CGIAR Systemwide Livestock Programme
Concept Note for Research Grants 2006

Project title:
Identifying livestock-based risk management and coping options to reduce vulnerability to droughts in agro-pastoral and pastoral systems in East and West Africa

Lead centre:
International Livestock Research Institute (ILRI), PO Box 30709, Nairobi 00100, Kenya

Collaborating institutions (IARC, NARS, ARI, others):
- International Livestock Research Institute (ILRI)
- International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
- Institut National de Recherches Agronomiques du Niger (INRAN), Niger
- University of Wisconsin, Madison, USA
- RECONCILE (NGO), Nakuru, Kenya

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Total cost of Project (SLP Funds, USD):
$ 300,000.00

Anticipated Start Date and Duration of Project:
April 2007 start, duration 2 year

Background/Justification (Max.300 words):
There is a growing consensus that the frequency and severity of meteorological droughts in arid and semi-arid zones of Africa have increased (UNEP 2002; Dietz et al. 2004), where pastoralism and agro-pastoralism are the dominant livestock production systems. There is also a general agreement that the pastoralists and agro-pastoralists in these agro-ecological zones have become more vulnerable to climatic shocks, especially droughts (Campbell 1999; FAO 2001; UNEP 2002; Niamir-Fuller 1999). Common reasons given for this include demographic pressure, sedentarization of the pastoralists, restricted access to lands, expansion of crop fields into grazing areas and livestock corridors, poverty, lack of effective marketing infrastructure for livestock, and poor institutional preparedness (FAO 2001; UNEP 2002). Livestock as a store of wealth play an important role in drought mitigation and risk coping strategies of pastoral/agro-pastoral households (Turner 2000). For example, livestock play an important role as economic buffer to drought-induced food deficits (Turner 2000) when animals are commonly sold and sale profits go into purchase of grains for household consumption.

This proposed research aims to identify livestock-based risk management and coping options to reduce vulnerability to climatic shocks, particularly drought, in pastoral and agro-pastoral systems of East and West Africa. In addressing this, it is necessary to gain a better understanding of the changing nature of vulnerability and how it is distributed socially (gender, age, wealth) and geographically (resource access, access to markets, climate) (Actionaid International 2005). There is also the need to understand the existing ex-ante risk management and ex-post coping strategies that pastoral/agro-pastoral households use to manage climatic shocks. A key factor that determines the degree of vulnerability to shocks in pastoral and agro-pastoral systems is their natural resource base, especially forage and water. There is therefore the need to analyze the evolution of the natural resources and the effect on livestock management, for instance livestock movement in response to droughts.

Project purpose (Max. 200 words):
The purpose of this project is to identify intervention options (technical, policy, and institutional) that reduce the vulnerability of livestock keepers and/or communities dependent on livestock for their livelihoods to climatic shocks, particularly droughts, in pastoral and agro-pastoral systems in East and West Africa and the vulnerability of livestock to shocks. This purpose addresses the need to reduce vulnerability of both the pastoralists/agro-pastoralists and their livestock to droughts (securing livestock assets). Securing livestock assets is important in view of the roles they play in drought mitigation and coping strategies in pastoral and agro-pastoral systems.

Outputs:
1. A synthesis of the best available knowledge on the changing nature of pastoralism and agro-pastoralism as a result of climate change, especially drought in East and West Africa, based on scientific and indigenous knowledge prepared.

2. Understanding of the changing nature in the vulnerability of pastoralists/agro-pastoralists to droughts in East and West Africa improved.

3. Livestock-based risk management and coping options to reduce vulnerability of pastoralists/agro-pastoralists to droughts in East and West Africa and potential policy options identified.

Financial Summary (Research Grant - funds requested from the SLP, USD):

Description	Year 1 (USD)	Year 2 (USD)	Total (USD)
Personnel	49,000	49,000	98,000
Services	37,465	37,465	74,930
Supplies	2,035	2,035	4,070
General expenses	20,000	20,000	40,000
Workshops	0	10,000	10,000
Training	0	10,000	10,000
Equipment	0	0	0
Travel	9,000	4,000	13,000
Overheads (20%)	25,000	25,000	50,000
Total	***142,500***	***157,500***	***300,000***

Matching funds (USD by source):
Desert Margins Program GEF (Global Environment Facility) project – 170,000 USD
Directorate General for Cooperation and Development (DGCD Belgium) funded Decision Support project (ICRISAT led) – 50,000 USD
ILRI in-kind contribution – 43,200 USD

Users and beneficiaries:
Users and beneficiaries of project outputs include poor pastoralist and agropastoralist producers and associations (e.g. AREN in Niger; KILA, RECONCILE in Kenya); NGOs especially those that work with pastoral and agro-pastoral societies, manage micro-loan and rural gain/livestock banks, provide emergency relief (e.g. Veterinaire Sans Frontieres (VSF), Care International, ActionAid International), donor organizations (World Food Programme, Food and Agriculture Organization), researchers and policy makers.

Most project activities will be participatory involving the stakeholders, especially the pastoral and agro-pastoral communities in the study sites. Thus, the stakeholders will be involved right from the beginning to the end of the project. This will ensure identification with and common ownership of the project outputs. Processes and lessons learned from the project activities will be documented and regularly shared with the stakeholders through consultations and community workshops. The end of project workshop will also serve to communicate the project outputs to the beneficiary groups.

Location:
This proposed project will be carried out in semi-arid agro-ecological zones of Kenya (East Africa) and Niger (West Africa). Pastoral and agro-pastoral systems are the main livestock

production systems in Kenya and Niger. Drought is a major problem and threat to pastoral and agro-pastoral livelihoods in both countries (FAO 2001). There exist differences in the spatio-temporal variability of rainfall between West and East Africa with important implications for agropastoral production (Ellis and Galvin 1994). These differences will prove useful for understanding the changing vulnerability to climate change across semi-arid Africa. The 2000 drought in Kenya was the worst to be experienced in the country for 40 years (UNEP 2002). Niger experienced drought in 2005, which was worsened by locust infestation leading to a serious food crisis. Many lives and livestock were lost due to the drought. Current maps of poverty show that Niger and Kenya have a higher percentage of poor livestock keepers than 85% of other countries in Africa (Thornton et al. 2002), and both countries are dominated by rangelands with significant pastoral and agro-pastoral populations. In addition, future projections of climate change, poverty and vulnerability show populations in both countries will become more vulnerable in the future (Thornton et al. 2006), and thus are good choice for intensive research work now to prepare for the future.

The two countries are representative of typical agro-pastoral/pastoral regions of East and West Africa and thus will enable a comparative study of agro-pastoral/pastoral vulnerability and identification of livestock-based technical, institutional and policy options to reduce vulnerability. In addition, previous work in the two countries by ILRI and the project partners will provide useful baseline data to build upon. The two countries are involved in the on-going Desert Margins Programme (DMP) GEF (Global Environment Facility) project on arresting land degradation and conservation of biodiversity in the desert margins of sub-Saharan Africa. Project sites in Niger are Fakara, Gabi and Zermou in Tillabery, Maradi and Zinder regions, respectively. The project sites in Kenya will build on past work by ILRI, by comparing sites in northern Kenya (Samburu) with those in southern Kenya (Kajiado and Narok). The project sites are chosen for contrasts as well as to get generic and robust lessons. Criteria used for choice of project sites in Niger include degree of vulnerability, cropping density, availability of baseline data, different social groups, and access to market. ILRI has worked in Fakara since 1994 and has very useful biophysical and socio-economic data on the site. The Kenyan sites provide a comparison of culturally similar pastoral populations (Maasai and Samburu), living in areas with very different drought frequencies and total rainfall. The sites also represent a market access gradient, with sites in southern Kenya much closer to market than those in northern Kenya. This type of cross-site comparison will allow us to develop a more general and more widely applicable understanding of vulnerability of these populations to drought. The proposed project will benefit from existing institutional linkages in the selected sites and provide opportunity for effective dissemination of project outputs.

Research approach and proposed research activities in relation to outputs (Max. 500 words):

This proposed project will utilize a series of methods that combine natural and social science approaches to address the multiple and overlapping environmental, socio-economic, and institutional issues. Remote sensed Normalized Division Vegetation Index (NDVI) data will be used for the analysis of the changing variability of the spatio-temporal distribution of green fodder production over the past 15 years across the study sites in Kenya and Niger. This will provide a better understanding of the spatial structure of variability of forage production and an understanding of the effect of different radii of livestock movement on the risk of fodder deficit. Vulnerability analysis framework will be used to explore the nature and dynamics of vulnerability of pastoralists and agro-pastoralists in the study sites to shocks. For socio-economic and institutional issues, household surveys, focus group discussions and community meetings/workshops will be used. The major activities in relation to the outputs are outlined below:

Activities for Output 1 (synthesis on changing nature of pastoralism and agro-pastoralism)

1.1 Consult stakeholders and plan for project implementation

1.2 Conduct desk study on impacts of climate change, especially droughts, on pastoral and agro-pastoral systems in East and West Africa based on scientific and indigenous knowledge

1.3 Conduct spatial analysis of green fodder production (NDVI) over the past 15 years across the study sites in Kenya and Niger

1.4 Conduct interviews in study sites on livestock management strategies in response to droughts and identify constraints to livestock mobility

Activities for Output 2 (improved understanding of vulnerability of pastoralists/agro-pastoralists)

2.1 Analyze relevant existing information and identify information gaps

2.2 Conduct interviews and participatory vulnerability analysis in study sites (stakeholder analysis, situation analysis, analyzing causes, analyzing community action)

2.3 Organize community workshops to share lessons

Activities for Output 3 (livestock-based risk management and coping options)

3.1 Conduct surveys in study sites on livestock-based risk management and coping options in response to drought including impacts of policy

3.2 Organize end of project workshop for feedback, monitoring and evaluation of progress and impact

Expected scientific impact and International Public Goods generated by the project (Max 250 words):

This project will contribute to a better understanding of nature and dynamics of vulnerability to climatic shocks in pastoral and agro-pastoral systems, and the identification of livestock-based interventions (technical, policy and institutional) to mitigate and cope with the shocks. The combination of natural and social science approaches provide an opportunity to look at the issue in a holistic way, which is necessary to address the different dimensions of vulnerability. Synthesis on changing nature of pastoral and agro-pastoral systems in response to drought in East and West Africa will provide opportunity for comparative evaluation of how the systems are faring in both regions and drawing lessons from each region that can be useful to pastoralists and agro-pastoralists in both regions and regions beyond with similar agro-ecological conditions. This cross-site comparison and the syntheses proposed in this project will be the international public goods on this project. In addition, the synthesis will provide information for both national and international research and development agencies on technological and policy options in addressing climate-related problems facing poor livestock keepers in both regions.

Expected impact on beneficiaries (poverty reduction, food security, environmental protection – Max 250 words):

Through participatory vulnerability analysis, the pastoralists and agro-pastoralists will be better informed of their vulnerability to climatic shocks and will be better equipped in their preparedness of community level actions to manage or deal with them. New climate information will spread the word in communities about new changes coming in the future. Information on spatial analysis of green fodder production in the study sites can guide livestock keepers in their decision on where and when to graze when faced with drought. This will not only reduce livestock losses due to lack of information but also enhance the livelihood of the pastoralists/agro-pastoralists. Identification of livestock-based

interventions in risk management and coping in response to climatic shocks can inform better drought mitigating interventions and institutional of the local, national and regional livestock early warning systems. All the above will contribute to securing livestock assets and can help the pastoral and agro-pastoral households to cope better to climatic shocks.

The indicators that will be used to demonstrate impact include the level of community participation in vulnerability analysis and how the results of the analysis are translated into concrete community actions in response to drought. Other indicators include scientific profile of the synthesis on changing nature of pastoral and agro-pastoral systems in East and West Africa in response to climate change, number of other scientific articles published, and the integration of policy options on livestock-based interventions for risk management and coping into development policy of government and development agencies.

Scaling out strategy (Max. 150 words):
The project findings will be up-scaled through the existing institutional linkages of the project partners, which include pastoral and agro-pastoral associations, governmental and non-governmental agencies, national and international research organizations, and donor agencies. End of project workshop will also be used to share project results and disseminate findings. Wide dissemination of scientific publications from the project will also provide another avenue for up-scaling the project findings.

Risks and assumptions associated with output delivery (Max. 200 words):
The risks that this proposed project can face are instability in the research locations and occurrence of natural hazards such as flood during the implementation of the project. These two risks can cause migration of the pastoral and agro-pastoral households and can undermine their participation in the project. For the delivery of project outputs, we assume that we will benefit from existing institutional linkages of the on-going projects in the project sites.

Systemwide nature of proposed project:
Two CG centers (ILRI and ICRISAT) that have complementary expertise in biophysical and socio-economic aspects of pastoral and agro-pastoral systems are involved in this project. Besides, both centers have several years of experience working with the pastoralists and agro-pastoralists in East and West Africa.

This proposed project is in line with the SLP call by addressing the problems facing pastoral and agro-pastoral livestock producers in East and West Africa, with emphasis on drought. By focusing on vulnerability of pastoralists and agro-pastoralists to climatic shocks, and livestock-based risk management and risk coping interventions, this project addresses the livelihood issues and options to use livestock as pathway out of poverty, which accords with SLP mandate.

Inter-center synergies are expected through institutional linkages that the project will foster and the institutes involved will contribute valuable information, data and insights from their respective institutions and on-going projects.

Specific capabilities and roles of partner institutions and key staff (Max.300 words):
Key staff by institutes:
ILRI

- Robin Reid, Landscape ecologist
- Philip Thornton, System Analyst

- Mohammed Said, GIS/natural resource management expert
- Augustine Ayantunde, Animal Scientist
- Andrew Mude, Consultant, Agricultural economist

ICRISAT

- Jupiter Ndjeunga, Agricultural economist
- Ramadjita Tabo, Agronomist
- Bruno Gerard, Agricultural engineer and remote sensing/GIS expert
- Saidou Koala, Soil scientist and DMP global coordinator

University of Wisconsin, Madison

- Matthew Turner, Professor and Chair, Department of Geography

INRAN

- Mohamadou Gandah, Soil scientist and Scientific director
- Moussa Bureima, Sociologist
- Tahirou Abdoulaye, Agricultural economist
- Abdou Dan Gomma, Animal Scientist

RECONCILE

- Michael Odhiambo, pastoral policy analyst

Contributions of each institute to the research activities

Activity	ILRI	ICRISAT	Univ. Wisconsin	INRAN	RECONCILE
Output 1					
Stakeholder consultation	X	X	X	X	X
Desk study	X				
Spatial analysis	X	X	X		
Interviews on livestock mobility	X		X		
Output 2					
Information gaps on vulnerability	X	X		X	X
Participatory vulnerability analysis	X	X		X	X
Community workshops	X	X		X	X
Output 3					
Survey on risk management	X	X		X	
End of project Workshop	X	X	X	X	X

Contribution to CGIAR goals (Yes/No and if Yes, how). Refer to System Priorities for CGIAR Research 2005-2015, Science Council Secretariat, December 2005):

a) Sustaining biodiversity. YES

b) More and better food through genetic improvement. NO

c) Reducing rural poverty through agricultural diversification and high value commodities. YES

d) Poverty alleviation through sustainable management of water, land and forest resources. YES

e) Policies and institutional innovations to support Sustainable reduction of poverty and hunger. YES

References:

ActionAid International. 2005. *Participatory vulnerability analysis: A step-by-step guide for field staff*. ActionAid International, London, UK. pp. 35.

Campbell, D.J. 1999. Response to drought among farmers and herders in southern Kajiado district, Kenya: A comparison of 1972-1976 and 1994-1995. *Human Ecology* 27: 377-416.

Dietz, A.J., Ruben, R., Verhagen, A. and Dietz, T (editors). 2004. *The impact of climate change on drylands: With a focus on West Africa.* Kluwers Academic Publishers, Boston, Massachuset, USA. pp. 469.

Ellis, J. and Galvin, K.A. 1994. Climate patterns and land-use practices in the dry zones of Africa. *BioScience* 44: 340-349.

FAO. 2001. *Drought related livestock interventions.* FAO report, Rome. pp. 47.

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Thornton, P.K., Jones, P.G., Owiyo, T.M., Kruska, R.L., Herrero, M., Kristjanson, P., Notenbaert, A., Bekele, N. and Omolo, A. 2006. *Mapping climate vulnerability and poverty in Africa.* International Livestock Research Institute, Nairobi, Kenya.

Thornton, P.K., Kruska, R.L., Henninger, N., Kristjanson, P.M., Reid, R.S., Atieno, F., Odero, A. and Ndegwa, T. 2002. *Mapping poverty and livestock in the developing world.* International Livestock Research Institute, Nairobi, Kenya.

Turner, M.D. 2000. Drought, domestic budgeting, and changing wealth distribution within Sahelian households. *Development and Change* 31:1009-1035.

UNEP. 2002. *Global environment outlook 3: Past, present and future perspectives.* United Nations Environment Programme, Nairobi, Kenya. pp. 416.

Logframe for project (title): Identifying livestock-based risk management and coping options to reduce vulnerability to droughts in agro-pastoral and pastoral systems in East and West Africa

Hierarchy of Objectives	Objectively Verifiable Indicators (OVIs)	Means of Verification (MoV)	Assumptions and Risks
Goal (SLP) Contribution of crop-livestock systems to poverty reduction enhanced			
Purpose (Project) Intervention options (technical, policy, and institutional) that reduce the vulnerability of livestock keepers to climatic shocks, particularly drought, in pastoral and agro-pastoral systems in East and West Africa and the vulnerability of livestock to shocks identified.	(Impact) - At least 20% of the population in the study sites better equipped in preparedness for drought by 2008. - Vulnerability to drought of pastoral and agro-pastoral households in the study sites reduced by 10% by end of 2008. - 15% reduction in livestock mortality in the study sites by 2008.	 - Government statistics - Selected research partners reports and publications such as ILRI, ICRISAT, INRAN, University of Wisconsin - External evaluation and impact assessment reports - Rural radio programmes - Websites	(Purpose to Goal) - Adequate social, economic and political stability exists. - No occurrence of severe natural hazards such as flood. - Relevant regional and national policies are implemented effectively.
Outputs (Project) *Output 1:* A synthesis of the best available knowledge on the changing nature of pastoralism and agro-pastoralism as a result of climate change, especially drought in East and West	 - High profile synthesis on the changing nature of pastoralism and agro-pastoralism is completed and disseminated to research and development agencies by June	 - Selected ILRI/ICRISAT reports and publications - Peer-review journals - Publications on the web	

Africa, based on scientific and indigenous knowledge prepared.	2008. - At least two papers from the synthesis submitted to peer-review journal by the end of 2008.		
Output 2: Understanding of the changing nature in the vulnerability of pastoralists/agro-pastoralists to droughts in East and West Africa improved.	- Emerging issues and trends in vulnerability of pastoral and agro-pastoral systems to climatic shocks made available to policy makers and development agencies by end of 2008. - A range of options to reduce vulnerability to droughts in pastoral and agro-pastoral systems documented and published by end of 2008.	- Selected ILRI/ICRISAT reports and publications - Rural radio programmes - Newspaper articles or special features - Publications on the web	- Adequate social, economic and political stability exists. - No occurrence of severe natural hazards such as flood. - High level of participation by the communities.
Output 3: Livestock-based risk management and coping options to reduce vulnerability of pastoralists/agro-pastoralists to droughts in East and West Africa and potential policy options identified.	- At least three risk management and coping strategies are identified and disseminated to research and development agencies in East and West Africa by December 2008. - At least two potential policy options are identified and made available to national partners in	- Selected ILRI/ICRISAT reports and publications - Newspaper articles or special features - Rural radio programmes - Publications on the web	- Adequate social, economic and political stability exists. - No occurrence of severe natural hazards such as drought or flood. - High level of participation by the communities.

	East and West Africa by December 2008.		
Activities (Project) *Output 1: A synthesis of the best available knowledge on the changing nature of pastoralism and agro-pastoralism as a result of climate change, especially drought in East and West Africa, based on scientific and indigenous knowledge prepared.*	(Inputs)	(Costs)	(Activity to Output)
1.1 Consult stakeholders and plan for project implementation	- Inception workshop - Visit to the study sites to inform the communities of the project	- $10,000	- Project starts on time and timely release of funds. - Commitment of all project stakeholders maintained.
1.2 Conduct desk study on impacts of climate change, especially droughts, on pastoral and agro-pastoral systems in East and West Africa based on scientific and indigenous knowledge	- Literature review - Synthesis of available knowledge	- $50,000	
1.3 Conduct spatial analysis of green fodder production (NDVI) over the past 15 years across the study sites in Kenya	- NDVI data for sites in East and West Africa by June 2007. - GIS software	- $30,000	

and Niger			
1.4 Conduct interviews in study sites on livestock management strategies in response to droughts and identify constraints to livestock mobility	- Baseline information on bio-physical and socio-economic characteristics of the study sites - Training of the enumerators - Village meetings - Selection of households for the interviews	- $70,000	-No political instability and major natural hazards in the study sites.
Output 2: Understanding of the changing nature in the vulnerability of pastoralists/agro-pastoralists to droughts in East and West Africa improved.			
2.1 Analyze relevant existing information and identify information gaps	- Literature review - Consultation with partners	- $ 20,000	
2.2 Conduct interviews and participatory vulnerability analysis in study sites (stakeholder analysis, situation analysis, analyzing causes, and analyzing community actions)	- Training of facilitators in participatory vulnerability analysis - Village meetings	- $ 50,000	-No political instability and no major natural hazards in the study sites.
	- Community feedback workshops	- $ 10,000	-No political instability and no

2.3 Organize community workshops to share lessons			major natural hazards in the study sites.
Output 3: Livestock-based risk management and coping options to reduce vulnerability of pastoralists/agro-pastoralists to droughts in East and West Africa and potential policy options identified.			
3.1 Conduct surveys in study sites on livestock-based risk management and coping options in response to drought	- Training of the enumerators - Village meetings - Selection of households for the interviews	- Cost already included in activity 1.4	-No political instability and no major natural hazards in the study sites.
3.2 Organize end of project workshop for feedback, monitoring and evaluation of progress and impact	- Workshop	- $10,000	
			(Preconditions): - Partnership/cooperation from local authorities, traditional leaders - Stability in study sites and favorable bio-physical environment