists have guns if they reside near an international border; bush encroachment is a threat to carrying capacity for range livestock; and privatization is an issue more at the national level.

The lengthy process of forming new policies in Ethiopia is caused by several factors, and a "policy gap" can be problematic if it allows poorly thought-out initiatives to be approved in the interim. The lack of policy and relevant technical interventions is particularly evident for the rangelands in Ethiopia. For example, a new move towards forced sedentarization of pastoral populations or initiation of irrigation schemes may be poor choices that could be pursued in the absence of a well thought-out policy framework. In the absence of new policies, old policies of previous Ethiopian regimes would remain as defacto rules and regulations, even if they are not appropriate today. Despite a "policy gap" and a lack of operating resources, the federal and state governments in Ethiopia appear committed to redressing problems in the rangeland areas by virtue of their commitments to creating new development agency offices in the south and paying attention to problems of infrastructure and supporting institutions. Kenya's problem, in contrast to Ethiopia, is a rather poor record of policy implementation in the rangelands despite having more governmental stability and a generally greater access to operating resources and well-trained agency manpower. The few larger range projects that remain in Kenya may still not be making the most effective use of a vast amount of technical information at their disposal. Problems with banditry, infrastructural damage from El Niño, and a decline in tourist revenues have recently hurt Kenya and have probably contributed to more isolation and poverty stress in the northern rangelands. The once impressive governmental services in the range sector still appear well-staffed, but operating resources to make good use of trained manpower are increasingly scarce.

Some issues that merit more attention as avenues for new initiatives in both southern Ethiopia and northern Kenya include consideration of how to sustain and strengthen local-level, decentralized development agencies, user associations for water supplies, other forms of grass-roots community mobilization, locally supported paravets, and alternative approaches to existing disaster early-warning systems. One fruitful area of applied research could involve study of how economic policies influence pastoral

behavior at international borders, especially when those borders are like the one between southern Ethiopia and northern Kenya that bisects a functioning market space. How government can best achieve its goals and improve the welfare of locals with instruments such as exchange rates, duties, taxes, etc, could be illuminating.

Major unresolved policy issues for Ethiopia may include: (1) How to improve food security in the lowlands; (2) how to mitigate resource degradation in semi-arid range sites, especially in the form of bush encroachment; (3) how to train and retain more talented personnel in the public sector, and encourage more talent to reside in rural locations to better serve the rural population; (4) how to engage more pastoralists in obtaining formal education and making rural education sustainable; and (5) consider other equitable forms of revenue generation for rangeland areas. For Kenya, major unresolved policy issues may include: (1) dealing with how to improved the security of land claims, rural people, and rural commerce; (2) rehabilitation of infrastructure; (3) reconsidering how formal education can best meet changing needs of pastoralists; (4) how to limit and redress environmental degradation and growing poverty associated with rangeland towns and settlements; (5) how to retain talented public sector personnel, as above; and (6) consider other forms of revenue generation, as above.

***Activity 5: Marketing Perspectives for Pastoral East Africa Price Dynamics and Trader Networks, led by Deevon Bailey, Peter Little, and Christopher Barrett with key participants including Francis Chabari, Hussein Mahmoud, and Sheila Nkonge.***

### **Problem Statement and Approach Price Dynamics**

The ability of pastoralists to market their livestock products in a timely fashion and at a fair price is essential for improving risk management at the household level, permitting an economic climate that fosters monetization, savings, and investment, and lessens the threat of environmental degradation due to factors such as overgrazing. One key element of marketing is price risk. If prices are relatively stable, lucrative, and predictable over space and time, planning horizons for producers and traders are improved and marketing efficiency can be enhanced. If, however, prices are relatively volatile, low, and unpredictable, this provides disincentives for producers and traders and market dysfunction can occur. We have initially addressed this component by commencing on a literature review of livestock and grain marketing for pastoral regions of East Africa. This review will identify areas where additional research is needed to answer questions about how price discovery occurs and the role of infrastructural constraints in market function. Another result of the review will be determination of revised theoretical frameworks and novel modeling applications. We have also embarked on an empirical analysis of livestock price dynamics and rainfall patterns for our study region. We have initially focused on data sets provided by the GTZ Marsabit Development Project in northern Kenya . We hope to complement this work with data from southern Ethiopia in the near future.

### **Preliminary Results Price Dynamics**

The data base for northern Kenya consists of over 63,000 records. Records include price data for cattle, camels, sheep, goats, donkeys and poultry collected at four markets (i.e., Dagoretti, Kariobangi, Marsabit, and Moyale) during the period 1993-7. We also have monthly rainfall data for Moyale and Marsabit for the period 1991-7 and quarantine records since 1990. We will examine relationships among market throughput, prices, rainfall, and quarantine restrictions.

Our initial analyses indicate a high degree of week-to-week price variation for livestock

in these markets. This means that pastoralists face considerable price risk when they take their animals to market. Price differences among markets on similar dates are also extremely variable, indicating that there are additional price risks involved when livestock are moved over long distances. Such levels of price risk almost certainly affect marketing decisions in the study region.

### **Problem Statement and Approach Trader Networks**

Virtually no detailed studies have been conducted concerning livestock marketing chains linking northern Kenya and southern Ethiopia with a terminal market in Nairobi. A preliminary survey was therefore conducted by Hussein Mahmoud under the supervision of Peter Little during August, 1998, to clarify trader networks, market through-puts, and marketing risks. Mr. Mahmoud visited markets in Nairobi, Isiolo, Marsabit, and Moyale and conducted 20 structured interviews with traders as well as visits with government officials and various NGOs. He also collected secondary data on livestock and grain marketing, veterinary services and quarantines.

### **Preliminary Results Trader Networks**

Livestock trade is a very important aspect of the economy of northern Kenya and southern Ethiopia. Moyale is a key livestock and agricultural market that serves as an important daily outlet for both agricultural products and livestock from Ethiopia. In 1996, 33,500 cattle and 15,700 goats were exported (with veterinary permit) from Moyale to Nairobi perhaps another 5,000 head of each were trekked to Isiolo avoiding veterinary requirements. In 1997, the various influences of El Niño served to reduce cattle and goat exports from Moyale by 60% and 39%, respectively, compared to the previous year. Conversely, however, the prolonged rains of 1997 appeared to boost crop production in the vicinity of Moyale, Sololo, and Marsabit. Most cattle for the Nairobi market come from southern Ethiopia, while most of the goats come from northern Kenya. Isiolo may not play a critical role in the regional livestock trade as once thought. Rather, livestock for Isiolo markets tend to be procured locally (including from lowland Samburu) and then re-distributed to Nanyuki, Nyeri, and Nairobi. Livestock originating in Moyale and Marsabit tend to by-pass Isiolo and head straight for Nairobi markets. Transport costs for livestock from Moyale to Nairobi are very high, and represent up to 15% of the original purchase price. For example, it can cost Ksh 40,000 to transport 18 head of cattle. Profitability is also reportedly threatened by excessive County Council fees, bribery, and unpredictable prices in Nairobi. Animals which are trucked or trekked long distances are at risk of morbidity or death. Market bans due to foot-and-mouth disease quarantines persisted up to six months in a few cases during the period 1992-8, which further contributes to marketing risks. In total Baringo and Samburu may export only 14,000 cattle per year, but export of smallstock may exceed 45,000 head per year. Nairobi is an important market for smallstock, while Nakuru and Laikipia are important outlets for cattle. Trading networks are often defined by ethnicity. Boran procure cattle in southern Ethiopia and get them to Moyale, while Burji traders (numbering 50 to 70), Garre, and a few Gabra are more involved in the livestock trade between Moyale and Nairobi. Many Burji traders have also diversified into trucking and wholesale operations, but most are also illiterate, know little of formal financial services, carry lots of cash when transporting animals, and thus are susceptible to robbery. The Isiolo trader network is dominated by Boran, Garre, and Issaq. The Boran tend to procure livestock locally for market, while the Garre can operate far to the north and northeast. The Issaq are the wealthiest traders who have worked in the area for the longest time. The Issaq are also diversified into other endeavors, including hotels, farming, wholesaler enterprises, and ranch fattening of beef cattle. Some Boran and Meru traders are

involved in moving livestock from Isiolo to Nairobi.

***Activity 6: Economic Diversification and Risk Management among East African Herders A Preliminary Assessment, led by Peter Little with key participants including Barbara Cellarius.***

### **Problem Statement and Approach**

The general social and economic literature postulates that economic diversification is a key component of risk management. We wanted to further explore this critical concept by conducting a thorough review of pastoral literature and secondary data for East Africa. Specifically, it was of interest to evaluate the influence of a number of key variables on the extent to which economic diversification occurs among pastoralists. These variables included: annual rainfall, ethnicity, ratio of pastoral to non-pastoral income sources, type of non-pastoral enterprises, income source by herder wealth category, gender, "other" indicators of income flows (i.e., food aid transfers), human population density, per capita livestock holdings, distance to urban centers, and effects of time.

### **Preliminary Results**

Our review resulted in the following conclusions: (1) Cultivation generally allows herders to better manage risk in more favorable agricultural areas, but in less favorable (i.e., lower rainfall) areas cultivation can actually increase risks and result in localized environmental degradation; (2) per capita livestock holdings are a good predictor of pastoral diversification the lower the holdings the greater the degree of diversification; (3) human population density is also a good predictor of pastoral diversification the higher the density the greater the diversification; (4) agroclimatic data can help determine certain patterns of diversification, but spatial relations (i.e., distance to markets and urban pastoralists via trading also seems to be an important element of diversification since the 1980s. Rapid growth (i.e., >10% per annum) of market towns such as Marsabit, Isiolo, and Maralal reflects the increased importance of trading in the study region.

We also found several gaps in our understanding of economic diversification among East African pastoralists. First, there is a lack of detailed information on intra-household resource allocation and how women are influenced by opportunities in the non-pastoral sector. Second, there needs to be more work on the risks and returns of non-pastoral investments, particularly education. Third, the literature raises a series of questions attempting to link economic diversification and risk management with spatial proximity to things like urban centers and roads, but provides little analytical treatment. The GL-CRSP can address all of these gaps in subsequent research.

***Activity 7: Spatially Explicit Archive (Atlas) of the Study Region, led by Paul Box with key participants including Chet Olson, Akiko Ogawa, and Kevin Smith.***

### **Problem Statement and Approach**

Assessment of risk management needs and options is greatly facilitated using a broad, spatial perspective. Recent advances in Geographic Information Systems (GIS) technology allows us to effectively incorporate spatial display and analysis in our project. We first wanted to begin to create a GIS template for the study region and incorporate a spatially explicit, simulation modeling environment that will operate on

the GIS template. The idea is to use the GIS template as a spatially explicit means of storing archived literature and field data. The template can also be used to help us analyze for spatial patterns in field data, with special reference to the risk mapping exercise described previously. Lastly, the GIS template can serve as means to conduct macro-level spatial and economic analysis. Mechanistic models depicting pastoral herd dynamics over space and time can operate on the GIS template.

## **Preliminary Results**

A series of GIS files have been located and compiled from standard public locations. The GIS layers compiled for a base map include: (1) country boundaries; (2) water bodies (lakes and oceans); (3) rivers; (4) major cities; (5) roads and railways; and (6) elevation (for shaded relief). Coding requirements are currently underway for the multi-agent simulation environment the system should be ready for pilot exercises by November. The geo-referenced risk mapping data is being added as a layer to the GIS template as an ongoing exercise.

***Activity 8 and 9: Land Use, Land Management, Risks, and Property Rights in Southern Ethiopia, variously led by Brent Swallow, Nancy McCarthy, Winnie Luseno, and Michael Kirk with key participants including A.B. Kamara.***

## **Problem Statement and Approach**

Property rights the rules that determine who can use resources and how they can be used help shape the way that people use land and livestock. Currently, in much of sub-Saharan Africa grazing lands are primarily governed by common property regimes which allow people to pool and reduce risks associated with variable forage production. The specific aims of this activity are to: (1) better understand grazing management under different property rights regimes and with different environmental and production risks; (2) identify conditions under which different development pathways are followed; and (3) identify how policy and other external interventions can assist communities to achieve preferred development pathways. The approach includes: (1) literature review; (2) development of a conceptual framework to analyze the relationships among property rights regimes, risk, land allocation, and livestock production; (3) development of simulation models that depict short- and long-term consequences of alternative policies; and (4) conducting field research in southern Ethiopia to examine relationships and test hypotheses. This report focuses on a review of land-tenure policy in Ethiopia, predictions of analytical models, and some initial field results.

Some clarification on field procedures is warranted. Forty ardas (communities) were selected in the Borana region to field test predictions from the analytical modeling. These were selected from the six districts of Yabello, Mega, Arero, Negelle, Teltele, and Moyale. The main criteria for sample stratification were the average and distribution (CV) of annual rainfall (in mm) for data collected from 1992-7. Mean rainfall varied from 873 mm (Arero) to 353 mm (Demballa Wachu). Coefficients of variation (CVs) were not necessarily correlated with mean rainfall, as is commonly the case elsewhere CVs ranged from 67% to 23%. They wanted to distribute the 40 sites evenly among four cells. The cells would vary in terms of mean rainfall (high or low) and variability (high or low). A 12-page questionnaire was used as the community level survey using participatory rural appraisal (PRA) methods. A GIS Spatial Characterization Tool and field surveys were used to characterize ecological resources and prepare community maps. Each community consisted of two or more encampments (e.g., ollas). Marketing and price data were collected from six markets on the Borana

Plateau.

## **Preliminary Results**

A review of land-use and property rights for Ethiopia is most easily broken-out into three periods: (1) The time of the Monarchy (until 1974; referred to here as Pre Derg); (2) the time of the socialist regime (1974-91; referred to as Derg); and (3) the time of the transitional government (1991- present; referred to as Post Derg). Each of these regimes has introduced different land policies. In Pre Derg times a few, large landowners controlled a massive peasantry through tithing, verbal lease arrangements, and sharecropping. In Derg times rural land was nationalized and programs involving creation of a socialist agrarian society prevailed individual transfer of land was prohibited. The current regime has moved relatively slowly on changing land tenurial regimes. At present there is a policy mix it is generally proclaimed that land remains under national ownership, but some inheritance rights are now respected and commercial privatization is encouraged in some cases. To a large extent pastoral land use in the south has remained unchanged over many generations, and relatively unaffected by change of government in Addis Ababa. One exception has been the creation of Peasant Associations (PAs) in the 1970s, which sometimes complimented, or conflicted, with traditional decision-making processes. In some cases private access to land can be granted through PAs, which circumvents more conservative judgements by traditional pastoral leaders. It is contended that there is a growing trend of privatization on the Borana Plateau annexation of communal land for cropping and pastures is the main form this trend takes, and some attempt to examine this issue and the threats it could pose to the pastoral way of life needs to occur.

A conceptual framework of how climate risk is related to land use patterns and enterprise choices under alternative social structures and tenurial regimes was established using analytical and simulation modeling. This effort yielded some predictions which could be field tested. Two of these predictions, for example, include: (1) in the absence of perfect social cooperation, a decreased climate risk (i.e., reduced annual variability in rainfall) should lead to higher stocking rates and lower profits per household with a specter of overstocking; and (2) conversely, in the presence of perfect social cooperation, a decreased climate risk should lead to lower stocking rates and higher profits per household. There are seven other hypotheses from this work that examine interactions among other socio-economic and environmental variables and their expected outcomes in terms of livestock management and property rights regimes.

Field data documented ecological and production characteristics for each of the 40 ardha. There were 199 olla comprised of 3,141 households. About 74% of households were headed by males, and 12, 21, and 66% of households, respectively, were characterized as wealthy, middle-class or poor. Cattle added to over 64,000 head and comprised 91% of the livestock biomass. Communal land overall added to 75% of the areas surveyed, while privatized land made up the remainder. Most (nearly 17 percentage points) of the privatized land was used for cultivation. Thirty-two of the 40 communities were involved in cultivation. Cultivation has increased from 1.4% of the land area to 17% in some cases by 1997. These data are currently being used to parameterize econometric models to test relationships among stocking rates, land use, property rights, and management institutions as mentioned above.

## **Gender**

We recognize the key role that women can play in carrying out applied research and outreach. We also recognize the importance of women and youths in our target

population of beneficiaries when designing our field investigations. Gender dimensions of our project are thus reflected in terms of : (1) how our team is organized; (2) the research questions and issues being pursued in the field; (3) how training benefits are allocated; and (4) the types of people who are participating in our outreach activity. Examples follow below.

First, we have two female scientists on our team, namely Dr. Cheryl Doss of Williams College and Dr. Nancy McCarthy of ILRI. Both are economists.

We are studying risk at various hierarchical levels. These include the regional, subregional, community, household, and individual levels of resolution. There can be important variability in risk exposure at each of these levels. Issues of gender and age can influence variability in risk exposure, particularly at the levels of the individual, household, and community. Females and youths may be unduly exposed to risks by virtue of their relative lack of social and economic power in these societies. Females and youths can be among the first casualties of severe socioeconomic or ecological perturbations. For example, it is well known that perturbations involving drought or insecurity 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, if any, assets. Women from such households are commonly those who are initially forced to diversify their income-generating activities to survive, including marketing of dairy products, incense, firewood, etc. They and their families are especially vulnerable and will receive special attention during the course of our project. In the household economics study by Desta, women were found to be the heads of almost 14% of Boran households (i.e., 1,583 households out of 11,562 censused within a 30-km radius of four towns), and 83% of these female-headed households were found to be relatively "poor" on the basis of livestock holdings. In the risk mapping study by Smith, risks as identified and ranked by women are held separate from those of men to see if varied patterns ultimately emerge.

We have given support to two female trainees in year one, both of whom are working on master's degrees associated with the Agricultural University of Norway. Their thesis topics are described in a following section under training. These women are Tihut Yirgu Asfaw (Ethiopian) and Kirsi Saaristo (Finnish). We are always on the lookout to recruit women for training opportunities.

For our outreach network we have included 25 organizations from Ethiopia and 27 from Kenya. Senior women represent five of these organizations in Ethiopia and four in Kenya.

## **Policy**

We have several goals for involving policy makers in our project. The first goal is to build a general awareness that we exist. A second goal is to "go on the offensive" regarding a few key issues and bring policy makers into that loop. A third goal is to actively involve some key policy makers in the decision-making process for our project.

We have identified policy makers either via the survey by Moris (above) or through an iterative process in our outreach activities.

For the first goal, we made a couple thousand copies of a color brochure that described the project, and have liberally distributed these to a wide variety of decision makers at local, national, and regional levels. Also for the first goal, we have included key decision makers as "information participants" in our outreach activity. Information participants receive hard copies of outreach workshop deliberations and are always

invited to attend.

For the second goal, we have contacted key individuals outlining the stance of the project on critical outreach issues and soliciting their support or participation. One good example is up-grading the road from Isiolo, Kenya, to Moyale, Ethiopia. We envision that improving this road could yield many benefits to help pastoralists better manage risks in our study region. Now is the time to set lines of communication in place. We have thus sent letters and/or e-mails espousing aspects of road improvement for northern Kenya to representatives of national and multi-national entities in-region.

For the third goal, we are gradually involving key national or state decision makers as co-hosts of outreach workshops. This gets them involved at the beginning. A good example is inviting leaders of the Oromia State Bureaus for Research Coordination and Cooperative Promotion to co-chair outreach workshops in Addis Ababa.

## **Outreach**

Our outreach targets are gradually evolving. Overall, we currently have two main outreach goals: (1) empowering pastoralists and agropastoralists within our study area to better manage the risks they face at a local level; and (2) identifying key national and regional issues pertaining to policy, infrastructure, etc., which impinge on the ability of people to act locally to improve their circumstances. Our approach varies with the two goals. Policy overlaps with outreach in some cases.

We have started to address the first goal through outreach activities. We currently have a network of 25 organizations in Ethiopia and 27 in Kenya. About half of these organizations are involved with grass-roots development within our study region. Typically each major town or settlement is home to one or more of these organizations. We use the outreach workshops to achieve consensus and coordination on local risk management interventions. For example, in Ethiopia the workshop participants agreed that out of a broad spectrum of choices, the risk management priorities should be: (1) conflict mitigation; (2) public education; and (3) benefits-oriented, cooperative formation. Improved focus on these topics is what will be striven for by workshop participants at their specific localities. A similar effort will be conducted for Kenya before the end of 1998. The next step in year 2 is to create an outreach component on the GL-CRSP that is independent of core funding for the applied research, and acts regionally to unite outreach across southern Ethiopia and northern Kenya. This outreach component will be a coordination arm to harmonize efforts of outreach participants at each locale to achieve improved risk management capability across the region.

For the second goal, our approach is to first identify the issue, either through outreach or applied research. Then we begin an "information offensive" that takes the form of letter writing, publishing popular articles, and organizing meetings. For example, one regional issue that has been identified as crucial is up-grading the road between Moyale and Isiolo. This has been identified through field reconnaissance and analysis of livestock marketing data. If this road were to be up-graded, numerous benefits would accrue to livestock markets, security, rural investment, etc. Another issue identified this year at the national level was the apparent lack of federal legislation in Ethiopia to allow formation of community credit unions in the southern rangelands. The State of Oromia, however, had already published a proclamation that would allow such activity, and such a state-level initiative can proceed in the absence of a federal initiative. Other issues are pending for year 2. These include the blanket prohibition of prescribed fire as a range management tool in southern Ethiopia, which has contributed to bush encroachment and hence a loss of carrying capacity for cattle there. Another includes a

plethora of cross-border issues that create bottlenecks between Kenya and Ethiopia concerning livestock trade.

To complete outreach for year 1 we also established a web page that outlines activities of the project and provides trip reports, training announcements, and other documentation for members of our outreach group in both Kenya and Ethiopia.

## **Developmental Impact**

### **Environment**

The benefits of our project to the environment tend to be more indirect rather than direct, and more medium- and long-term rather than short-term. Our basic position is that improved risk management will 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 crisis induced by drought and growing human populations. One tactic is to sell some animals before a crisis occurs, and use the funds received as household-level 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 across a society, the rate of growth in stocking rates would be mitigated. This would reduce the specter of heavy stocking rates on the land during years of lower-than-average rainfall, which is the key window of time when range vegetation is degraded. The "boom and bust" in the cattle cycle would be dampened as a result. The build up in non-livestock capital and investment would then permit societies 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 being engaged in destructive activities such as charcoal making, harvesting of green fuelwood, 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 production systems in our study region are unsustainable. For example, there is a loss of 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 resource restriction. There is abundant evidence that whether due to poor demand, bad 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 can 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 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 vibrant 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 endogenous and exogenous shocks.

### **Contributions to US 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 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. While livestock producers in the United States are under no imminent threat of starvation or extreme destitution comparable to pastoralists in northern Kenya or southern Ethiopia, there are commonalities in terms of how risks are conceptualized and interact to cause problems. For example, it has been forwarded by Holechek et al. 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 prominent implementation constraints for East African pastoralists. Whether drought cycles are predictable or not, and the possible influence of phenomena like El Niño on precipitation regimes, is a core issue of debate for agriculture in the United States as well as 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 suspicion. 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 some nine host-country nationals during year 1 (described below). 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 contributions have also included computers, books, and other technical materials to our main academic partner in Kenya, Egerton University.

### **Collaboration with IARCs and Other CRSPs**

We collaborate extensively with the International Livestock Research Institute (ILRI) in both Ethiopia and Kenya. We hold our workshops at ILRI conference facilities. Some administrative and logistical support is provided to us by ILRI. We have a link to the Livestock Policy Analysis Programme (LPAP). Dr. Nancy McCarthy is an economist with LPAP who is also a member of our GL-CRSP team. We also have links to the BASIS CRSP. Dr. Peter Little, a Co-PI on the GL-CRSP, is a PI on the BASIS CRSP. The GL-CRSP and BASIS CRSP share an interest in policy and economic issues that deal with border relations.

### **Other Contributions**

#### **Support for Free Markets and Broad-Based Economic Growth**

Interventions that will be advocated by our project will be in direct support of free markets and economic growth. Some of this has been previously described. This prominently involves linkages between markets and formation of benefits-oriented cooperatives to empower pastoralists at the local level. At a recent outreach workshop in Addis Ababa, one conclusion was that the GL-CRSP should help outreach partners find a means to help pastoralists form their own cooperative associations to spur development processes the idea being that a local association would form and pool capital resources to first organize a community credit union. This would be an impetus for the group to procure production inputs and invest to improve their marketing capability to make themselves less vulnerable to trading bottlenecks. A group, for example, could purchase a large truck and handle their own livestock shipping. The outreach entity would only provide the initial training and a few select inputs to get it rolling. The success of such an endeavor would rely heavily on the availability of livestock and grain markets and their efficiency of operation. Taken together, these elements all reflect the functioning of free markets, a role for agri-business, and developing a capability for pastoralists to empower themselves using private enterprise.

#### **Contributions to and Compliance with USAID Mission Objectives**

Our project contributes to and complies with Mission objectives in each country by dealing with food security, economic growth, the environment, and privatization issues. We have incipient, but good, contacts with prominent people in both USAID 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. For outreach, priorities like public education, conflict mitigation, and

formation of benefits-oriented cooperatives are testimony to the value we place on helping individuals improve their lives by being able to deal with risk by making more-informed choices.

## **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, in conjunction with helping formulate a broad program of improved risk management, to assist with the consolidation of a broad program of public education and awareness that will specifically culminate in helping pastoralists communicate their needs and desires with their locally elected representatives.

## **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 outreach as well as research. Research will therefore will very relevant to solving problems related to the "human condition" in the study region.

## **Leveraged Funds and Linked Projects**

The International Livestock Research Institute has contributed USD 4,000 this year to our project in accommodation costs. Egerton University has contributed about USD 7,231. This includes one month of salary support for both Aboud and Lusenaka (total = USD 1,631) and has waived USD 4,000 in annual tuition for four Kenyan students in the new masters program in the Department of Natural Resources linked to the GL-CRSP. They also have provided USD 1,600 in stipends for the Kenyans starting in September. Our grand total leveraging in-region is thus USD 11,231. A new project at Utah State University led by Dr. Paul Box entitled "A GIS-Based Cellular Automata and Individual-Based Model Simulation Environment" is briefly described below. This provides leveraging of another USD 19,200. Another older project at Utah State led by Dr. Layne Coppock funded by the USDA Sustainable Agriculture Research & Extension (SARE) program is entitled "Public Land Grazing Permittees Under Pressure: Sustainability of Coping Strategies on Private Lands" is briefly described below. It has been funded at USD 20,000 per year for three years. The grand total leveraging is thus USD 50,431 for year 1, equivalent to 16% of our core funds from the GL-CRSP.

Our project is linked to other projects dealing with outreach and research. For outreach, we are developing linkages 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 in Ethiopia, GTZ (in Maralal, Marsabit and Negele), Save the Children/USA, Norwegian Church Aid, and the Arid Lands Resource Management Project in Kenya. For research, our project has a link to several 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. In the United States, our project is linked to a new 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 a GIS framework and spatial modeling capability for our analyses of our project region in northern Kenya and southern Ethiopia. Our project is also linked to an older effort at Utah State University funded by USDA-SARE led by Dr. Layne Coppock since 1995.

This involves identification of prominent threats to the sustainability of 393 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.

## **Training**

### **Long-Term Training**

(Note: The list below includes graduate students and post-doctoral associates who are receiving full financial support from the GL-CRSP, as well as those who receive various forms of partial support. The list also includes graduates and undergraduates who have assisted with literature reviews, data analysis, and related tasks in the form of special projects).

Solomon Desta. Ph.D. Graduation in 1999. Range science (economics). Utah State University, Logan, Utah, USA.

Tihut Yirgu Asfaw. MA. Graduation in 1999. Rural economic development. Norwegian Agricultural University, Norway.

Kirsi Saaristo. MA. Graduation in 1999. Rural economic development. Norwegian Agricultural University, Norway.

Hussein A. Mahmoud. Ph.D. Graduation in 2001. Economic anthropology. University of Kentucky, Lexington, Kentucky, USA.

John Tangus. MS. Graduation in 2000. Natural resource social science. Egerton University, Kenya.

Clement Isiah Lenachuru. MS. Graduation in 2000. Natural resource social science. Egerton University, Kenya.

Mulugeta Shibru. MS. Graduation in 2000. Natural resource social science. Egerton University, Kenya.

Charles Lugo. MS. Graduation in 2000. Natural resource social science. Egerton University, Kenya.

Moses Esilaba. MS. Graduation in 2000. Natural resource social science. Egerton University, Kenya.

Sheila Nkonge. BA. Graduation in 2003. Business Administration. Utah State University, Logan, Utah, USA

Chet Olson. BA. Graduation in 1999. Geography & Earth Resources. Utah State University, Logan, Utah, USA

Akiko Ogawa. MA. Graduation in 2000. Geography & Earth Resources. Utah State University, Logan, USA.

Barbara Cellarius. Ph.D. Graduation in 2002. Anthropology. University of Kentucky, Lexington, Kentucky, USA.

Kevin Smith. Post-doctoral associate. Finishing in 1999. Economic Anthropology. Department of Rangeland Resources, Utah State University, Logan, Utah, USA.

## **Short-Term Training (research and outreach workshops)**

*Preliminary Research Planning Workshop on Risk Mapping and Associated Field Topics, held at Utah State University, Logan, UT, February 16-26, 1998.* The purpose of this was to provide a framework for the field work to be undertaken by Dr. Kevin Smith, a newly hired post-doctoral associate. Attendees were primarily GL-CRSP team members including Coppock, Smith, Barrett, Little, Box, Bailey, Desta, and Moris and advisory board member Adams.

*First Project Planning Workshop, held at Egerton University, Njoro, Kenya, June 18-22, 1998.* The purpose of this was to review initial progress in field research, review the proposed master's-level training program in the Department of Natural Resources at Egerton (that would supply students for our field work), and do a review of possible field sites in Baringo District. There were about 27 people in attendance at the workshop sessions held at the Egerton campus. The Kenyans were mostly represented by key administrators and faculty, staff, and prospective graduate students from the Department of Natural Resources. Team members of the GL-CRSP in attendance included Coppock, Barrett, Little, Smith, Moris and McCarthy.

*First Outreach Workshop for Ethiopia, held at ILRI, Addis Ababa, Ethiopia, August 18, 1998.* The purpose of this was to review progress in field research and have the outreach group set risk management priorities for intervention in southern Ethiopia. There were 21 people in attendance. Team members, students, and field assistants of the GL-CRSP in attendance included Coppock, Smith, Tihut Yirgu, Kirsii Saaristo, and Shanu Godana.

*First Outreach Workshop for Kenya, to be held at ILRI, Nairobi, Kenya, December 01, 1998.* The purpose of this meeting is the same as the one immediately above for Ethiopia. It was postponed from late August because of travel restrictions imposed for Kenya due to the embassy bombings. About 25 people are expected to attend. Team members of the GL-CRSP who will be in attendance for this meeting include Coppock and Desta.

## **Collaborating Personnel**

### **United States**

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

Dr. Christopher Barrett, Associate Professor, Department of Agricultural, Resource & Managerial Economics, 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, Department of Economics, Williams College.

Dr. Upmanu Lall, Professor, Department of Civil and Environmental Engineering, Utah State University.

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

Dr. Jon Moris, Professor, Department of Sociology, Social Work & Anthropology, Utah State University.

Dr. Allen Rasmussen, Associate Professor, Department of Rangeland Resources, Utah State University.

### **Ethiopia**

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

### **Kenya**

Mr. Abdillahi Aboud, Professor, Department of Natural Resources, Egerton University.

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

Dr. Brent Swallow, research scientist, Livestock Policy Analysis Program, International Livestock Research Institute.

## **Collaborating Institutions**

### **United States**

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Department of Agricultural, Resource & Managerial Economics

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Department of Economics

Williams College

Williamstown, MA 01267

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### **Ethiopia**

Livestock Policy Analysis Program

International Livestock Research Institute

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Fax: 251-1-611-892.

### **Kenya**

Livestock Policy Analysis Program

International Livestock Research Inst.

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Nairobi, Kenya.

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Fax: 254-2-631-481

### **Publications**

We have no peer-reviewed publications ready for submission by the end of year 1. Several are in preparation, however. We have published two popular articles in Ruminations, the newsletter of the SR/GL-CRSP, during year 1. One dealt with preliminary results of the field research by Desta, while another dealt with a consultancy conducted by Ndofor of the World Council of Credit Unions.

## **Abstracts and Presentations**

Desta, S., and D.L. Coppock. 1998. Banking livestock capital: A strategy for pastoral asset diversification in southern Ethiopia. Abstract published in the proceedings of the 51st Annual Meeting of the Society for Range Management, held February 8-12, Guadalajara, Mexico.