1. Cover sheet
(Insert from Emory)

2. TITLE PAGE

"CLIMATE-INDUCED VULNERABILITY AND PASTORALIST LIVESTOCK MARKETING CHAINS IN SOUTHERN ETHIOPIA AND NORTHEASTERN KENYA"

Principal Investigator and Lead Institution

Peter Little, PhD
Professor; Director, Emory Program in Development Studies
Emory University, 207 Anthropology Building, Room 305, 1557 Dickey Dr., Atlanta, GA 30322
Phone: 404-727-0994, Fax: 404-727-2860, Email: peter.little@emory.edu , Organizational Website: www.emory.edu

Co-Principal Investigators and Partners

Workneh Negatu, PhD
Associate Professor and Director, Center for Rural Development, Center for Rural Development (CRD), Addis Ababa University, PO Box 1176, Addis Ababa, Ethiopia , Phone: 251-1-111972321; 251-1-911684425 (mobile), Fax (251) 111 23 10 74
Email: wnegatu@idr.aau.edu.et ; or wnegatu@yahoo.com ,Organizational website: http://aau.edu.et/

Polly Ericksen, PhD
Senior Scientist, International Livestock Research Institute (ILRI), P.O. Box 5689
Addis Ababa, Ethiopia, Phone: +251-11 616 3215, Fax: +251-11 461 252/464 645,
Email: P.Erickson@cgiar.org ,Organizational website: http://www.ilri.org/

Other Team Members

Ali Hassen, PhD., Sociologist, Center for Rural Development (CRD), Addis Ababa University

Uriel Kitron, PhD., Ecologist, Emory University

Hussein Mahmoud, PhD., Economic Anthropologist/Geographer, Pwani University College, Kenya

Carla Roncoli, Ph.D., Development Anthropologist, Emory University

3. PROJECT ABSTRACT

This project addresses interactions between climate-induced vulnerability and markets in drought prone-sites of southern Ethiopia (primarily) and northeastern Kenya. Secondarily, it examines changes in herd management and settlement strategies associated with climate variability and impacts on different groups of producers and market chains. The design is based on related premises that uncertainty over climatic events and their potential effects on pastoralist livelihoods and markets will continue in eastern Africa and that these effects remain poorly understood. The project will employ mixed methods of household surveys, ethnography, market chain and spatial analyses. Benefit/cost analysis will address herders' and traders' benefits/costs associated with different commodity chains, with a particular focus on how poor herders access different markets. Research sites for the study include: (1) the Borena zone, Ethiopia; and (2) Garissa District, northeastern Kenya. Both of these locations have experienced severe droughts at least four times since 1980, and now are deep in the midst of a drought and humanitarian crisis (2011). The study is directly relevant to US Government's 'Feed the Future' strategy and its multiple concerns for 'bridging the relief-to- development' gap and expanding producer access to local and regional markets. It also relates to USAID/Ethiopia's and USAID/Kenya's goals of increased incomes and food security in arid and semi-arid (lowland) areas. By involving faculty, students, and practitioners at Pwani University College, Kenya, Addis Ababa University, and local Non-Governmental Organizations (NGOs) and firms, the project will build regional capacity to address climate-induced vulnerability among pastoralists and conduct pastoralist market chain analysis.

4. RESEARCH PROPOSAL: "Climate-induced Vulnerability and Pastoralist Livestock Marketing Chains in the Horn of Africa"

Table of Contents (Proposal)

1. Introduction and vision for the project

Once again, a prolonged drought in the Horn Africa has attracted the attention of the international community as the area confronts another climate-induced disaster that is aggravated by political conflict and insecurity. The crisis especially is bad in the triangular zone of northeastern Kenya/southwestern Ethiopia/southern Somalia. At least three other times since 1980 a large-scale drought crisis has challenged local livelihoods in this region and the development and humanitarian communities that struggle to understand and address the problem. Renewed concern for the sustainability of the region's key livelihood, mobile pastoralism, also is raised as large-scale losses of livestock and heightened food security among pastoralists have been associated with the disaster. Indeed, part of the tragic story has been the loss of literally millions of US dollars worth of animal assets, especially cattle, which further jeopardizes local livelihoods, food security, and future recovery. At the same time that this tragedy has been occurring, animal and animal product exports from both Ethiopia and northern Somalia (Somaliland) continue and, in some cases, have shown remarkable increases, a further indication of how important the pastoralist livestock sector is to the region despite serious climate risks (*Focus* 2011:1). This project addresses the role that livestock markets plays in drought coping and recovery strategies, with a particular emphasize on those market chains that can help poor and particularly vulnerable livestock producers.

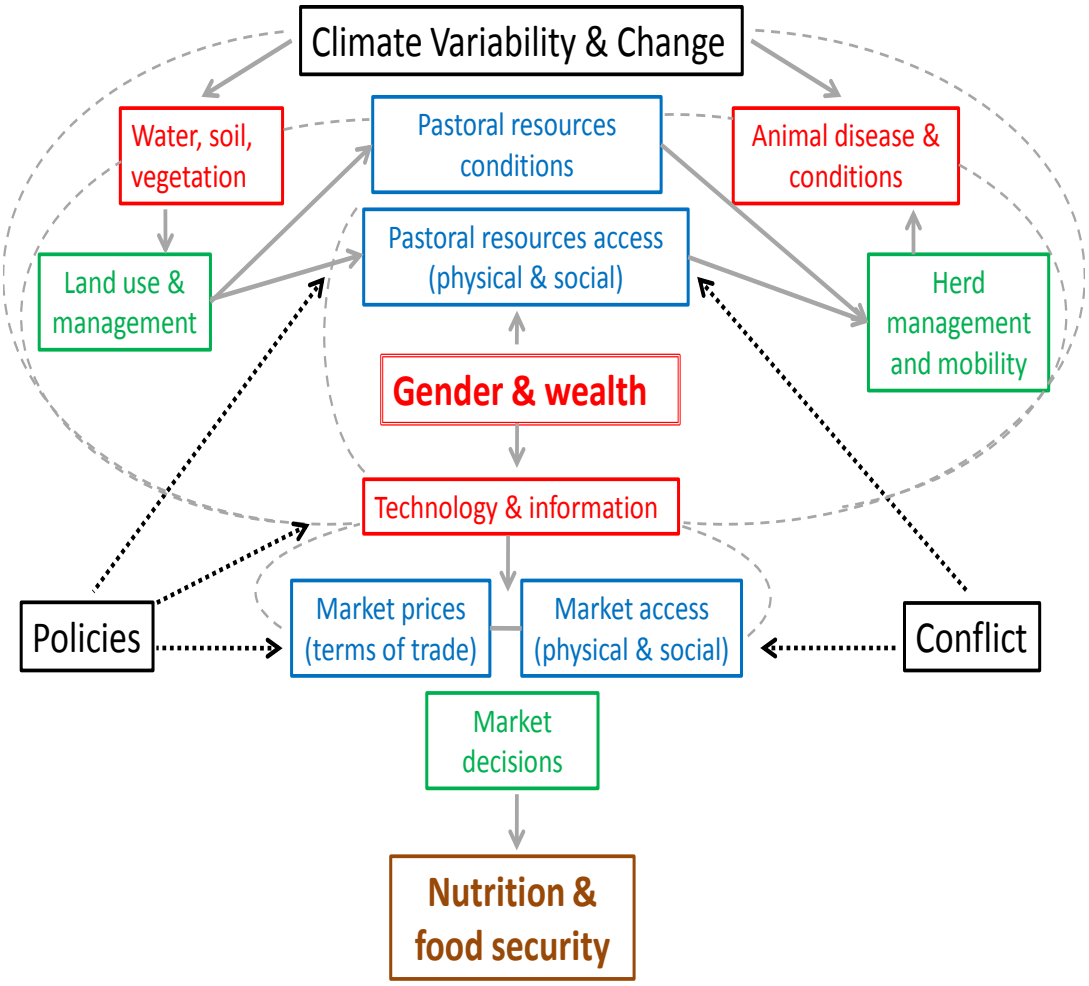
What generally have been missing in many studies of livestock marketing in the region are producers themselves (especially pastoralists), those actors that raise the valuable commodities which support these market systems, and their environment (see Behnke 2008). They incur most of the production risks under volatile climatic, environmental, and politico-economic conditions, but we know little about the benefits and costs that they accrue from different value chains, nor the ways that local shocks (especially climatic extremes) affect their access to different markets, as well as market-based coping strategies. When climate-induced risks, such as drought occurs, herders frequently are distant from markets in attempting to keep their animals alive in remote grazing and water points. Moreover, weather-related risks at the producer-level also instigate other related risks, such as animal weight loss, livestock (and human) disease, and conflict when competition over limited resources turns violent.

Thus, to understand livestock marketing chains in the Horn of Africa and how they interact with producers, it is important to understand the spatial and environmental parameters of pastoral production systems. The schematic representation in Figure 1 spells out the different factors that influence how market decisions are made and what their impacts are. The rest of this section and the next one (Section 2) elaborates on the different elements and mediating variables in Figure 1.

Livestock producers normally manage climatic and other production risks through mobility, but these strategies are changing. The pattern we find today is one of increasingly fixed residences but highly mobile herd camps of young males and, in some cases, women (Little et al. 2008). Under these systems the bulk of the human population and some livestock (especially small stock, calves, and some cows) are in settled residences which creates added animal and human health risk, while the majority of animals are in distant rangelands under the care of herders. Moreover, flexible tenure systems and user rights have until recently allowed herders to access needed pastures when conditions dictate, especially critical dry season/drought reserve zones like river valleys and highlands. These valuable ecological 'patches' are essential to the sustainability of the production system and the market chains which they supply. They increasingly are threatened by alternative land uses, especially irrigated and rainfed farming and protected conservation areas (Gebre 2001; Angassa and Oba 2008; Elias 2008). Since most livestock value chain analyses in the region focus on post-production processes higher up in the chain, there is little understanding of the threats to the markets themselves when the production base and economics of pastoralism is undermined either by alternative land uses or natural processes, such as drought or floods.

Recent innovations in pastoral areas of Kenya and Ethiopia, such as trucking water and fodder and feed, allow herders to stay near markets to sell animals when droughts occur, while mobile phone technologies allow them to obtain information on grazing and market conditions (see Aklilu 2009; Aklilu

Figure 1. Factors and mediating variables that influence market decisions



and Wakesa 2002; Gebremedhin et al. 2009; Pastoralist Livelihoods Initiative 2007). These recent innovations in pastoral areas of Kenya and Ethiopia were confirmed by field observations this past year under the seed grant (see Little 2011a). Herders and traders also have been increasingly utilizing modern veterinary inputs to manage both environmental, animal disease, and market uncertainties. During climate shocks herders increasingly are compelled to move into better watered but also higher risk disease areas, a risk that is further magnified by these higher concentrations and crowding of animals. Although new trade opportunities in the Horn of Africa, such as overseas exports of chilled meat or live animals, are quickly applauded by policy makers as effective means to alleviate poverty and sustain economic growth, there remains little understanding of market risks and access among mobile pastoralists of different scale (large-, medium- and small-scale herd owners), especially via alternative and less volatile markets (see Aklili 2002; Aklilu and Catley 2010; Little 2009).

Preliminary research under the 'seed' grant confirmed the challenges of balancing the spatial aspects of animal production with the demands of markets for timing of sales and breed specifications, as well as the use of markets to increase incomes and revenues for poor herders (Little 2011b). A key constraint for marketing animals is that the best areas, in terms of range and water resources, for pastoralist livestock production generally are not located where spatial access to markets is good. In other

words, market systems require fixed points (for example, market towns or 'bush' markets) for transactions, but mobile herding systems—especially during drought--gravitate toward distant grazing and water points where vegetation and water availability usually are better. Various delivery models, such as subsidizing trader transport costs or organizing sales in remote locations, have been attempted by NGOs but these have had mixed results and generally are unsustainable. As our preliminary investigations and a wide body of literature demonstrate, herd mobility remains the key risk management strategy that pastoralist pursue to cope with drought and other disasters. The extent to which pastoralists can manage herd production, family (especially nutrition), and marketing needs strongly affects their welfare and that of the markets themselves, especially since herders depend on markets for cash to purchase food for family consumption needs. Of course, the interactions between herd and family welfare, on the one hand, and marketing, on the other, are strongly influenced by climatic factors, especially extreme weather events (droughts and floods). In short, critical research questions for this proposal are: how do mobile herders access high value and other market chains in relatively remote areas; how do weather-related risks, including floods and droughts, affect their ability to access these markets as well as the markets themselves; and what scales of producers and groups, including women, benefit from different livestock markets (including for small ruminants) and which do not?

The research design for this project is based on the premise that uncertainty over extreme climatic events (especially their frequency and intensity)—and their effects on herder and herd welfare, markets, animal disease and conflict--will continue in the region and likely worsen during the next decade and beyond. The potential impacts of climate-related risks on pastoralists and livestock markets are poorly understood. Field visits by the research team in February and March 2011 under the CRSP seed grant generally confirmed the importance of the proposal's focus on relationships between climate variability (and related fodder/pasture and water availability), mobile pastoralism, and livestock market chains. At the time highly mobile pastoral populations were at distant pastures and unable to access livestock markets and, thus, were forced to make tough choices about moving the herd or destocking through the market in order to avoid large loses and purchase needed food and goods. The importance of considering food security and herd management strategies were prevalent during 2011 when cattle-based pastoralism fared worse than camel and small stock keepers and food shortages were especially severe for cattle owners. Although dry rangelands of the African Horn often are associated with drought events, there remains considerable uncertainty over the direction of climate change in the region, with the exception that warming trends in mean air temperature are likely to continue as has been the case in the past 100 years (Hulme et al., 2001). In fact, some models predict that flood events rather than droughts will actually increase in dryland areas of East Africa, including large parts of the Horn (Christensen et al., 2007).

The proposed project will also carefully address herd specie management and associated gender and labor issues, which are critical to assessing the ways that pastoralists interact with markets. One aspect of risk-mitigating diversification among pastoralists is to diversify herd composition, which has management, ecological, and marketing implications Anecdotal information indicates that herders are diversifying into small stock, especially goats, and camels which are better suited to prolonged drought conditions than cattle. With regard to small ruminants, their spatial and labor demands are considerably less than for large ruminants, such as cattle and camels. They also reflect a gendered component since small stock management and marketing are more likely to involve women than cattle or camel-based activities which usually are dominated by males. In terms of market price volatility, small stock, especially goats, and camels are less likely to experience the extreme climate-related price swings that cattle markets experience. It is hypothesized that this type of market stability improves income and food security for households, although it requires further investigation.

A second aspect of diversification among pastoralists entails income diversification, especially the incorporation of waged employment, trading, and rainfed agriculture where it is possible (see Little et al. 2001). Once again, there is a highly gendered aspect to income diversification: women often are more involved in milk trading and in certain other income diversification activities, such as local beer brewing and petty trade in grain, vegetables, firewood sales than are men. In pastoralist areas of the Horn of

Africa, they also are more likely to be involved in small stock trading than in cattle and camel, especially when the latter activities involve long-distance movements. For instance, young pastoralist males have heavily diversified into cattle and camel trading, some on a near full-time basis. As recent as 2000 few Borana youth of southern Ethiopia were working as cattle traders or brokers, although large numbers currently are engaged. Through income and livelihood diversification, both males and females hedge against losing all their assets and resources when the livestock sector is damaged through drought or other calamity. For the wealthy men and women income diversification is an accumulation strategy that hedges against drought and increases wealth, but for the very poor it is a survival strategy that is pursued out of necessity rather than a desire to diversify their livestock assets.

There is some evidence that the capacity to intensify land use and free up labor for non-livestock livelihoods is greater when households focus on small rather than large stock production. Their management and marketing is more consistent with mixed livelihood systems that include farming and waged employment, as well as a more sedentary form of pastoralism. On the downside, small stock are not as competitive in long distance trade as cattle because of the national and international 'brand' awareness of Boran and mixed Boran breeds from southern Ethiopian and northern Kenya. The implications of an increase in small stock production need to be further explored since they have important implications for land use, environmental sustainability, and markets themselves. Moreover, there is a need to address who is excluded from livestock markets, including small stock trade. Many stockless herders, whose numbers increase after each incidence of drought are employed in livestock trade either as loaders, trekkers, fodder and water transporters, market assistants, or other types of work. For each animal sold at a key market, several individuals (up to 10+ in the case of southern Ethiopia, Mahmoud 2003) are involved, in addition to the seller, broker (s), and buyer.

1.1 Research Sites

The primary research site for the project will be Borena Zone in southern Ethiopia; a secondary and complementary site will be across the border in Garissa District, Kenya. In Garissa we will support limited research on marketing and traders. Although logistical issues associated with managing a second Kenya site are acknowledged, there are four important reasons to keep Garissa as a secondary/minor site. First, the marketing and pastoral production systems in the southern Ethiopia/northeastern Kenya/southern Somalia triangle traverse borders and markets and livelihoods in Borena Zone southern Ethiopia are affected by processes and events in northeastern Kenya. Producers in both areas also compete for similar regional (e.g., Nairobi) and international markets (e.g., Egypt and Middle East). Second, it will be easier to 'regionalize' research findings if we have border sites in two countries, especially since their market linkages extend to at least two other countries, the Sudan and Somalia. The relevance of these multiple sites also make comparisons to West Africa's extensive regional trade, especially from the trade from Sahelian (Mali, Niger, and Burkina Faso) to coastal countries (Nigeria, Ghana, Togo, and Ivory Coast), considerably easier (see Williams et al. 2006), further facilitating the regionalization of the study's findings. Similar to the Horn of Africa, regional livestock trade in West Africa involves long distances, multiple actors, and unofficial trans-border exports.

Third, key team members (Little and Mahmoud) of the proposed project have long-term research experience in the area and access to longitudinal data from Garissa, which will help in establishing an early baseline for the study. Moreover, in 2009 another member of the team (Roncoli) participated in a study of climate change adaptation in Kenya that covered Garissa District. Finally, there currently are considerable humanitarian and development interests in Garissa District, Kenya and neighboring southern Somalia, including from USAID and the World Bank, and the project will benefit from being there as efforts are made to improve the region's food security and invest in efforts to move the area from a relief-to-development mode**.** ***The latter issue of moving communities from relief interventions to sustainable food security and development, is an important concern of the US Government's Feed the Future (FTF) initiative (US Government 2010).*** With these heightened concerns in the region, there also is increased likelihood for our project to leverage additional resources for research and outreach activities

from interested agencies working in the region, including USAID. Our work in Garissa will be mainly limited to market and trader-related data collection.

What follows is a description of the proposed sites:

1.1.1 Borena Zone, Ethiopia (primary)

The prime research site will include the key livestock production area of Borena Zone, southern Ethiopia near the key market towns of Yabello, Dubluk, and Moyale. This area is inhabited by Borana pastoralists and agropastoralists. Here the focus will be on (a) the cross-border trade with Kenya where goats (and some camels) move from Kenya to Ethiopia and cattle from Ethiopia to Kenya; (b) the vertically integrated small stock trade from Borana sites to abattoirs near Addis Ababa and eventually for export overseas as chilled meat (see Desta et al. 2006); (c) the growing domestic trade in cattle between the lowlands/plateau and highland towns; and (d) the new export trade in camels. The nature of these different market systems are not well understood, nor are the ways that herders (males and females) access and/or benefit from them, especially the meat export trade. Because of the growing export trade from southern Ethiopia in small and large ruminants, the area provides an excellent opportunity to examine how local herder production and marketing patterns are affected by proximity to export trade.

Herders in this area have confronted three major droughts in the area since 1999 and two minor ones. They also face increased insecurity and conflict due to disputes over territorial boundaries and water points (deep wells). As noted above, a new export trade to Sudan/Middle East based on camels in the area and nearby northern Kenya has developed, as well as increased exports of Boran cattle and small stock from the area. Neither of these trades is very well understood in terms of their benefits for small-scale pastoralists, with strong concerns that much of the benefits from the Ethiopia's export trade have gone to intermediaries, buying agents, and export companies (see Aklilu and Catley 2010). Moreover, the growth in local rainfed farming and large-scale commercial agriculture by outside investors, and private land enclosures has undermined pastoral production and probably livestock marketing. Yet, it is unclear what impacts these changes are having on the different markets and the capacity of herders to supply them and cope with increased weather events (see Angassa and Oba 2008; Elias 2008; McPeak et al 2011).

Within the Borana area, the project will collect household and land use data in two sites. These are Dillo, which is a site that focuses mainly on small stock (especially goats) and cattle and is located in a relatively dry part (c. 400 mm per annum) of the zone with little cultivation; and Didi Hara, which focuses heavily on cattle production, has relatively favorable average rainfall (c. 600 mm/year), and has experienced recent rapid growth in rainfed cultivation. Spatially Dillo is distant from major markets (> 90 km) and communication infrastructure and suppplies Moyale, Dubluk, and Mega markets. Didi Hara, in turn, has good spatial access (> 30 km) to a key livestock market (Baki) in the Yabello area. Dillo is near the Kenya border (< 15 km), but Didi Hara is in the northern interior of Borena zone.

1.1.2 Garissa District, Kenya (secondary)

This site is based in the middle Tana River of northeastern Kenya and is the site of the largest cattle market in East Africa outside of Nairobi (see Little 2003; Little 2009). It is inhabited by Somali pastoralists and agropastoralists residing along the Tana River and westward toward and across the Somalia border (Nunow 2000). Here the commodity chains to be covered include (a) the domestic cattle trade to Nairobi and Mombasa; (b) the vibrant cross-border trade between southern Somalia and Kenya; and (c) the livestock export trade out of Mombasa port which relies on leased commercial ranches for fattening northeastern Kenya livestock near the Kenyan coast before export or local slaughter (see Mahmoud 2006). With its proximity to livestock-rich southern Somalia, the Garissa market sources more than 50 percent of its animals from stateless Somalia and much of this is consumed in Nairobi and Mombasa. Our recent field observations, February-April 2011, revealed that market sales were an important drought coping mechanism. During April, for example, markets were flooded with herders desperate to unload weak animals and earn cash to purchase food. This area recently supplied weakened, immature animals to Kajiado, District, Kenya (a distance of about 500 km) to assist with restocking herds

there that were damaged during the 2009 drought, and to be fattened for sale to the Nairobi market. We have been in touch with Professor Kathleen Galvin of Colorado State University, whose LCC-CRSP proposed study plans to work in Kajiado District, Kenya, about sharing data on market links to northeastern Kenya from the perspective of Kajiado pastoralists and traders. We also are interested in knowing whether or not (and how) Maasai herders adjust marketing strategies based on climate information, which would complement our proposed work in NE Kenya and Ethiopia.

The Garissa research site also will emphasize the critical threats to livestock production posed by alternative land use systems (especially irrigation along the Tana River) and increased settlements and their affects on the different livestock markets and groups of local herders. The growth in state and private investment in irrigated agriculture threatens the livestock production base in the region as well as aggravates land use conflicts and violence. Insecurity in northeastern Kenya and conflict in nearby southern Somalia means that periodic incidences of violence occur that disrupt both livestock movements and trade (Nunow 2000; Little 2003).

The Tana River basin supplies needed natural and cultivated fodder and water for the Garissa market and for animals transiting to Kenya's urban markets. However, considerable investments in hydropower and irrigation, as well as upstream erosion and deforestation in the basin has made the river system highly unreliable for livestock traders and producers, often resulting in periods of very low flow or excessive floods. The latter occurred in 1997-1998 and 2006-07 and resulted in massive livestock losses and the onset of a Rift Valley Fever (RVF) epidemic that closed official markets for several months. The economic losses were enormous and can only be estimated in the tens of thousands of US dollars (Rich and Wanyoikie 2008). Foot-and-mouth disease is another common disease that also disrupts markets in the area (as well as in the Ethiopian site discussed above) and seriously affects pastoral livelihoods.

1.1.3. Mediating variables in both sites

In both research locations several mediating variables or sets of variables strongly condition the relationship between pastoralist households and individuals (including male/female, rich/poor), on the one hand, and market chains, on the other. In addition to rainfall, the project proposes to consider other important factors. First, are ecological or environmental factors (vegetation, soils, and water) that strongly determine the quality of livestock produced and the effectiveness of rainfall distribution. We do not plan to collect extensive data on these processes but will conduct intensive interviews with household members about vegetation/landscape changes and plan to use of NDVI (Normalized Deviation Vegetation Index) and other remotely sensed data to look at land use, soil moisture, and vegetation changes. A second factor is the occurrence of animal diseases, which are influenced by climatic factors and can disrupt markets and damage pastoralist welfare. In particular, we are concerned with how constrained mobility and concentrations of animals/people around scarce water/grazing resources during extreme climate events can increase risk of animal disease transmission. These include outbreaks of Rift Valley Fever (RVF), Trypanosomiasis, and Foot and Mouth Disease (FMD). Third, is wealth (assets) and gender—which were discussed earlier-- that can influence which households and individual herders can access which markets (export, cross-border, national, and/or local). Fourth, are technologies like mobile phones that can shape how herders obtain climate, market, and other important types of information. In interviews with household members and traders we will ask several questions about how new communication technologies improve market access for herders and allow them to better manage market- and weather-related risks. We also plan to test the hypothesis that access to mobile phone technology can have a positive impact on prices that pastoralists receive for their animals by comparing a set of households in Dillo without cell phone infrastructure and access, with a group of households in Didi Hara which have favorable access to the national mobile phone network. Finally, there are changing settlement patterns that influence grazing patterns, herd mobility, markets, and the quality of animals themselves and we plan to collect these data through community-level focus group and household interviews and mapping activities that juxtapose settlement growth against key seasonal resource 'patches' in both locations.

1.2 Cross-cutting themes

Several key cross-cutting themes are embedded in the research program. These include the following:

1.2.1 Nutrition and food security

The proposed project directly addresses food security and, indirectly, nutritional issues by examining trade issues for pastoralists, especially the terms of trade between grain/food prices and livestock prices. ***It also directly relates to a key concern of both the FTF Guide (2010) and Research Strategy (2011) about how markets and improved market policies can alleviate food insecurity among poor and vulnerable populations, such as pastoralists.*** Both research areas in the project are net deficit locations for grain, which increasingly are key components of pastoralist diets. Herder households in our study region depend on cereals for more than 50 percent of kilocalorie consumption requirements during much of the year, with the percentage rising to 90 percent or more during extreme dry seasons when animal products (especially milk) are scarce. Generally grain prices are high and unstable in pastoral areas. In extreme emergencies, such as the current crisis (2011), food aid supplements grain purchases but in most years market purchases are how households acquire grain and other foods (cooking oil, vegetables, and sugar) for nutritional and energy needs. Thus, a critical indicator to examine for food security is the terms-of-trade between what herders receive for their products (mainly livestock but also milk and hides/skins) and what they must pay to purchase needed grains (mainly maize and wheat flour).

The study will examine seasonal swings in commodity prices and how this affects pastoralists food security, herd management strategies, and mobility. A key factor that influences livestock sales by pastoralists is the need for cash to purchase food. As noted earlier, fluctuations in livestock and grain prices have a significant effect on household and community food security. Although detailed nutritional data are not planned to be collected by the project, our focus group and household studies will collect data on seasonal changes in daily meals consumed; periods of recorded hunger by household members; diversity of diet reflected in food expenditures; and food shortages that affect the motivation and timing of livestock sales. We plan to encourage 1-2 Masters of Public Health (MPH) students at Emory University to pursue university funds to conduct nutrition-related thesis work in project sites.

The terms-of-trade indicator can show strong seasonal changes as well as longer term structural trends when livestock trade is significantly disrupted due to climate extremes, government policy, conflict, or other external factors. Since 2008 prices for cereals in pastoralist areas of the Horn of Africa have increased by more than 100 percent even without the occurrence of drought. The world-wide trend of rising food prices since 2008 especially has hurt African consumers, especially those in food deficit zones. What this means is that herders must sell a higher proportion of their herds (animals assets) every year to buy comparable amounts of required grain and other foods, which greatly impacts on their food security and nutritional status. In extreme droughts the situation worsens as prices for livestock can drop as much as 50 percent or more, while grain prices can double in a short period of time. With such deteriorating terms of trade for herders, the amount of kilocalorie equivalent that a herder can buy with the sale of one head of cattle or small stock can decline by as much as 60 to 80 percent. Little documents cases of extreme climate events—in this case floods—where Somali pastoralists of northeastern Kenya and southern Somalia experienced grain (kilocalorie) equivalency loses of more than 150 kg of maize for one head of cattle due to declining cattle and rising grain prices (see Little 2008). Because herders are so dependent on the market for income and food, it is important that regional, national markets, and even international markets are well understood.

1.2.2 Gender

A key hypothesis of the project is that different market chains and specie-specific markets provide varied benefits to different groups of traders and producers, including gender-based groups. In both sites some of the most vulnerable households are female-headed, which comprise up to 20 percent of households in Borena zone, southern Ethiopia (see McPeak et al. 2011). These households not only are among the poorest and most affected by climate shocks, such as drought, but they also are the least likely

to have access to the most lucrative market chains, especially high-value national and international markets. Do women benefit disproportionately from specific markets, such as small stock, and receive few benefits from other trade channels? What role do women play as traders and brokers in certain types of markets and organizations, such as marketing cooperatives?

Different aspects of herd management and marketing decisions and responsibilities also are highly gendered. Previous work on climate has shown that women may have different concerns about climate variability and its impacts, as well as seek different kinds of climate information than men (see Luseno et al 2003). Concerns about water availability for domestic use and grazing conditions near homesteads where local milk cows and calves often graze usually is of greater interest to women than men.

1.2.3 Capacity building

Section (5) describes our formal and informal training program which will be a major means that our project will build capacity in the region. In particular, we have included two universities in the region, one of which is launching a new MA program in Pastoralist Development and Training.' In terms of capacity building among these institutions, the project will assist the new social science department of Pwani (Coast) campus of Kenyatta University through involvement of some of its students and faculty (Mahmoud) in research at the Garissa site. In Ethiopia the Center for Rural Development (CRD) (formally called the Institute for Rural Development, IRD), Addis Ababa University (AAU) will be involved through faculty (Negatu and Hassan), a post-doctoral researcher, students, and a new curriculum on lowland development. They will build their research and training capacity through participation in the project. Both in Kenya and Ethiopia outreach will be achieved through a workshop and community stakeholder meetings in each country. These will involve leaders from NGOs, pastoral civil organizations, government, including Regional States of Oromia and Afar, and key policy makers at Federal and Regional levels.

From the start of the project, we also will build relationships with NGOs, including Gayo Pastoral Development Initiative (GPDI), based in Oromiya Regional State, and collaborate with a private share-hold livestock company, Utuba Gumi Company, that is based in Borena Zone. We met with officials from these groups during the seed grant period and plan to invite members to in-field training sessions on field methods. We also propose conduct community-based research and development meetings where conduct community workshops to present our research findings in a participatory format that allows pastoralists and traders to comment on our work. These activities will permit communities to comment on our work and voice their own development and information needs. It will help them be able to articulate development priorities and make their cases to government and potential funders. These types of community workshops with livestock producers and traders were conducted with considerable success under the Pastoral Risk Management (PATIMA) of the Global Livestock CRSP during 2000-2005. Additional information on capacity building and training are provided in sections (d) and (e)

1.3 *Relationship to Livestock-Climate Change Collaborative Research Support Program (LCC-CRSP) goals*

The proposed project relates to both overall goals of the LCC-CRSP.

1.3.1 Expanding income opportunities and increasing stability for livestock keepers

The proposed project relates most directly to the goal of expanding income opportunities and increasing stability. Although livelihood diversification is an import risk management strategies for pastoralists, livestock remain the key source of incomes in the rangelands of the African Horn and marketing of animals and marketing and consumption of animal products are the main sources of household income (>50 percent) (see Little et al. 2008). By addressing emerging markets in the region

and livestock-based value added activities, the proposed study seeks to expand incomes, as well as pursue markets (e.g., small stock domestic market) that we hypothesize are the most stable in the region and more resistant to external shocks (climate and other) than others. Activities that keep value-added in the pastoral sector and promote region-based development, such as sustainable rangeland use (e.g., acacia sap and animal feed collection), post-slaughter livestock processing and distribution (e.g., hides and skins, meat processing), animal fattening combined with marketing, and dairy sales and processing build on the rangeland's main resource, livestock. As Little notes, "they allow herders access to new sources of income and value that complement pastoralism, and can stem movements of herders to towns and settlements where they require food and other public assistance at high costs to government and donor agencies alike (2009:2)."

1.3.2 Advancing management practices to adapt to climate change

By addressing the ways in which livestock keepers use markets to mitigate and cope with climate change, the project also directly relates to this second goal of the LCC-CRSP. In particular, both the need to earn income through trade and to manage herds to optimize animal productivity in light of increased cimate risks, force herders to be aware both of market- and range-related factors when making herd management and land use decisions. In this sense, herders need access both to market and climate-related data and both of these issues are examined in detail in the proposed project. How herders use these different types of information to adjust their management practices is a key focus of the study, and one which has great relevance to the future sustainability of pastoralism in the African Horn's rangelands. We will be particularly interested in seeing how indigenous knowledge systems of climate forecasting relate to external forms of climate information, which may or may not be accepted by local communities (see Orlove et al. 2010; Luseno et al. 2003). As the project highlights, new communication technologies and dissemination models may be keys to helping herders adjust their management practices in a changing and increasingly risky environment. Not only can the use of mobile phone technology possibly improve producer prices and allow herders to better time sales, but it also can reduce livestock losses by more efficiently communicating about grazing and water conditions to improve herd movement decisions.

2. Hypotheses and research questions

By inserting pastoralists/producers into livestock market chain analyses, the proposed study raises a number of important hypotheses and research questions. Four main hypotheses to be tested in the study are raised, and then a subset of additional questions.

Hypothesis 1: Certain livestock market chains exclude small-scale producers, while other markets are more inclusive.

Data will be collected at household, trader, and market-levels and disaggregated by wealth group, animal species and market demands, and destination.

Hypothesis 2: Climate and market information will be used differently by different wealth groups of herders and by men and women, and the capacity to act on that information (for example, to sell or move animals to a new location) will vary by wealth and gender characteristics of the household and individual.

Data will be collected at household and individual-levels on how climate and market information is acquired and whether or not this information is acted upon and by whom.

Hypothesis 3: Marketing of animals to mitigate against, cope with, and/or recover from climate events is just one of several risk management strategies that herders pursue and, in many cases, will be secondary to other herd management practices, such as mobility.

Data will be gathered at the household level on different risk management strategies for dealing with climate variability.

Hypothesis 4: The more dependent a household is on the market for cash income, the greater the impact will be on herd and land management strategies, including investments in private enclosures and water points or changes in specie and sex composition of herd.

Land use, settlement, and vegetation data will be gathered via remote sensed sources (NDVI) and existing aerial maps, and household and key informant interviews.

Other important questions for the study are:

- How can markets work better for poor herders--in terms of improving their welfare--under conditions of high risk, with climate variability/change being a key source of that risk?
- What are the benefits and costs (including risk-related) for pastoralists (male and female) associated with four key market chains: (1) local (domestic); (2) national (domestic) focused on supplying key urban centers; (3) unofficial cross-border/regional (international); and (4) overseas export trade (animal and chilled meat) (international)? Which groups of herders (rich/middle/poor, male/female) benefit the most from these different markets, and which benefit the least?
- How do changing terms of trade for livestock keepers affect livestock marketing, cash expenditures, and overall household food security?
- How do herders negotiate the need to seasonally move herds for grazing and watering in remote locations (i.e., mobility), especially in the context of climate variability, with the need to sell animals for cash? In what ways are herder mobility decisions changing in light of increased marketing opportunities and what are their socio-economic and ecological impacts?
- What innovations in feed markets, communication technologies (for example, use of mobile phones and SMS), and veterinary services and inputs, assist herders and traders with managing risks and accessing different market chains?
- What institutional innovations and collective behaviors allow herders (especially women) to better negotiate and access market chains, as well as effectively respond to climate shocks?

3. Description of research methods

The project will utilize a range of mixed methods at different scales and for different types of information (for example, quantitative and qualitative). These include:

3.1 Key informant and Focus Group Interviews

The project will depend especially heavily on key informant and focus group interviews during the first year of the project. Semi-structured interview guides will be used in both cases that will allow common issues/questions to be raised but also permit a certain degree of 'freewheeling' conversation so respondents can have sufficient space to express their opinions. The project will rely heavily on these methods during Year 1 when designing the household and trader studies.

3.2 Trader Interviews

Because traders assume such a critical role in the livestock trade business, research design on markets will emphasize trader interviews, supplemented by data collection at the three key markets in southern Ethiopia and one market in Kenya, in addition to interviews with other key actors. By timing visits to occur on market days, it will be possible to interview both the seller (herder) and buyer (trader), although at larger markets both the buyer and seller often are traders. We plan to interview a sample of 25 traders at each of the four markets—three in Ethiopia and one in Kenya—for a total of 100 interviews. Traders will be interviewed twice during the study—toward the beginning and toward the end of the research. To the extent possible, we will try to randomly sample traders by seeing if market officials will provide us with a list of traders who pay market fees. If this is not possible, we may have to resort to

opportunistic sampling, in which case we will predetermine criteria for selection: annual volume of sales (scale), gender and age of trader, and type of animal species traded.

3.3 *Household Study*

A randomized survey of 140 households in southern Ethiopia (70 in each study site) will be conducted. In Borena Zone, Ethiopia households will be interviewed twice during Years 1-3. Year 1 will serve as the baseline and Year 3 will serve as the final round to document changes since Year 1. As noted earlier, Didi Hara and Dillo communities were PARIMA Pastoral Risk Management project sites and we will use data from that household study (2000-2002) to help design the survey and measure changes since 2000. The PARIMA study has very good data on household economies, herd management and movements, marketing behavior, expenditures, livelihood and land use strategies. It has little information on access to climate information affects market decisions, which will be an important focus of our household work. We have agreed to collaborate and share information about how climate information affects mobility and marketing decisions with the Dr. Galvin-led Colorado State University proposal (see letter in section 10). To gain some insights into food security and nutritional issues we will ask about numbers of meals per day, periods of hunger, and periodic shortages of food.

For our study we will interview the household head (male or female) and, where possible, one other income earner in the family who most likely will be the spouse in the case of a male-headed household. The household list for sampling will be drawn up with the support of local *kebele* (administrative location) officials and existing census data. In addition to the household survey, a sub-set of the households (25 in each site for a total of 50) will be intensively interviewed to capture qualitative data on a range of marketing, climate adaptation, social network, and livelihood activities. This sub-sample of more intensively interviewed households will help the team to understand patterns and interpret data from the household survey.

3.4 Market Sales and Price Data

In Borena, Ethiopia monthly livestock market data currently is being collected at selected markets (including Dubluk and Moyale) by the Ethiopia Livestock Market Information System of the government, with technical support from Texas A+M (see monthly report of Ethiopia Livestock Market Information System 2011). In Garissa, Kenya data on trade is collected by the Kenya District Livestock Marketing Council whom we met with during the past year and the Veterinary Department, which regulates cattle movements outside the district. It is possible to use Kenya's Veterinary Department records to estimate the scale of cross-border commerce and livestock movements from the borders to down-country markets (including Nairobi) (see Little 2006), and we already have met with the District Veterinary Officer in Garissa who also attended our research planning meeting in June, 2011 (see e-mail in section [10]). The Kenyan government tolerates cross-border trade in livestock, as long as the animals are cleared by veterinary officers for movement to Kenyan markets. Thus, at the key Kenyan border markets of Moyale, Mandera, and Garissa officials from the veterinary department conduct very rudimentary health checks and provide permits to buyers that allow immediate transport of the animal(s) to a Kenyan market for slaughter within three days. Importantly, for the researcher the number of permits is recorded daily, as is the destination of animal movements. These data provide a good indication of the annual volume of the trade and its seasonality, as well as the importance of different terminal or destination markets. The veterinary officers themselves also are an excellent source of information about trade. Records from Addis Ababa- and Nairobi-based markets and slaughter houses also will be helpful sources of market information.

3.5 Case Studies

We propose three specific case studies to be conducted during the project. These are valuable complements to on-going survey work and provide insights that often are not possible from quantitative work. It is anticipated that one or two of these will be completed as part of the MA training under the project. The first will be a study of collective action in livestock marketing, with a focus on pastoralist

initiatives (including private share companies) and women's groups who originally were important market mediators for the small stock trade in the mid-2000s but no longer seem to be active in the business. A second case study will address government marketing policies at all levels in the market chain (local, national regional/cross-border, and export) with a goal of understanding entry points where the project might be able to constructively influence market policy in a positive fashion. Finally, we will carry out a case study of mobile phone technology delivery and how decisions are made about which market centers and rural settlements receive them; the ways in which development practitioners are using it in their own work; and the possibilities to use the technology to more effectively deliver climate and market information to livestock keepers.

3.6 Climate and Spatial Data

The Ethiopian Meteorology Agency has 2 rain stations in or near Borena zone, with some readings that date back as far as 1950s (Kenya's Meteorology Department has better spatial and temporal coverage, but the focus here is on Ethiopia). The water department in Yabello may also have some rainfall statistics. We will use these data to help us understand changes in periodicity and intensity of rainfall events—statistical analyses show that there has been little long-term change in average rainfall but this tells us little about timing/periodicity and changes in intensity of rainfall events during past 50 or so years. We will also have access to a new source of climate information, compiled by colleagues working with the Climate Change, Agriculture and Food Security (CCAFS) programme, which combines rainfall data with satellite proxies, to construct a 30-year historical time series of precipitation data for Ethiopia, including the Borena zone where a CCAFS benchmark site is located. Analysis of Normalized Vegetation Differential Index (NDVI) data can be used to indicate where grazing conditions are above or below normal. ILRI colleagues have access to the grazing condition products produced under the Livestock Early Warning Systems (LEWS) project which continues after its start with the previous Global Livestock CRSP.

We will collect spatial data through GPS readings of households included in our study, including readings for different herd/household movements during the year. All secondary and 'bush markets' that supply Dubluk, Yabello (Baki), and Moyale markets will also be geo-referenced with GPS instrument. The spatial patterns of herd and household movements will be analyzed vis-à-vis the spatial data that will be collected on market distribution and seasonal use of different markets. These spatial patterns can be combined with maps of grazing conditions (see ecological data below). We will also try to locate permanent and seasonal water points, as herders need access to water in order to move long distances with their livestock.

3.7 Ecological Data Collection

Access to water and pastures are critical in movements of animls from distant range areas to secondary markets. The reasons for this include: 1) livestock as a commodity group require water and fodder; 2) all of the cross-border sites are in arid or semi-arid areas where natural resources are limited. Analysis of Normalized Vegetation Differential Index (NDVI) data can be used to indicate where grazing conditions are above or below normal, the length of droughts and the periodicity of droughts for specific areas. These data go back 30 years, allowing for trend analysis in both dry and wet season conditions. ILRI colleagues also have access to the grazing condition products produced under the LEWS project. These products include both forage biomass and forage deviation maps since 1998 for Ethiopia and Kenya.

Long-distance trade in livestock that depends on trekking by foot often is seasonal. During the dry season when water and pasture is particularly scarce, traders often do not move animals long distances and, consequentially, market supplies and price are affected. Data on different aspects of these issues will be gathered through trader questionnaires, unstructured interviews with trekkers, and available (albeit limited) resource maps of the area. We are especially keen to understand how changing settlement and resource distribution patterns are affecting livestock marketing channels and herders access to them. We will use GIS, satellite imagery and spatial analysis tools to create a geo-referenced database that will

include environmental, climate/weather, human demographic and livestock data. One concern is that settlement leads to overuse of nearby grazing areas in the same way that poorly planned water infrastructure development does. Herders also must make difficult assessments of the tradeoffs between bringing animals in for sale versus keeping them near water and pasture.

We also suspect that increased commercialization of livestock production both in southern Ethiopia and northeastern Kenya are having impacts on communal grazing areas as large-scale producers and traders are carving off areas for private enclosures and/or water points. Additionally, a new coping strategy available to wealthier herders is water trucking to livestock en-route from distant pastures. As was noted earlier, to help us to better understand the environmental context of trade and production, we will be collecting geo-referenced data on key markets and resource patches (water points and dry season grazing areas) at different points in time, relative to the number of animals for sale in both the Garissa and Borena markets . Some of these geo-referenced data already will be available from the PARIMA data set.

4. Description of expected results and development impact

A CRSP-funded research project should engage the public, in this case development practitioners and policy makers, by insuring that the findings of the study have practical programmatic and policy implications. To do so, this project will involve development practitioners and policy makers at the start of the project cycle in identifying key research issues and topics that are important for their work and for local and national development in their countries. We already began this process during the current year under our seed grant and have established contacts with key individuals at the local, national, and regional/international levels.

We also are seeking results and impacts that support the US Government's FTF Guide (2010) and Research Strategy (2011), especially concerns with improving food security through new technologies, income sources, and market opportunities; identifying market policies that improve food security and incomes; actions and policies that move communities from relief to sustained food security and development; and developing new and successful adaptations by vulnerable populations to climate variability and change. We expect the following results and development impacts to be achieved during the project:

- By assessing the kinds of climate-based information that pastoralists and traders can use to make informed decisions about selling/buying animals and herd movements (mobility), we will inform policy makers and practitioners about the needs for pastoralists and traders to use certain kinds of climate-related information; the kinds of format that herders and traders can best use climate information; and the differences between climate information needs for pastoralists versus traders. To achieve this impact, we will work with government officials involved with climate forecasting (for example Ethiopia Meteorology Agency--www.ethiomet.gov.et/ and government early warning systems) and development practitioners (NGOs and Community-Based Organizations [CBOs]) that are involved in early warning/climate forecasting for local communities. We expect not only to find differences in climate information needs and responses between pastoralists and traders but also between men and women. Regarding gender-based differences in climate information needs and responses, we are testing this issue through Hypothesis 2 since there are contradictory views on it (see Hansen et al. 2011). The development impacts of this aspect of the project will improve drought-mitigating and coping strategies by producers and traders, especially related to using markets to de-stock before disasters and rebuild after a crisis.
- By demonstrating ways that livestock markets can work for low-income pastoralists through (1) improved climate and market information, (2) collective action that economizes on transport costs and strengthens bargaining power of herders, and (3) use of improved technologies, such as feed supplements, veterinary inputs, and mobile phones, the project will work closely with pastoralist

groups and local NGOs to advise about appropriate market interventions. To achieve this impact, we will collect data on existing marketing groups and invited members to participate in community-based meetings to discuss what collective action seems to be working and which does not.

- By evaluating which market chains and market policies have the greatest potential to alleviate poverty among pastoralists and ex-pastoralists, a key outcome will be appropriate pro-poor market policies for herders. To achieve this impact, we will review market policies in Ethiopia and Kenya and in the region as a whole, including IGAD (Inter-governmental Authority of Development [Horn of Africa regional organization based in Djibouti]), African Union, and Common Market for Eastern and Southern Africa (COMESA). We will meet with officials and programs at several of these organizations, including FAO/IGAD Livestock Policy Initiative (LPI), African Union, Ethiopian and Kenyan governments and several of the different donor organizations, including the USAID Regional Office for Eastern Africa. Despite its tremendous importance to pastoralists and to national and regional economies, the issue of regional/cross-border trade remains controversial in Ethiopia and a policy-based outcome of this project will be to dialogue with policy makers about new regional policies for livestock trade (also see Little 2009).
- By working with women's groups and individual women to become more actively involved in livestock trading activities, the project will determine which market chains and specie-specific markets (e.g., small stock versus cattle) hold the greatest potential for pastoralist women.
- By building the capacity of the Center for Rural Development, AAU to train MA-level researchers and practitioners, the project will strengthen institutional capacity to conduct policy-based research and design effective development policies and programs on pastoral economies.
- The project will work with and educate policy makers about the economic importance of pastoralist livestock trade which is greatly underappreciated in the Horn of Africa, especially in Ethiopia. To achieve this, the project will address the misinformed concerns of policy makers about cross-border trade. The first tactic for researchers and practitioners will be educational; that is, to instruct (convince?) policy makers about pastoralist cross-border trade's scale and importance to local and national economies. We will pursue policy discussions at three different institutional levels. First, are the local officials 'on the ground' in these sites who can play a key role in encouraging/discouraging policies—the isolation of many of these sites means that local officials have a large degree of implicit autonomy. Second, are national officials who must be involved because it requires international agreements and dialogue between countries, and because domestic policies have a direct effect on cross-border trade. Third, the involvement of the regional organization IGAD is required because it is one of the few organizations in the region with a cross-border mandate and with priorities focused on improved trade and transport links between member states. These three different levels of institutions need to be involved in policy discussions about regional cross-border trade (see Little 2006 and 2008).

5. Training plan

The proposed project will pursue training of students, post-doctoral researchers, and practitioners at several levels. First, it will work the current MA program in Rural Livelihoods and Development and the new MA program in Pastoralism and Lowland Development at the Center for Rural Development (CRD), Addis Ababa University (AAU). The project has a unique opportunity to contribute to the curriculum and training needs of one of the few MA programmes in eastern Africa on pastoralism and development, and key Emory faculty already have been in touch with CRD staff about assisting this programme through curriculum support and teaching. Where possible, Emory faculty will participate in short-course lecturing at CRD related to the MA programme and Emory University already has an MOU with AAU. During the duration of the project, the MA thesis research of five CRD/AAU students will be

funded and integrated into the research program. Thesis topics and research sites of students will be selected in consultation with CRD faculty and senior project researchers and will reflect specific information gaps in the project. Possible MA thesis topics for Years 1-2 include: the role of cell phone technologies in improving herder access to market and climate-related information; women's cooperatives and groups in livestock marketing; and socio-factors factors related to increased small stock production.

Second, there will be 'in practice' training of two MA-level Kenyan students at Pwani University College of Kenya through training in research methods and involvement in data collection at the project's secondary site at Garissa District, Kenya. They will be involved in market-related research under the direction of Dr. Hussein Mahmoud who is on the social science faculty at Pwani. At AAU we will conduct one short GIS/spatial analysis workshop. Emory has conducted two such workshops in Kenya in the past, and at other sites.

A third mechanism for training will be support for two post-doctoral fellows, one will be employed at CRD, AAU and one at Emory University. These recent graduates will receive considerable on-hands training by senior researchers both in Ethiopia and USA and an opportunity to build professional networks and to publish under the project. It is anticipated that both post-doctoral fellows (Ethiopian and US) will become leaders in the field and represent the next generation of pastoralist livestock systems researchers.

A fourth area of training will be through graduate student training at Emory University. At Emory doctoral students are fully funded by the university, so only minimal funds have been allocated for their participation in the project. As noted earlier, we hope to recruit two Masters of Public Health (MPH) students with interests in international nutrition to conduct summer thesis work in the project areas and will actively seek funds through Emory's Global Health Institute and other on-campus funds to support MPH thesis. It is anticipated, however, that one Emory PhD student and two Emory MPH students will participate over the life of the project.

Finally, support for methods training for student enumerators and researchers and for policy and program analysis will be a fifth aspect of training that the project will provide. Where possible, we will recruit research enumerators from pastoralist communities and will train them in data collection methods and interviewing skills. More importantly, we will work closely with local leaders and practitioners (NGO, CBO, and government workers) to help them interpret the program and policy implications of our work. Research briefs (3-4 pp) will be published for each major research report/publication and during the project, with the assistance of a group like MARIL (Managing Risk for Improved Livelihoods-Ethiopia), we will hold community meetings where we discuss the development implications of our research findings and how they can interpret them for planning their own activities and development priorities.

6. Strategies for gender inclusivity

The project addresses an activity—pastoralist livestock marketing—that generally has been dominated by males, especially cattle and camel trade. While it will be impossible to conduct our project without looking at trade in these animals, we will also examine small stock (goat and sheep) marketing which has a greater involvement of women. There are recent changes and wealthy women are involved in financing all levels of livestock trade and animal species, even though they often are not visible in the trade (Mahmoud 2003). Because we are addressing local and domestic market chains we also will be working with actors, such as fodder suppliers, butcheries, and meat sellers, which involve women. Moreover, women are involved as grain traders and we plan to interview a sample of them to understand if and how they supply pastoralist communities; seasonal differences in supplies and prices; and overall changes in pastoralist demand for cereals.

The proposed research questions raise important issues about the benefits which accrue to different groups of producers, especially women/men and high/middle/low-income herders. As noted in section (3), several key research questions are targeted to understanding gender-based differences in market access, climate information processes, and livelihood activities, and specifically how women

relate to these. Currently about 20 percent of households in northern Kenya and southern Ethiopia are headed by females and there are few constraints to their ability to sell animals (McPeak et al 2011). The project will look at the effects of livestock sales on asset ownership and gender roles both within and between households. Our team includes social scientists with considerable experience in addressing gender issues in rural Africa.

Gender-disaggregated data, of course, will be gathered for all research, training, and outreach activities. Data analysis and reporting also will differentiate findings by gender, wealth and, where possible, age differences. To insure that women's perspectives are captured, we will conduct focus group interviews that are gender differentiated; where possible, interviews with at least two members of the household with one being a woman; interview women traders and other women market actors; conduct key informant interviews with key women group leaders and other important pastoralist women; and insure strong women representation in community research and training meetings.

It is not just enough to conduct gender-based analysis. It also is important to insure gender balance--to the extent possible-- among recruited students, researchers, and team members. On our core research team, one of two Co-PIs is a woman, and the overall team of senior researchers has other women as members. In addition, we have designated a target of 50 percent of all student and student researchers (US and African) involved in the project to be women. Throughout the Horn of Africa African women working on pastoralist research issues are woefully underrepresented. Therefore, we will have a goal that at least 50 percent of African students who are funded and whose research is sponsored by the project should be women. Finally, we also want to insure gender balance among field enumerators and survey supervisors, which is critical because a male interviewing a woman may not be able to attain the respondent rapport and quality of information that a women enumerator can. We have a target of equal gender representation among field assistants and enumerators recruited to the project, although we recognize the difficulties this may present because young males from the research sites usually have much better education and training than their female counterparts.

7. Timeline

If and once the award is made sub-contracts initially will need to be drawn up and Post-doctoral Researchers recruited both for Emory and CRD before field research can begin. Based on previous experience much of Year 1 will be dedicated to focus group and key informant interviews before final design and implementation of formal surveys. Household and market survey work is expensive and time-consuming and one needs to be careful about design and data entry and analysis needs. The community-based development meetings in Year 3 with follow-up in Year 4; the research and policy meeting in Year 2 and the Final project workshop in Year 4; and the on-going publication of research and policy briefs and plans for a final edited volume or special issue of a journal also are noteworthy benchmarks in the project timeline. Below is the full proposed timeline for the project (Table 1).

Table 1. Proposed Timeline

YEAR 1 (11/2011-10/2012)	Responsible Institute	Activity
November-January	CRD (AAU) ILRI, Emory	Finalize sub-contracts and agreements; virtual meeting/or conference call among team members; Begin Recruit Post-Doctoral Researchers
February-April	CRD (AAU) ILRI, Emory	Begin Focus group and key informant interviews in Ethiopia; collect meteorological and mapping data for Ethiopia and Kenyan sites
May-July	CRD (AAU), Emory	Design and test household and trader surveys; Post-Doctoral Researchers

		join project; design and test household survey and questionnaires
August-October	CRD (AAU), Emory	Implement baseline round of household surveys; First Ethiopian MA student is supported.
YEAR 2 (11/2012-10/2013)		
November-January	CRD (AAU), Emory, ILRI	Design and test trader research module; First round of trader interviews is started in Kenya and Ethiopia
February-April	CRD (AAU), Emory, ILRI	Data entry and analysis for 1st round household survey; continue market data collection and analysis; 2 MA students from IRD/AAU students supported for thesis research in southern Ethiopia
June-August	CRD (AAU), Emory, ILRI	Policy and Research Meeting at ILRI Addis Ababa; begin case histories of household marketing and decision-making; conduct short GIS workshop at CRD/AAU; complete analysis of NDVI and GPS data to look at spatial patterns
September-October	Emory, CRD (AAU), ILRI	Publish 2 policy-oriented research briefs and submit one journal article and complete two field reports; continue interviews and meetings with policy makers.
YEAR 3 (11/2013-10/2014)		
November-January	CRD (AAU), Emory, ILRI	Data entry and preliminary write-up of trader and marketing data
February-April	CRD (AAU), Emory, ILRI	Conduct second/final round of household data collection
June-August	CRD (AAU), Emory, ILRI, GPDI (Ethiopia), and MARIL (Ethiopia)	Complete final round of trader interviews and case histories of households; Conduct Community-based research and development meeting in two communities of Borena, Ethiopia;
September-October	Emory, CRD (AAU), ILRI	Complete preliminary outline and distribute assignments for edited book or special issue of journal on study findings; work on data entry, analysis
YEAR 4 (11/2014-4/2015)		
November-January	CRD (AAU), Emory, ILRI	Complete policy work and interviews; follow-up on recommendations from community-based development meetings; work on data entry, analysis and write-up
February-April	CRD (AAU), Emory, ILRI, MARIL, GPDI	Complete final project report for CRSP; complete preliminary drafts for edited book or special issue of journal; Hold final workshop to present study findings and policy

		recommendations, Addis Ababa, Ethiopia or Nairobi, Kenya

Literature Cited

Abebe, D., Cullis, A., Catley, A., Aklilu, Y., Mekonnen, G. and Ghebrechirstos, Y. 2008. Livelihoods impact and benefit-cost estimation of a chommercial de-stocking relief intervention in Moyale district, southern Ethiopia. *Disasters. The Journal of Disaster Studies, Policy and Management* 32/2, 167-189

Adow, Mohammed. 2008. Climate Change and Population Displacement: Pastoralists in Kenya. Case Study 31, Forced Migration Review, London England.

Aklilu, Y. 2002. An audit of the livestock marketing status in Kenya, Ethiopia and Sudan, Volumes I and II. OAU/Interafrican Bureau for Animal Resources.

_____. 2009. *Livestock and Animal Product Trade and their Importance for Pastoral Economic Growth in Ethiopia.* Unpublished Background Note for Pastoral Economic Growth and Development Study, Addis Ababa, Ethiopia.

Aklilu, Y., and M. Wekesa. 2002. "Drought, Livestock and Livelihoods: Lessons from the 1999-2001 Emergency Response in the Pastoral Sector in Kenya." Humanitarian Practice Network Paper #40. Overseas Development Institute, London.

Aklilu, Y. and A. Catley. 2010. *Mind the gap: Commercialization, Livelihoods and Wealth Disparity in pastoralist areas of Ethiopia*. Medford, MA: Feinstein International Center, Tufts University.

Angassa, A. and Oba, G. 2008. Herder perceptions on impacts of Range enclosures, crop farming, fire ban and bush encroachment on the rangelands of Borana, Southern Ethiopia. *Human Ecology*, 36: 201-215.

Behnke, Roy. 2008. The Economic Contribution of Pastoralism: Case Studies from the Horn of Africa and Southern Africa. Nomadic Peoples 12 (1): 45-79.

Christensen, J., B. Hewitson, A. Busuioc, et al. 2007: Regional Climate Projections. In Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller, eds., Cambridge: Cambridge University Press.

Desta, S., G. Gebru, S. Tezera , and D.L. Coppock. 2006. Linking pastoralists and exporters in a livestock marketing chain: Recent experiences from Ethiopia. Pp. 109-127. **In** J. McPeak and P. Little (eds.) **Pastoral Livestock Marketing in Eastern Africa: Research and Policy Challenges.** ITDG Publishing, United Kingdom.

Elias E. 2008 Pastoralists in Southern Ethiopia: dispossession, access to resources and dialogue with policy makers. *Drylands Coordination Group Report* No 53, Oslo.

Ethiopia National Livestock Market Information System. 2011. Livestock Price Trends, July 2011. Addis Ababa: Ethiopia National Livestock Market Information System, Government of Ethiopia (also see www.Lmiset.net).

Flintan, F. 2008. *Women's Empowerment in Pastoral Societies* World Initiative for Sustainable Pastoralism (WISP), IUCN, Nairobi.

Focus (on Ethiopia's meat and live animal exports). 2011 Ethiopia meat and live animal exports register dramatic increase. Trade Bulletin 5, July 2011: 1-3.

Gebre, Ayalew. 2001. *Pastoralism Under Pressure: Land Alienation and Pastoral Transformations among the Karrayu of Eastern Ethiopia, 1941 to the Present*. Maastricht: Shaker Publishing.

Gebremedhin, Berhanu., A. Hirpa and K. Berhe. 2009. Feed Marketing in Ethiopia: Results of a Rapid Market Appraisal. IPMS (Improving Productivity and Market Success) of Ethiopian Farmers Project Working Paper 4. ILRI (International Livestock Research Institute). Nairobi, Kenya.

Hansen JW, Mason SJ, Sun L, Tall A (2011) Review of seasonal climate forecasting for agriculture in sub-Saharan Africa. *Experimental Agriculture* 47:205-240

Hulme, M., R. Doherty, T. Ngara, M. New, and D. Lister. 2001. African climate change: 1900-2100. *Climate Research* 17(2): 145-168.

Legese, G., Hailemariam Teklewold, D. Alemu and A. Negassa. 2008. Live Animal and Meat Export Value Chains for Selected Areas in Ethiopia: Constraints and Opportunities for Enhancing Meat Exports. Improving Market Opportunities. Discussion Paper #12. ILRI (International Livestock Research Institute). Nairobi, Kenya.

Little, Peter D.
_____. 2003. **Somalia: Economy Without State.** Oxford, UK: James Currey Publishers; Bloomington, IN: Indiana University Press.

_____. 2008. Livelihoods, Assets and Food Security in a Protracted Political Crisis: The Case of the Jubba Region, Southern Somalia. In L. Alinovi, G. Heimrich, and L. Russo eds. **Beyond Relief: Food Security in Protracted Crises.** Pp. 107-126. Warwickshire, UK: ITDG Publications/Practical Action Publishing.

_____. 2009. Income Diversification among Pastoralists: Lessons for Policy Makers. Policy Brief Number 3, COMESA and Pastoral Areas Coordination, Analysis and Policy Support (PACAPS) Program, Tufts University, Medford, MA.

_____. 2009. Hidden Value on the Hoof: Cross-Border Livestock Trade in East Africa. COMESA Comprehensive African Agriculture Development Program. Policy Brief #2.

_____.2010 Unofficial Cross-Border Trade in Eastern Africa. In A. Sarris, T. Jayne, and J. Morrison, eds. **Food Security in Africa: Market and Trade Policy for Staple Foods in Eastern and Southern Africa.** Pp. 158-181. Cheltanham, UK: Edwin Elgar Publishing.

_____.2011a Trip Report, Feb-March: Kenya-Ethiopia. ACC-CRSP.

_____.2011b Field Report: Summary of Key Observations, Garissa District, Kenya and Borena Zone, Ethiopia, February-June 2011 (based on intermittent field site visits). ACC-CRSP.

Little, Peter D., Hussein A. Mahmoud, and D. Layne Coppock. 2001. When Deserts Flood: Risk Management and Climatic Processes Among East African Pastoralists. Special Issue on Anthropological Perspectives and Policy Implications of Climate Change Research. **Climate Research** 19 (2): 149-159.

Little, Peter D., J. McPeak, C. Barrett, and P. Kristjanson. 2008. Challenging Orthodoxies: Understanding Pastoral Poverty in East Africa. **Development and Change** 39 (4): 585-609.

Luseno, Winnie, John G. McPeak, Christopher B. Barrett, Peter D. Little, and Getachew Gebru. 2003. Assessing the Value of Climate Forecast Information for Pastoralists: Evidence from Southern Ethiopia and Northern Kenya. **World Development** 31(9): 1477-1494.

Mahmoud, Hussen A. 2003. *The dynamics of cattle trading in northern Kenya and southern Ethiopia: The role of trust and social relations in market networks*. Ph.D. dissertation, University of Kentucky, Lexington, KY.

_____. 2006. "Innovations in Pastoral Livestock Marketing: the emergence and the role of 'Somali cattle traders-cum-ranchers' in Kenya." **In** J. McPeak and P. Little, eds. *Pastoral Livestock Marketing in Eastern Africa: Research and Policy Challenges*. Pp. 129-144. Warwickshire, UK: ITDG Publishing.

_____. 2007. "Conflict and Pastoral Livelihoods in the Kenya-Ethiopia-Somalia Borderlands," in *Fighting for Inclusion: Conflicts among Pastoralists in Eastern Africa and the Horn*. Edited by P. Goldsmith, pp. 54-78. Nairobi: DPMF (in collaboration with Hussein A. Mahmoud and Mustafa Babiker).

McPeak, John, Peter D. Little, and Cheryl Doss. 2011. **Risk and Social Change in an African Rural Economy: Livelihoods and Pastoralism.** London and New York: Routledge.

McPeak, John and Peter D. Little, eds. 2006. *Pastoral Livestock Marketing in Eastern Africa: Research and Policy Challenges.* Warwickshire, UK: ITDG Publications, 288 pp.

Nunow, A.A. 2000. *Pastoralists and Markets: Commercialisation and food security in North East Kenya*, PhD dissertation, Thela Publishers, Amsterdam.

Orlove, B., C. Roncoli, M. Kabugo, A. Majugu. 2010. Indigenous Climate Knowledge in Southern Uganda: The Multiple Components of a Dynamic Regional System. *Climatic Change* 100: 243-265.

Pratt, Ninn, A. Bonnet P, Jabbar M.A., Ehui S. and de Haan C. 2005. Benefits and Costs of Compliance of Sanitary Regulations in Livestock Markets: The Case of Rift Valley Fever in the Somali Region of Ethiopia. ILRI (International Livestock Research Institute). Nairobi, Kenya.

Pastoralist Livelihoods Initiative (PLI). 2007. Food for Thought: Livestock Feeding Support During Drought. Feinstein International Center, Tufts University, Addis Ababa, Ethiopia.

Rich K and Wanyoike, F. 2008. An assessment of the regional and national socio-economic impacts of the 2007 Rift Valley Fever outbreak in Kenya. American Journal of Tropical Medicine and Hygiene 2008 volume.

Rich, K. M., B. D. Perry and S. Kaitibie. 2009. Commodity-based Trade and Market Access for Developing Country Livestock Products: The Case of Beef Exports from Ethiopia. International Food and Agribusiness Management Review. 12(3):1-22.

US Government. 2010. Feed the Future Guide. www.feedthefuture.gov/guide/html.

US Government. 2011. Feed the Future: Global Food Security Research Strategy. www.feedthefuture.gov/documents/FTF_research_strategy.pdf

Williams, T.O., B. Spycher and I. Okike. 2006. *Improving livestock marketing and intra-regional trade in West Africa: Determining appropriate economic incentives and policy framework.* Nairobi: ILRI.

TRAVEL

Year 1:

• Names of travelers: Peter Little, Polly Erickson, Uriel Kitron, and US Post-doctoral researcher (TBD) (does not include national researchers for in-country travel).
• Destination: Ethiopia (Erickson, Little and Post-doc-Kenya (Kitron—he has on-going projects there and will combine travel with other grants):
• Purpose : Little--to finalize sub-awards with local and regional institutions; hold meetings with key stakeholders; and design and be involved with focus group, key informant interviews; Little, Erickson, Kitron, US Post-doc—in collaboration with Ethiopian and Kenyan colleagues design household, trader, and market surveys; collect meteorology, mapping data.
• Number of days of travel: 90 days for Post-doc researcher; estimated total of 85 for others.

Year 2:

• Names of travelers: Peter Little, Polly Erickson, and US Post-doctoral researcher (TBD) (does not include national researchers for in-country travel).
• Destination: Ethiopia (Erickson, Little and Post-doc)-Kenya (Little):
• Purpose : In collaboration with Ethiopian and Kenyan team members oveersee first round of trader interviews is started in Kenya and Ethiopia; attend Policy and Research Meeting at ILRI Addis Ababa; begin case histories of household marketing and decision-making; complete analysis of NDVI and GPS data to look at spatial patterns
• Number of days of travel: Full Year (365 days) for Post-doc researcher; estimated total of 46 for Little and Erickson.

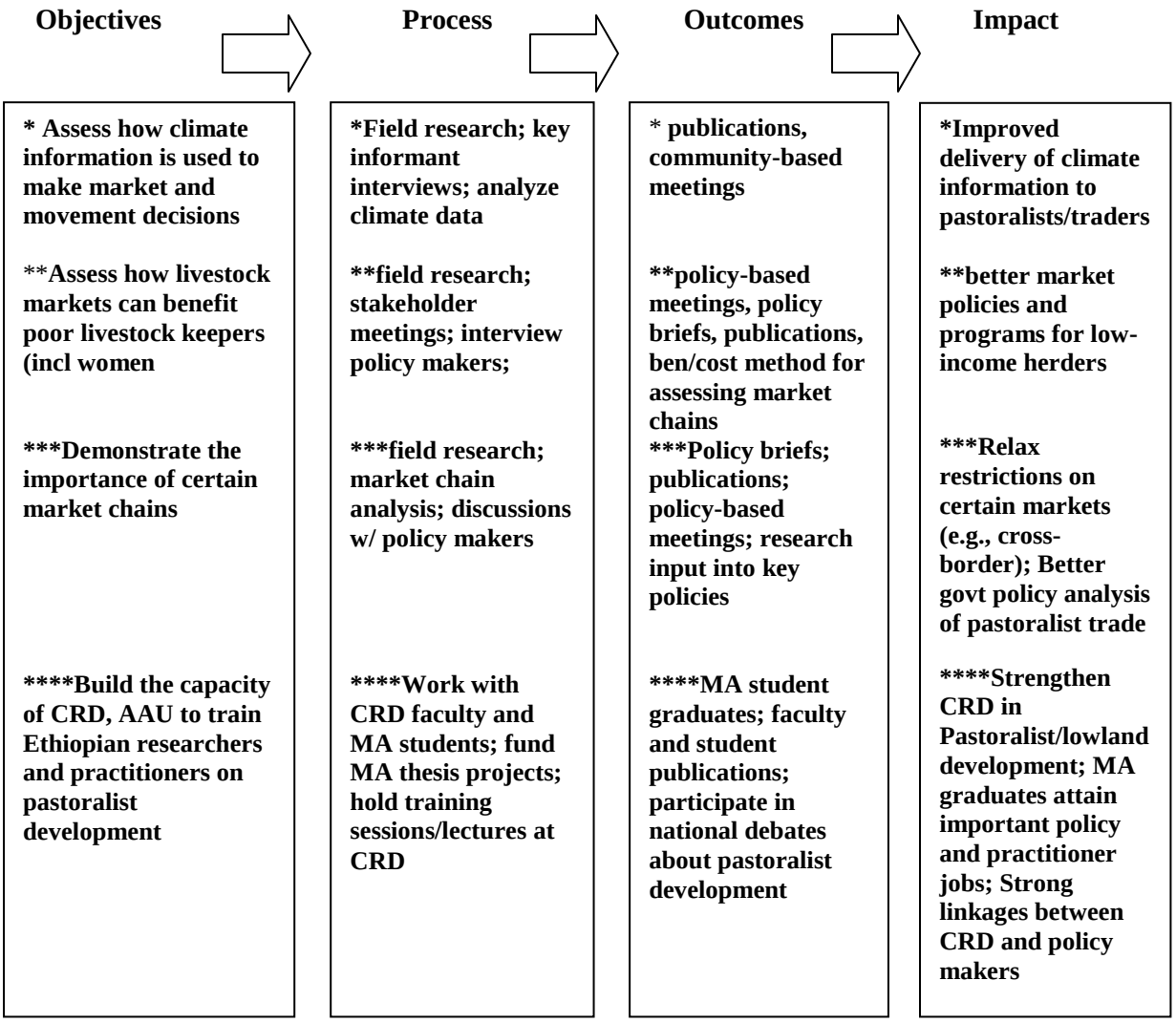
Year 3:

• Names of travelers: Peter Little, Polly Erickson, Hussein Mahmoud, Carla Roncoli, and US Post-doctoral researcher (TBD) (does not include national researchers for in-country travel).
• Destination: Ethiopia (Erickson, Little and Post-doc)
• Purpose: In collaboration with Ethiopian and Kenyan team members Conduct second/final round of household data collection; complete final round of trader interviews and case histories of households; and conduct Community-based research and development meeting in two communities of Borena, Ethiopia;
• Number of days of travel: 120 days for Post-doc researcher; estimated total of 82 day for Little, Erickson, Roncoli, and Mahmoud.

Year 4:

• Names of travelers: Peter Little, Polly Erickson, Hussein Mahmoud, 3 other Kenyans to attend final project workshop (does not include national researchers for in-country travel).
• Destination: Ethiopia (Erickson, Little and Post-doc)
• Purpose: In collaboration with Ethiopian and Kenyan team members complete policy work and interviews; follow-up on recommendations from community-based development meetings; Hold final workshop to present study findings and policy recommendations, Addis Ababa, Ethiopia or Nairobi, Kenya
• Number of days of travel: 35 days.

Monitoring, Evaluation, and Impact Plan



Project Indicator	Estimates	Measurement
Number of institutions/organizations whose competency/capacity areas are strengthened	5	assessment quality of faculty publications and presentations; assessment of student achievements and placement;
Enhanced human capacity for increased sustainable agricultural productivity	60	Number of participants (by gender, location) in community meetings and seminars
Number of policies/regulations/administrative procedures analyzed	14	Analysis of market policies, food aid policies, regulations, livestock movement regulations, veterinary and settlement regulations;
Number of households with improved market access	20,000	analysis of household and market-level data
Number of women's organizations/associations assisted	4	Participation in community development meetings; number of

		development interventions pursued based on project recommendations
Number of individuals who have received short-term training (male)	10	Attendance at training seminars and workshops;
Number of individuals who have received short-term training on livestock development/pastoralism (female)	10	Attendance at training seminars and workshops;
Number of Ethiopian graduate students who have completed MA studies on project topics (male)	6	Number of MA degrees granted
Number of Ethiopian graduate students who have completed MA studies on project topics (female)	6	Number of MA degrees granted
Number of new technologies or management practices under research	10	Evaluation of technologies and management practices from field reports.
Number of vulnerable households benefiting directly	30,000	Improved marketing policies and policy dialogue to allow herder households to take advantage of market opportunities; Number of herders and traders who benefit from improved market policies/programs and climate forecasting
Number of public-private partnerships formed	2	number of private market groups formed.

Statement of institutional track record and experience in the proposed host country.

Emory University has conducted several long-term projects both in Kenya and Ethiopia and in several other African countries. In the field of global health it is a national and international leader. Among its recent activities in Ethiopia are a $20 million Gates Foundation-funded research and training program in nursing and related medical fields; Emory-Ethiopia Global Interdisciplinary Partnership Grant from CARE International (to facilitate collaborative research and training programs between Emory University and Addis Ababa University in fields of public health, computational sciences and mathematics, and anthropology); and a range of NSF-funded faculty and graduate student projects in demography, mental health, and food security. The proposed Emory PI (Peter Little) has directed and co-directed several interdisciplinary research programs on livestock development, pastoralism and food security in Kenya and Ethiopia that are similar to the current proposal, including a current seed grant from the LCC-CRSP. He has worked with CRSP-funded projects for 15 years. He was a Co-PI on the GL-CRSP funded Pastoral Risk Management (PARIMA) Project, 1997-2006, and was responsible for the social science component of the program. PARIMA addressed different risk management strategies of pastoralists of northern Kenya and southern Ethiopia, with a focus on drought, conflict, marketing, and food security. The project was very successful in disseminating research results to key policy makers and development practitioners in Kenya and Ethiopia, for generating numerous publications (Little alone authored or co-authored more than 10 journal articles/book chapters, 1 co-edited book, and 1 co-authored book under PARIMA), and training MSc and PhD students and Post-Doctoral researchers. Under PARIMA Little worked closely with research units at ILRI and Egerton University, Kenya and was responsible for supervising the PhD training of an Ethiopian staff member (Dejene Debsu) of Addis Abba University and a current staff member (Hussein Mahmoud) of Pwani College/Kenyatta (a proposed collaborating researcher under the current proposal) and one post-doctoral researcher. The Kenyan and Ethiopian students came to the USA to do PhD training with Little and both have launched successful academic and research careers. Dr. Little also served as the PI of two BASIS-CRSP research programs in Kenya and Ethiopia that were evaluated as highly successful and have similarities to the proposed project. The first BASIS-CRSP activity was on cross-border livestock trade and food security in the Horn of Africa (1998-2001) with field sites in Kenya and Ethiopia. This was the first interdisciplinary research project on cross-border livestock trade in the region and resulted in several journal articles, book chapters and a book, and strong collaboration with researchers from Ethiopian and Kenyan universities, including Addis Ababa University. Building on Little's earlier research project on cross-border cattle trade along the Kenya/Somalia borderlands (1995-1996), the project continues to have important policy implications, including a recent policy brief that was written on the cross-border livestock trade for the Common Market for Southern and Eastern Africa (COMESA) (Little 2009). The second interdisciplinary BASIS-CRSP activity was the project on "Assets, Cycles, and Livelihoods: Addressing Food Insecurity in the Horn of Africa and Central America," 2001-2004. The collaborating host country institution was the Institute for Development Research (the predecessor to the current collaborator Institute for Rural Development, College of Development Studies, AAU) and Workneh Negatu was a Co-PI and is a team member and Co-PI of the current project. Another member of the Emory team, Dr. Uriel Kitron, has current research and training projects in the region, and works closely with Kenyatta University in Kenya. His work involves long-term research collaboration and training activities on public health, GIS, epidemiology, and environmental studies with Kenyatta University, as well as other Kenyan institutions.

CVs of Lead PI and all U.S. and host-country Co-PIs

PETER D. LITTLE (Proposed PI)

EDUCATION:

Ph.D. in Anthropology, Indiana University, 1983
M.A. in Anthropology/Minor in African Studies, Indiana University, 1979
B.A., cum laude honors in History/Phi Beta Kappa, Tulane University, 1975

PROFESSIONAL HISTORY (Selected since 1997):

Professor of Anthropology and Director, Development Studies Program, Emory University, 2008-present
Professor and Chair (2002-07), Department of Anthropology, University of Kentucky, 1997-2007
Advisory Panel, Research Program on Climate Change in Local Coping Strategies in southern Mali and southern Ethiopia, Bill and Melinda Gates Foundation-funded Program, Oxfam-USA, Boston, MA, 2011
Chair, Interdisciplinary Panel for Centre-Commissioned External Review (CCER) of Pastoralism, International Livestock Research Institute (ILRI), Nairobi, Kenya, 2010.

RESEARCH GRANTS, CONTRACTS, AND FELLOWSHIPS (Selected since 1996):

Principal Investigator (PI),"Climate variability, pastoralism, and commodity chains in Ethiopia and Kenya," funded by the Livestock-Climate Change CRSP (based at Colorado State University), Principal Investigator, Dec. 1, 2010-Nov. 30, 2011, $79,990.

Team Leader and Lead Author, 'Future Scenarios of Pastoralist Economic Growth and Development in Ethiopia, 2010-2025,' Department for International Development (DfID) and Government of Ethiopia, Addis Ababa, Aug. 2009-Jan. 2010, July-Oct. 2010 (lead author on four policy reports on pastoralism in Ethiopia).

Lecturer and Consultant, Policy Analysis for Pastoral Areas Program (PACAPS) (Eastern Africa), Tufts University and Institute for Environment and Development (IIED) (funded by USAID), 2008-2009 (lectured to African policy makers on livestock development and worked on regional policy guidelines on cross-border livestock trade for Common Market for Eastern and Southern Africa [COMESA]).

Principal Investigator (PI), John Simon Guggenheim Memorial Foundation, Research and writing project on the 'Anthropology of Neoliberalism in Africa,' 2007-2008.

PI, BASIS Collaborative Research Support Program (CRSP), 'Regional Workshop and Dissemination Activity on Poverty and Food Security in Ethiopia,' 2006-2007.

Co-PI, National Science Foundation (NSF), Doctoral Dissertation Improvement Grant (with Dejene N. Debsu), Land Tenure and Conflict/ Dynamics in Pastoral Areas of Southern Ethiopia, 2006-2007.

Co-PI, NSF, Doctoral Dissertation Improvement Grant (with Karen Greenough), Becoming Mobile Pastoralists: Desedentarization among the Ful'be of Tanout, Niger, 2006-2007.

PI, United Nations Food and Agriculture Organization (Rome, Italy), Case Study of 'Trade, Rural-Urban Dynamics, and Livelihoods in Southern Somalia,' 2005-2006.

Co-PI, Trust Fund for Environmentally and Socially Sustainable Development (TFESSD) (Norway), Improving the Effectiveness of Action to Reduce Poverty and Vulnerability of Pastoralists (with J. McPeak, C. Barrett, and P. Christjanson), 2004-2006.

Co-PI, Global Livestock-Collaborative Research Support Program (GL-CRSP) (funded by USAID). Pastoral Risk Management on East African Rangelands. (with L. Coppock, Utah State University and C. Barrett, Cornell University, 1997-2006.

PI, John D. and Catherine T. MacArthur Foundation, Research and Writing Grant on "Economy without State: Accumulation and Survival in the Somalia Borderlands," 2001-2002.

PI and Team Leader, Broadening Access and Strengthening Input Market Systems-Collaborative Research Support Program (BASIS-CRSP) (USAID),"Assets, Cycles, and Livelihoods: Addressing Food Insecurity in the Horn of Africa and Central America," 2001-2004.

Co-PI, NSF, Doctoral Dissertation Improvement Grant (with Hussein Mahmoud), The Dynamics of Livestock Trade in Northern Kenya: Trust and Social Relations in Market Networks, 2001-2002.

PI and Regional Director Broadening Access and Strengthening Input Market Systems (BASIS) CRSP, Horn of Africa Research Program, Case studies of cross-border trade; and food security and livelihoods in South Wello, Ethiopia, 1996-2001.

SELECTED PUBLICATIONS (sample of most relevant to proposal topic):

SELECT BOOKS:

2011 **Risk and Social Change in an African Rural Economy: Livelihoods in Pastoralist Communities.** London and New York: Routledge (co-authored with John McPeak and Cheryl Doss).

2009 (1992) **The Elusive Granary: Herder, Farmer, and State in Northern Kenya**. Cambridge, UK: Cambridge University Press (originally published in 1992 and reissued in paperback in 2009).

2006 **Pastoral Livestock Marketing in Eastern Africa: Research and Policy Challenges.** Warwickshire, UK: ITDG Publications (co-edited with John McPeak).

2003 **Somalia: Economy Without State.** Oxford, UK: James Currey Publishers; Bloomington, IN: Indiana University Press.

2000 **Commodities and Globalization: Anthropological Perspectives**. Monographs in Economic Anthropology Series. Boulder, CO and London, UK: Rowman and Littlefield (with A. Haugerud and P. Stone).

1994 **Living Under Contract: Contract Farming and Agrarian Transformation in Sub-Saharan Africa**. Madison, WI: University of Wisconsin Press (with M. Watts).

1987 **Lands at Risk in the Third World: Local Level Perspectives**. Boulder, CO: Westview Press (with M. Horowitz).

JOURNAL ARTICLES (7 most relevant to proposal topic):

2008 Challenging Orthodoxies: Understanding Pastoral Poverty in East Africa. **Development and Change** 39 (4): 585-609 (with C. Barrett, J. McPeak, and P. Kristjanson).

2008. Food Aid Dependency in Northeast Ethiopia: Myth or Reality? **World Development** 36 (5): 860-874.

2003 Assessing the Value of Climate Forecast Information for Pastoralists: Evidence from Southern Ethiopia and Northern Kenya. **World Development** 31(9): 1477-1494 (with W. Luseno, J. McPeak, and C. Barrett).

2001 When Deserts Flood: Risk Management and Climatic Processes Among East African Pastoralists. Special Issue on Anthropological Perspectives and Policy Implications of Climate Change Research. **Climate Research** 19 (2): 149-159 (with H. Mahmoud and L. Coppock).

2001 Avoiding Disaster: Diversification and Risk Management among East African herders. **Development and Change** 32 (3): 401-433 (with K. Smith, B. Cellarius, L. Coppock, and C. Barrett).

2000 Climatic Shocks and Pastoral Risk Management in Northern Kenya. **Practicing Anthropology** 22 (4): 11-14 (with H. Mahmoud).

1996 Conflictive Trade, Contested Identity: The Effects of Export Markets on Pastoralists of Southern Somalia. **African Studies Review** 39(1): 25-53.

BOOK CHAPTERS AND OTHER JOURNAL ARTICLES (More than 25 book chapters in total but not listed for space reasons):

MONOGRAPHS, PUBLISHED RESEARCH REPORTS, AND WORKING PAPERS (More than 30 but not listed):

HONORS AND AWARDS (SELECT) (since 2000):

Guggenheim Fellow, John Simon Guggenheim Memorial Foundation, 2007-2008

Wethington Research Award, University of Kentucky, 2007

University Research Professorship, University of Kentucky, 2007

Albert D. and Elizabeth H. Kirwan Memorial Prize (for outstanding contributions to original research), University of Kentucky, 2006

***Choice* Outstanding Academic Book** (for book, *Somalia: Economy without State*), 2004

Amaury Talbot Book Prize for African Anthropology, Royal Anthropological Institute, London (for book, *Somalia:Economy without State*), 2003

GRADUATE STUDENTS AND POST-DOCTORAL RESEARCHERS

(have chaired or co-chaired 11 PhD students and supervised 5 Post-Doctoral Researchers)

Polly Joanna Ericksen
International Livestock Research Institute (ILRI)
PO Box 30709 Nairobi, Kenya
+254 422 4823, p.ericksen@cgiar.org

D.O.B. 3 February 1967
Citizenship: UK and USA
Gender: Female

Education

Department of Soil Science, University of Wisconsin-Madison. PhD. 1998.
Department of Economics, University of Wisconsin-Madison. M.S. 1991.
Department of History, Swarthmore College, Swarthmore, Pa. B.A. 1987.

Professional Experience

International Livestock Research Institute (ILRI), Nairobi, Kenya. Senior Scientist, April 2010 to present. I am a member of the "Vulnerability and Sustainability in Pastoral Systems" and the "Sustainable Livestock Futures" teams.
Environmental Change Institute (ECI), University of Oxford, UK. Senior Researcher. April 2005 to April 2010. My duties were split between the Global Environmental Change and Food Systems (GECAFS) project and the ECI.
International Research Institute for Climate Prediction (IRI), Earth Institute at Columbia University, New York. Postdoctoral research scientist, Sept. 2003 to April 2005.
Catholic Relief Services, Baltimore, Md. Senior Technical Advisor for Agriculture and Environment, August 2001 to August 2003.
Alternatives to Slash and Burn (ASB) Global Coordination Office. Consultant, May 2000 to August 2001.
Alternatives to Slash and Burn (ASB) Programme, ICRAF, Nairobi, Kenya. Interim Global Coordinator, March 1998 (hired as assistant) to May 2000 (appointed as Interim in June 1999).
Sustainable Agriculture and Natural Resource Management Collaborative Research Support Program (SANREM-CRSP) (US-AID), University of Wisconsin-Madison. Research Assistant, January 1994 to May 1995; September 1996 to June 1997
Soil Science Department, University of Wisconsin-Madison. Teaching Assistant, Fall 1994 and Summer 1997.
Nutrient and Pest Management Program, University of Wisconsin Extension. Economist, May 1992 to December 1993.
A. E. Havens Center for the Study of Social Structure and Social Change, University of Wisconsin-Madison. Office coordinator, September 1991 to May 1992.
Department of Economics, University of Wisconsin-Madison. Teaching assistant, September 1990 to May 1991.
Lewin/ICF, Washington, D.C. Research Assistant, July 1987 to May 1989.

Publications

Edited books

Ingram, J.S.I., P.J. Ericksen and D.M. Liverman (ed) 2010. *Food Security and Global Environmental Change*. Earthscan, London.
Palm C.A., S. A. Vosti, P.A. Sanchez, and P.J. Ericksen (ed). 2006. *Slash and Burn Agriculture: The Search for Alternatives*. Columbia University Press, New York.

Chapters in Edited Books

Ericksen, Polly, Beth Stewart, Jane Dixon, David Barling, Philip Loring, Molly Anderson and John Ingram. 2010. Value of a food systems approach. *In* Ingram, J.S.I., P.J. Ericksen and D.M. Liverman (eds.). *Food Security and Global Environmental Change*. Earthscan, London

Ericksen, Polly**,** Hans-Georg Bohle and Beth Stewart. 2010. Vulnerability and resilience in food systems. *In* Ingram, J.S.I., P.J. Ericksen and D.M. Liverman (eds.). *Food Security and Global Environmental Change*. Earthscan, London

Ericksen P., Beth Stewart, Siri Eriksen, Petra Tschakert, Rachel Sabates-Wheeler, Jim Hansen and Philip Thornton, 2010. Adapting food systems. *In* Ingram, J.S.I., P.J. Ericksen and D.M. Liverman (eds.). *Food Security and Global Environmental Change*. Earthscan, London

Ericksen, P., Woodley, E. et al. 2005. Using Multiple Knowledge Systems in Sub-global Assessments: Benefits and Challenges. Millennium Ecosystem Assesment *Volume 4: Sub-global Assessments*. Chapter 4. (www.millenniumassessment.org)

Thomson, M.C., Ericksen, P.J., Ben Mohammed, and Connor, S.J. 2004. Land-use change and infectious diseases in West Africa. *In* R. DeFries, G. Asner, R. Houghton (ed) *Ecosystem Interactions with Land Use Change*. AGU, Geophysical Monograph Series. pp 169-187.

Special Journal Issues

Ericksen, P.J., J.S.I.Ingram, D. Liverman (ed). 2009. Global Environmental Change and Food Security, Special issue of *Environmental Science and Policy* 12(4)

Refereed articles in Academic Journals

Thornton, P.K., P.G. Jones, P.J. Ericksen and A.J. Challinor. (2011). Agriculture and food systems in sub-Saharan Africa in a four-plus degree world. *Philosophical Transactions of the Royal Society*. *A* 2011 **369**, 117-136

Ziervogel, G. and P.J. Ericksen 2010. Adapting to Climate Change to Sustain Food Security. *Wiley Interdisciplinary Reviews: Climate Change* 1: 525-540

Ericksen, P.J., J.S.I. Ingram, D. Liverman. 2009. Food Security and Global Environmental Change – Introduction to Special Issue. *Environmental Science and Policy* 12(4): 373-377

Boyd, E., H. Osbahr, P.J. Ericksen, E. Thompkins and M.C. Lemos. 2008. Managing transformations for resilient futures. *Development* 51: 390-396

Ericksen, P.J. 2008. What is the vulnerability of a food system to global environmental change? *Ecology and Society*.13(2):14. [online] URL: http://www.ecologyandsociety.org/vol13/iss2/art14/

Ericksen, P. J. 2008. Conceptualizing food systems for global environmental change research. *Global Environmental Change* 18:234-245

Van Noordwijk, M., J. Paulsen, and P. Ericksen. 2004. Filters, flows and fallacies: quantifying off-site effects of land-use change. *Agriculture, Ecosystems and the Environment.* 104 (1)

Ericksen, P.J. and M. Ardón. 2003. Similarities and differences among farmer and scientist views of soil quality in Central Honduras. *Geoderma* 111 (3-4): 233-248.

Cox, P., N. Shams, G. Jahn, P. Ericksen, and P. Hicks. 2002. Building collaboration between NGOs and agricultural research institutions. *Cambodian J. Agriculture* 6.

Ericksen, P.J., K. McSweeney and F.W. Madison. 2002. Assessing linkages and sustainable land management for hillside agroecosystems in Central Honduras: Analysis of intermediate and catchment scale indicators. *Agriculture, Ecosystems and the Environment* 91 (1-3): 295-311.

Ericksen, P.J. and K. McSweeney. 1999. Fine scale analysis of soil quality under mixed land uses and landforms: a case study from Central Honduras *American Journal of Alternative Agriculture* 14(4): 146-157.

Workneh Negatu, PhD
Abridged CV

Dr. Workneh Negatu is an associate professor of agricultural economics and development and director of the Center for Rural Development at Addis Ababa University. He was director for the ex-IDR (Institute of Development Research) from 2000 to 2003. He was the director of the Institute of Rural Development until June 2010. Before he joined Addis Ababa University in 1999, he was faculty and the head of Agricultural Economics and Farming Systems Research Department at Deberezeit Agricultural Research Center of Haramaya University. His area of research is smallholder agricultural and pastoral development with focus on food security, technological innovation and institutions, and natural resource management. He is also involved in the instruction of Master's courses on agricultural and rural development strategy and policy.

Personal Data

Name:	Workneh Negatu
Nationality:	Ethiopian
Marital Status:	Married
Number of Children:	Three

Address: Institute of Development Studies /Addis Ababa University, P.O. Box: 1176
Addis Ababa
Fax (251) 111 23 10 74. Tel: (251) 111 23 97 21
Cellphone: (251) 911 684 425
E-mail: wnegatu@ idr.aau.edu.et or wnegatu@yahoo.com

Education

PhD, Development Studies/Agricultural and Development Economics, University of East Anglia, UK, 1997
MSc, Regional Economics and Planning, Martin-Luther University, Wittenberg, Germany, 1986
BSc, Agricultural Economics, Alemaya College of Agriculture/ Addis Ababa University, Addis Ababa, Ethiopia, 1979

Some selected professional services

Served as**:**

7. Bio-EARN Program Advisory Committee member, Inter-University Council for East Africa, July 2006 – 2009;
8. Consultant researcher for SAVE/UK project - Impacts of Productive Safety Net on Childhood Poverty Reduction: Implications for Child Education, November 2007 –February 2009.
9. Principal consultant researcher for ARD (Association for Rural Development. Ltd, USA) project – Impact of Land Certification in Gerado Kebele, Amhara Region, Ethiopia, October 2007-April, 2009;
10. Lead researcher for ROSP (Report on the Status of Pastoralism)–Ethiopia project, as part of DFID-sponsored Horn/East Africa Regional ROSP program involving Ethiopia, Kenya, Tanzania and Uganda, since June 2007.
11. Coordinator and CO-PI for BASIS-CRSP (Broadening Access and Strengthening Input Market System - Coordination Office of Research Support Project in Ethiopia, September 2000 to June 2006.
12. Editor In-Chief for Ethiopian Journal of Agricultural Economics of the AESE, 1999-2003.
13. Chief Editor of the Ethiopian Journal of Development Research, IDR/ AAU, 2000- 2003.

Awards:

- Fulbright visiting scholarship at Emory University, Atlanta, USA, February 2011-August 2011

- Research scholarship award of DAAD (German Exchange Program) at Humboldt University-Berlin , July 2006 – September 2006
- A visiting research scholarship at Agricultural and Applied Economics Department, University of Wisconsin-Madison, USA, as part of BASIS-CRSP project, February 2004- August 2004.

Some selected publications:

Kebede, Abnet, **Negatu, Workneh** and Hassen, Ali (2011). Comparative analysis of vulnerability of pastoralists and agro-pastoralists to climate change: A case study in Yabello Woreda in Oromia Region, Ethiopia. Ethiopian Journal of Development Research (issued)

Negatu, Workneh, Getachew Kassa, Negussie Dejene, Degefa Tolossa, Tesfaye Tafesse and Ali Hassen (2010). Pastoralism in transition: Changing population and economies in Ethiopia. Oxfam-GB (monograph)

Negatu, Workneh, (2010). Pastoral knowledge resources and communication: Reflections from ROSP (Report on the Status of Pastoralism) Project in Ethiopia. A paper presented at the Consultative Workshop on Participatory Learning and Knowledge Management organized by the Ministry of Federal Affair and Federal Project Coordination Unit (FPCU), 26 April 2010, Adama, Ethiopia

Anandajayasekeram, P., Isinika, A., Kimmins, F., **Negatu, W**., Osgood, D. Pray, C., Rivera-Ferre, Santhakumar, V., Waibel, H. (2009). Agricultural knowledge, science and technology: Investment and economic returns, pp. 495-550. In: Agriculture at a cross roads. Global report. IAASTD. McIntire, B. D., Herren, H. R., Wakhungu, J and Watson, R.T. (eds). NY and Washington D.C: Island Press

Tafesse, Tesfaye and **Negatu, Workneh** (2009). Infrastructure and food security in the Nile Basin region: A case study from Ethiopia, Kenya and Sudan. Study report prepared fro Socioeconomic Development and Benefit Sharing Project, Nile Basin Initiative: Entebbe: Socio-economic Development and Benefit Sharing Project (SDBS).

Negatu, Workneh, 2008. 'Food Security Strategy and Productive Safety-net Program in Ethiopia'. In: Taye Assefa, ed.: Ethiopia's National Policies, Strategies and Programs, 2008: pp. 1-14. Addis Ababa, FSS.

Muluken, Yilma, Bogale, Ayalneh and **Negatu, Workneh** (2008). Measuring rural household food security and its determinants in Assosa district of Benshangul Gumuz region of *Ethiopia. Quarterly Journal of International Agriculture*, Vol 47 ((2008) No. 4: 307-325.

Carter, Michael, Little, Peter, Mogues, Tewodaj and **Negatu, Workneh (**2008). 'Poverty Traps and Natural disasters In Ethiopia and Honduras', 2007. World Development, Vol. 35, No.5, pp835-856

Negatu, Workneh, 2006. 'Determinants of Small Farm Household Food Security: Evidence from South Wollo, Ethiopia'. *Ethiopian Journal of Development Research*, Vol. 28, No.1, April 2006.