

PROGRESS REPORT
July 1, 1998- June 30, 1999

Project Title: Responses to Climate Variability and Utility of Climate Forecast Information for the Livestock Sector in the Arid and Semi-arid Zone, South Africa.

Principal

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Project

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This project was funded September 30, 1999, several months after the original start-up date. We therefore got a late start in conducting research and though we have made some progress, the fieldwork will not begin until the summer of 1999.

Project Description

This project is exploring the effects of ENSO events and the potential value of climate forecasting to livestock ranchers and pastoralists in a semi-arid shrub-savanna region bounded by 25°-29° south latitude and 22°-25° east longitude, in northern South Africa. This region is environmentally similar to a large portion of central southern Africa, where ENSO-induced losses of livestock production and economic opportunity are major problems for both commercial ranchers and small-holder herdsman. The global goals are:

Determine how climate forecasts (El Nino) might enhance human welfare by exploring the potential value of climate forecasting to livestock ranchers and pastoralists.

Determine how forecast information can be packaged and delivered to optimize human adaptation.

The objectives of the project include:

1. Assessing the effects of ENSO events on vegetation, livestock and people in the study area.
2. Identifying short-term, event-oriented tactics used by ranchers and pastoralists to cope with individual ENSO events.
3. Estimating how long term climate variability influences livestock production patterns and human coping strategies.
4. Determining the extent to which climate forecasting facilitates drought-coping tactics or could be modified to facilitate coping.
5. Using recent ENSO events (1992-93, severe, and 1997-98, mild) as part of a comparative research design.

Methods

Several complimentary methods are being employed in the project.

Interviews and Surveys with local livestock owners will be carried out to:

1. characterize the patterns of resource exploitation and land use employed by various types of livestock owners in the study area. This will include obtaining information on land use, land tenure, stocking rates, property size, grazing management practices, agricultural production, if relevant, marketing, etc.;
2. determine how ranchers and pastoralists cope with ENSO-induced events both for long term strategic management adjustments and short term tactical responses to ENSO events;
3. determine the extent to which livestock owners now have access to and use climate forecast information;
4. ascertain how forecast information could be best packaged and disseminated to maximize utility to livestock owners.

Interviews with local administrators will be conducted to identify relevant policies and institutions which influence the efficacy of drought-coping strategies and tactics used by livestock owners. How do policies and institutions facilitate or constrain drought-coping? How could these be improved?

County (provincial) level data will be acquired on several factors such as livestock sales, ranch size, and land tenure.

Two Workshops will be held. One in October 1999, the other in Year 3. The purpose of the first workshop is to present project plans and objectives to local livestock owners and climate forecasters. The purpose is to generate stakeholder interest and to solicit advice for modifying plans and methods. Climate forecasters will be asked to present information about the form, timing, etc. of their forecasts. Ranchers will be asked about how they acquire climate information. The second workshop will focus more explicitly on the issue of maximizing the utility of forecast information for livestock owners. In the second workshop, the results of research will be presented and alternative methods of providing climate forecast information will be discussed.

Field ecological surveys will be undertaken to ground truth vegetation maps and to identify regions of special concern within the study area. This will include sites such as degraded areas, or areas of major importance to routine grazing management or drought-coping practices. The field surveys will also be used to provide data needed for model parameterization and validation.

A Spatial description of the ecosystem is now being developed through the acquisition and creation of GIS data bases representing the abiotic, biological/ecological, demographic, socioeconomic and sociopolitical attributes of the study area. Other information of a non-spatial nature, such as long term climate data, local agricultural, demographic and economic statistics are also being sought.

SAVANNA Model simulations and scenarios will be used to assess the value and probable success of alternative coping strategies, including how alternative strategies influence ecosystem sustainability and economic viability under probable ENSO drought patterns. SAVANNA will also be used to explore the possible value of coupling model assessments of ENSO impacts with climate forecasts to provide outcome information on ecological and economic impacts of ENSO events to livestock owners.

Progress and Plans

Interviews and Surveys with local livestock owners (August 1999 and into 2000). A survey instrument, developed by Galvin for use in similar situations among pastoral societies in East Africa, is now being modified for this study. The survey outline at this point includes acquiring information on descriptions of operations, factors that affect management of the operation, information of the El Nino events, effects of the El Nino event on the operation and information needs for future variable climate events in the region. Galvin, Vogel and Hudson will initiate the surveys in August 1999.

Interviews with local administrators will be initiated by Vogel and her research assistant.

County level data acquisition will be conducted by Vogel in 1999.

Workshop: (October 1999 for first workshop) Vogel is in the process of organizing the October workshop. Hudson will help with the logistics when he gets to South Africa. People who on the agenda include climate forecasters, an agricultural economist, agricultural department personnel from the local area and national level, ranchers and project personnel.

Field ecological surveys (Late 1999 or early 2000) will be directed by Ellis.

A Spatial description of the ecosystem: (Ongoing) Weisberg is currently developing a GIS data base for the study area. Jia is assisting in the acquisition and analysis of remote-sensed data.

SAVANNA Model simulations and scenarios: (early 2000) The SAVANNA model has been adapted to a variety of grazing ecosystems around the world, including a site in south Africa.

Analyses of the effects of climate on livestock enterprises are now underway for other sites. A socioeconomic sub-model is now being developed to extend analyses from ecological to economic sectors. Model adaptation and parameterization for the South African study area will commence in June 1999.

Expected Outcomes of the Research

1) Insights relevant to basic social science

- # Insights into the tactics (short-term responses) used by ranchers and small-holders to mitigate immediate effects of ENSO events.

These might include sales of animals; use of government programs, changes in grazing management; purchase feed, etc.

- # Insight into long-term strategies used to minimize risk in a region of high climate variability

These might include using drought resistant species (plants and livestock); very large spatial scale of exploitation; using properties in different regions; maintaining grazing reserves; grazing management strategies which maximize livestock survival under stress, at some cost to productivity; etc.

2) Identification of important feedback to the climate scientists and forecasters

- # Research design incorporates two ENSO events (91-92, & 97-98). Survey of impacts on ranch operations of these two events should identify the type of forecasting and specific information most useful to ranchers or pastoralists.

3) Identification of information relevant to policy, decision making and the application of climate forecast information

- # SAVANNA model simulations will assess the value and probable success of alternative coping strategies, with and without the benefit of climate forecasting. Outputs will include effects on economic viability, food security and human welfare under projected ENSO drought patterns.
- # SAVANNA will be used to explore the possible added value of coupling model assessments with climate forecasts to provide more detailed information on ecological and economic impacts of ENSO events to livestock owners.

