GLOBAL LIVESTOCK CRSP

Expansion of LEWS Activities in Ethiopia Under the Pastoralist Livelihoods Initiative (PLI)

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In the recent past, pastoralists of Ethiopia have become increasingly food insecure and vulnerable to drought and other shocks. This trend is corroborated by high levels of food aid and evidence that coping mechanisms are weakening. Through a Pastoralist Livelihoods Initiative (PLI) that began in October 2005, the USAID-Ethiopia Mission supported Ethiopia in undertaking urgent and timely interventions to respond immediately to emergencies and to improve livestock production and early warning systems targeted at reducing the prospect of disasters due to recurrent droughts (USAID, 2005). The Livestock Information Network and Knowledge System (LINKS) project is one of the multiple partners that contributed significantly to the implementation of the PLI. This brief describes the contribution of the LINKS project towards the establishment and strengthening of the capacity of the Somali and Afar regional states of Ethiopia to institute and manage region-wide district-based pastoral livestock Early Warning Systems (EWS).

Background

The Pastoralist Livelihoods Initiative (PLI), implemented through a collaboration of the Government of Ethiopia, private sector, non-governmental organizations (NGOs), and universities was a project focused on strengthening livestock-based livelihoods through a variety of proven interventions including: early market purchase of stock before severe drought; restocking with improved breeds of small ruminants (sheep and goats), while improving productivity of existing breeding stock; and by exploiting immediate opportunities for long term livestock market development (including policy reform and public/private partnerships for systems improvement).

The PLI sought to urgently address the needs of an increasingly vulnerable population made so by climatic conditions (i.e. drought and lack of access to markets). The overall objectives of the PLI is to mitigate the impact of drought and other shocks by sustainably improving the preparedness, livelihoods and incomes of pastoralists.

The Pastoralist Livelihoods Initiative has four intermediate result-oriented objectives:

1. Optimization of stocking rates and production of livestock in the extensive grazing areas of the regional states of Somali and Afar and the pastoral lowlands of the regional state of Oromia;

2. Preparation of pastoralists for droughts and other shocks through the establishment of livestock specific early warning and response mechanisms in Somali and Afar;

3. Increase of income for pastoralist through efficient off-take of livestock and animal products from the pastoral areas of Somali and Afar and the pastoral lowlands of Oromia due to improved access to well-organized livestock markets; and

4. Harmonization of technical and policy processes to support the strengthening of pastoralist preparedness, livelihoods, and incomes.

Under objective two above, the GL-CRSP Livestock Information Network and Knowledge System (LINKS) project was awarded funding from the United States Agency for International Development (USAID) to undertake technology transfer in order to implement the Livestock Early Warning System (LEWS) technology suite, developed by the LINKS team of Texas A&M University, in the Afar and Somali regions of Ethiopia. The overall goal of this objective was to reduce the vulnerability of the populations of Somali and Afar to food insecurity and related hardships by improving the regional capacities to monitor and analyze food and livelihood security information and to advocate for timely and appropriate responses.

The LINKS project has developed a suite of tools for monitoring the impact of emerging weather events on livestock forage supply in the pastoral regions of eastern Africa. Of particular note is the Livestock Early Warning System (LEWS) technology. LEWS is a robust suite of automated technologies that utilize satellite based weather data, Normalized Difference Vegetation Index (NDVI) data, and geo-referenced measured vegetation

sites scattered across East Africa to monitor deviation in forage production for livestock compared to long-term data with projected 90 day forecasts provided every 10 days to an array of collaborating institutions. LEWS utilizes the Phytomass Growth Model (PHYGROW- Rowen, 1995) as the foundation, whose primary inputs include soil parameters, plant community characteristics, and livestock management decision rules, which are driven by gridded weather data for a particular location to simulate daily forage available for livestock and wildlife (Stuth et al., 2003 and 2005).

The LINKS project worked in partnership with Save the Children-UK (SC-UK) to establish an effective and sustainable district-level food and livelihood security monitoring and early warning system (EWS) within Somali and Afar, focused on triggering timely and appropriate responses. The objective of the proposed EWS was to strengthen the capacity of the Somali and Afar Regional Disaster Prevention and Preparedness Food Security Bureaus (DPPFSBs) to establish and manage region-wide district-based pastoral EWSs that are linked to appropriate and early responses through a food and livelihood security monitoring, reporting, analysis, and dissemination system. Such a system was proposed to complement the Ethiopian government's Federal Disaster Prevention and Preparedness Commission's efforts to establish a livelihood-based EWS in the country. The role of LINKS in the consortium was to augment and bolster the content of early warning information and products produced for and by the PLI by offering a robust suite of livestock early warning and livestock market information products and technologies, and complement partner activities from SC-UK. The products that LINKS continues to provide include: current and forecasted forage production for livestock, generated automatically from satellite based weather data; NDVI data; and geo-referenced measured vegetation. This forage production information is delivered every 10 days via the Internet, along with monthly reports of 30, 60, and 90 day forecasts for forage production. The livestock market information avails near-real time weekly market prices and supply transaction information for key markets, as well as an updated analysis and synthesis of market trends as they relate to the food security situation of pastoral areas.

Justification. Presently, SC-UK utilizes the Household Economy approach (the sum of household income and the exchange value of its labour and other assets) to estimate the impact of a 'shock' on the ability of a household to acquire food and non-food goods. This information is used to manage threats to food security through provision of timely and analytical early warning and vulnerability information. The process involves the monitoring of key indicators and response triggers that are physically observed in the field on a regular basis and tied to a "warning stages" categorization. These indicators include forage standing crops that must be physically observed on a regular basis. The livelihoods assessment requires actual regular physical visits to the field by monitoring experts. In order to undertake assessments and determine standing forage conditions in comparison to the norm, eye-ball estimations of deviation from a single reference "normal" year over the last ten-year period are carried out by the monitors. This methodology poses some practical and methodological challenges towards monitoring forage conditions. Insecurity and denial of access due to the insecure nature of the pastoral environments makes regular visits difficult. Sampling may also be difficult and compromised due to poor accessibility rendering regular return assessments impractical. Physical monitoring by individual monitors in different locations introduces individual biases leading to lack of standardization of the survey outputs for comparison among and across multiple locations or areas. Furthermore, a lack of long-term institutional memory (both due to regular staff transfers and human cognitive remembrance abilities) makes the process of objective determination of deviations of current forage situations in comparison to long-term normals near impossible.

The LEWS technology suite addresses these issues by providing a scientifically grounded empirical basis for determining forage standing crop conditions. Furthermore, given the fact the monitoring is an automated process, the information and data about forage conditions have been stored in a database since 1961, meaning determination of deviation of current forage situations can be calculated on the fly. Once the forage model has been set-up, no further regular visits are required as the model automatically generates new forage information based on changing climatic variables that are automatically captured from satellite weather information of various web-repositories. The information is generated in near real-time, providing statistical predictions and an insight into future forage conditions.

Methodology

The expansion of forage monitoring locations arose from the need to fill critical gaps in the LEWS monitoring system in Ethiopia. After careful analysis, it was determined that at least 50 monitoring points were required in the Somali region, with 25 more in the Afar region in order to create a well balanced distribution of monitoring locations that will provide a much more objective and robust representation of vegetation/land use classifications, and thereby forage production units. The expansion of monitoring locations enhances the accuracy of the LEWS forage monitoring and early warning products by increasing the sampling frame and therefore the representation of the heterogeneity of landscapes of interest. The bulk of the activity was undertaken between October 2005 and September 2007. The field activities involved field characterization of

dominant plant species, characterization of the dominant soil series, gathering information on plant preferences by animal types, stocking rates, and traditional grazing decision rules. Each monitoring site was geo-referenced and linked with both rainfall data and Normalized Difference Vegetation Index greenness data for the region. Once the vegetation information was entered and stabilized into the PHYGROW model, weather data information and NDVI coordinates were set up and associated with each monitoring site to produce forage standing conditions for analysis and forecasting.

Significant Outputs

Like crop production, forage production is a supply indicator. The livelihood security of pastoralists relies not only on forage production, but on access to that forage. Sufficient forage production does not guarantee that all pastoralists have forage entitlements. Pastoralists' forage entitlements are determined by other factors, such as land tenure, infrastructure, borders, and conflict. Nevertheless, if forage production is poor, the impact on pastoral livelihoods can be substantial.

The project saw the completion of the expansion of vegetation monitoring locations in Somali and Afar. Over eighty new sampling sites have now been established to complement previous existing monitoring locations. The forage production information being generated at these new locations has been integrated into the forage early warning/ forage monitoring system and has tremendously improved the accuracy of the forage production information being generated for Ethiopia.

The information collected has formed a solid foundation for the development and targeting of suitable early warning interventions in the pastoral areas of Ethiopia. Accurate targeting of emergency interventions to monitor and protect pastoral livelihoods and reduce the requirements for emergency assistance is currently being achieved by use of the forage monitoring/early warning information generated by a number of emergency intervention institutions working in Ethiopia including: DPPFSBs, USAID, SC-UK, Famine Early Warning Systems Network (FEWSNET), and the World Food Programme (WFP), among others. Detailed region-specific maps of forage conditions are now being produced for both Somali and Afar every ten days, information that is currently being integrated in routine food security monitoring activities and the reporting of the respective regions' food security agencies. With the increase in monitoring locations, many users and stakeholders have developed confidence in the new set of products, including maps of forage production, proving that the information is both scientifically and practically sound, capable, and accurate enough to be used for both early warning and planning purposes.

Practical Implications

Livestock entitlements are the most important assets for pastoralists, while livelihood strategies such as herd management, employment and migration patterns, marketing patterns and income generating activities determine how pastoralists cope with advancing drought. A forward-looking social protection system needs to intervene early, ideally right after a weather shock, which in the case of Ethiopia tends to be lack of rain during critical months. Rainfall and forage monitoring are very useful in the early detection of emerging problems for pastoralists. Employing techniques such as LEWS, monitoring can be carried out cheaply and cost effectively for large areas, through remote sensing and biophysical modeling techniques.

The LEWS forage monitoring products supply a comprehensive set of early warning indicators that provide accurate information to trigger responses to drought conditions and acute food insecurity, as well as useful input for post-emergency interventions and development planning.

With the improvement in confidence gained from the expansion of monitoring locations, the LEWS products have been targeted as the technology of choice for use in an early livelihood protection index being developed in the pastoral areas of Ethiopia (Hess et al., 2006), and LEWS technologies are also being integrated into a risk financing strategy established by WFP, DFID (UK Department for International Development), and the World Bank.

Further Reading

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The GL-CRSP Livestock Information Network and Knowledge System (LINKS) project developed from the GL-CRSP Livestock Early Warning System (LEWS) project established in 1997. The LEWS project developed and applied a suite of information communication technology to provide a regional decision-support framework for livestock early warning. The LINKS project is placing LEWS technology inside a broader livestock information and analysis system that is designed to improve livestock markets and trade, thereby enhancing the well-being of pastoralists in eastern Africa. The project was led by Dr. Jerry W. Stuth, Texas A&M University until his death in April 2006. The project is now led by Dr. Paul Dyke, Texas A&M University. Email: dyke@brc.tamus.edu.

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

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