



RUMINATIONS

NEWSLETTER OF THE SMALL RUMINANT/GLOBAL LIVESTOCK COLLABORATIVE RESEARCH SUPPORT PROGRAM

Texas A&M University System Hosts SR/GL-CRSP PAC Meeting

In February, Dr. Paul Dyke and fellow team members organized a full-day presentation of the Livestock Early Warning System (LEWS) project for the Program Administrative Council (PAC) members. In the morning, PAC members visited the Blackland Research Center in Temple, Texas where Dr. Dyke serves as Director of the Integrated Information Management Laboratory.

The Blackland Research Center was created in 1909 as part of the Texas Agricultural Experiment Station (TAES), a state agency affiliated with the Texas A&M University System (TAMUS). It is one of 13 regional experiment station centers in Texas. The Grassland, Soil and Water Research Laboratory of the USDA/Agricultural Research Service (ARS) and the Natural Resources Conservation Service are also located at the facility in Temple, Texas. TAES and ARS scientists work cooperatively on a number of research programs thus capitalizing on the strengths of each agency.

The Integrated Information Management Laboratory (IIML)

was created as part of Blackland in 1992. It serves as the focal point for many of the national and international integrated applications of models and data by laboratory scientists. Several large national and international databases have been developed and several ARS-developed simulation models have been applied and improved under the auspices of the IIML.

PAC members were given a demonstration of the Spatial Characterization Tool (SCT) and Country Almanacs being used by the LEWS team. The SCT-Africa database is being used to define different pastoral

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Destu Completes Borana Pastoral Studies in Ethiopia

With field work funded by the SR-CRSP, the Rockefeller Foundation, Utah State University, and the International Livestock Research Institute (ILRI), Solomon Destu completed his studies in Ethiopia during October, 1997. Destu had spent about 20 months surveying 330 Borana pastoral households located within 30 kilometers of four towns in the southern Ethiopian rangelands. The objectives of this work were to determine (1) sources of instability for the production system; (2) rates of livestock losses (deaths) over the past 17 years; and (3) constraints which

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Grad Student to Study Nutrition in Central Asia

In Central Asia, Dr. Emilio Laca's work with livestock development and rangeland conservation will be complemented by a human nutrition study conducted by UC Davis graduate student, Mary Carpenter. Carpenter is working with Dr. Louis Grivetti from the Nutrition Dept. as well as Dr. Laca in the Agronomy Dept. While Laca focuses on rangeland production systems, Carpenter concentrates on human health and nutrition issues. The correlation between these two components provides for a project that is multi-dimensional and interdisciplinary. Carpenter has worked with environmental activists in Russia for 3.5 years, and in Uzbekistan in a family planning and reproductive health clinic for 1.5 years. She is currently a master's graduate student in International Agricultural Development studying nutrition.

This human nutrition component has two main objectives. First, if herd quality or quantity is to be increased, then grains may be channeled toward livestock. Humans may also need to utilize these same resources. Carpenter will survey the types of foods used by humans, and the roles they play to determine whether there is competition between livestock

and humans for grains and forage foods.

Second, the study will illuminate the relationship between herd quality and diet

quality/meat consumption.

Surveys may include paper and pen questionnaires as well as sampling of micronutrient levels in blood and anthropometric measurements.

Carpenter's work in Central Asia has the same theme as Dr. Neumann's work in East Africa on animal source food intake and cognitive development in children, albeit Carpenter's studies are at an earlier stage. This summer, Carpenter will be working in Kazakhstan, holding informative town meetings and conducting household surveys concerning resource utilization, diet composition, and health status. Special attention will be paid to gender issues and household dynamics to uncover the roles played by the male and female members of the household. The project will also study socio-economic issues that may affect the population's well being. For example, Central Asia's record of abnormally high anemia may not be solely due to



Student Mary Carpenter and Professor Emilio Laca

low food quality, poor sanitation could also be a factor of the problem.

The information gathered from the nutrition component will complement the larger project by determining the links between livestock management systems and nutritional status of women and children living on collective and private farms in Central Asia. Relationships between nutrition production systems and sustainability must be understood in order to propose solutions that are viable in the long-term and which result in improved welfare of the rural population. International, national, and NGOs such as UNICEF, UNDP, Women in Development Program, and USAID's health program will have access to this information which can be utilized to develop programs that address both these issues, thus improving the health and wealth of the people of Central Asia.

Project PI: Dr. Emilio Laca, University of California, Davis ealaca@ucdavis.edu

Livestock and Wildlife: Treading on Common Ground

By Katherine Lui

It has been proven that traditional pastoral livestock production and conservation of wildlife populations in East Africa are highly compatible. However, in recent years, this compatibility has shown signs of degradation. Livestock and wildlife populations have dropped sharply over the past two decades, suggesting damage to rangeland carrying capacity. Pastoral movements have been limited by competing forms of land use. Lack of understanding of livestock-wildlife interactions remains a formidable barrier against the formation and establishment of ecologically and economically stable strategies for wildlife conservation and livestock production. There are three main conflicts between pastoralists and wildlife - competition for resources, disease, and damage. Dr. Michael Coughenour's project in East Africa, "Integrated Modeling and Assessment for Balancing Food Security, Conservation and Ecosystem Integrity" attempts to overcome this barrier and resolve the conflicts.

The project will develop an integrated modeling and assessment system (IMAS) that will enable people to make informed choices about alternate land use strategies.

The IMAS model will integrate computer modeling, geographic information system (GIS), and remote sensing. In addition, two submodels will also be developed. A human ecology-economics submodel will examine the impacts of ecological changes and developmental innovations at the household, community and regional levels. A disease interactions submodel will be used to predict health consequences of alternative livestock and wildlife management strategies and

disease control measures. The submodel will focus on five main diseases - rinderpest, malignant catarrhal fever (MCF), corridor disease (bovine theileriosis), East Coast fever, and brucellosis. This study, and the models developed from Coughenour's project, can be used to aid potential research collaborations with the US in Yellowstone National Park and the Grand Teton where MCF and brucellosis transmissions from wildlife to livestock populations are a current issue.

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The Kenya Wildlife Service

The Kenya Wildlife Service (KWS) was founded in 1990 under the Wildlife Conservation and Management Amendment Act. It is a government parastatal that manages a national sanctuary, 22 national reserves, 26 national parks and five marine reserves. Its purpose is to manage and protect the natural resources and wildlife of Kenya. KWS works to preserve the national parks and reserves as well as the endangered animals that live in Kenya. A new part of their mission includes the promotion of recreational and eco-tourism in eastern Africa.

Under the management of Dr. David Western, KWS has maintained their conservation programs and anti-poaching

efforts while supporting the travel industry which brings economic growth to the area. Through the Kenya Wildlife Community Service project KWS works with local habitants to balance the cultural and socio-economic aspects with wildlife conservation. Community involvement is highly emphasized as an effective method of protecting the community, its natural resources, and the wildlife. KWS has worked to protect communities and crops by patrolling and fencing areas as well as monitoring wildlife movement.

For more information about the Kenya Wildlife Service, visit their web site at: <http://www.safariweb.com/kws>

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The Kenya Wildlife Service (KWS) has shown considerable interest in the SR/GL-CRSP project. Currently, the KWS is involved in a collaborative effort to project future trends in land-use in order to anticipate potential threats to wildlife and ecosystems in Kenya. The focus of Dr. Coughenour's proposal is similar to that of the KWS project, as well as a proposal from a Michigan State University team led by Dr. David Campbell. The collaboration between KWS, Colorado State University (CSU) and Michigan State University (MSU) will involve the combination of the original proposals and the identification of various roles and assignments that each organization will conduct. In Tanzania, Professor Nikundiwe of the University of Dar es Salaam has expressed strong interest in developing a student training program involving this project. James De Martini, an assessment team member of the project, has established connections and initiated the disease subcomponent of the project in Kenya and Uganda. A June workshop is currently being planned in Nairobi, Kenya in order to define the details of this collaborative effort between the KWS, Dr. Coughenour, and Dr. Campbell.

The IMAS Model

The IMAS is modeled after an existing spatial-dynamic

ecosystem model called SAVANNA that was originally developed in the 1980s for pastoral ecosystems in northern Kenya. Using information gathered from field studies, GIS, and remote sensing, the model will be able to predict interactions between livestock and wildlife, including spatial-dynamic competition for forage and disease transmission. The model will also quantify the impacts of land tenure, enterprise scale, and conservation policy on livestock production, pastoral welfare, and wildlife and ecosystem integrity. More user friendly software is being developed. The IMAS will be customized to run procedures automatically. There will be menus with options for running the model to assess pastoral livestock production and wildlife abundance under a range of scenarios defined by climate, land-use patterns, typical management strategies and policies. It is hoped that the model will provide both retrospective and prognostic information about the causes and implications of change under alternative scenarios of policy and management.

Human Ecology-Economics

Ultimately, changes in production, management, and policy will primarily affect the household level in terms of changes in income, food security, and nutritional status. Within the household, there are

gender differences in cash generation and cash flow that need to be assessed to determine sex differences in food security. The human ecology-economics submodel will evaluate and integrate these impacts to derive responses of human nutritional level, household expenditures, and human welfare in response to different input scenarios. The submodel will also investigate the impact of changes at community and regional levels.

Disease Transmission

Integrated with IMAS, the disease submodel will incorporate field studies and GIS to assess cause-specific morbidity and mortality in populations of wild and domestic animals and humans. An experiment will be conducted to test the hypothesis that disease-related losses will be no greater in mixed populations of livestock and wildlife than in livestock alone. Participating cattle herders will be divided into two groups, one with wildlife removed from the rangeland, and the other where wildlife and livestock coexist. Data from this experiment will be analyzed and compared with outputs generated by the disease submodel. Results from these studies will have great implications on similar studies concerning wildlife-livestock interactions in the US.

*Project PI: Dr. Michael Coughenour,
Colorado State University Ft. Collins,
mikec@nrel.colostate.edu*



PROFILE

Masanov Leads Kazakh Field Studies

By Tara C. Foster

Dr. Nurbulat Masanov is currently a professor at the Kazakh State University and a team member on Dr. Kenneth Shapiro's project, "Impacts of Economic Reform on the Livestock Sector in Central Asia." Dr. Masanov has extensive experience in the sciences and the history and culture of Kazakhstan. He has a degree in History, has worked at the Institute for History, Archaeology and Ethnography at the Academy of Sciences of Kazakhstan as a senior research fellow, and has worked as an academic secretary for the Department of Social Sciences at the Academy of Sciences of Kazakhstan. Dr. Masanov

received his doctoral degree from the Institute for Ethnology and Archaeology at the Academy of Sciences of the Soviet Union in Moscow. His doctoral dissertation was entitled, "The Specific Character of the Social Development of Nomad-Kazakhs Before the Revolution: The Historical-Economic Aspects of Nomadism." Dr. Masanov is active in international and regional academic conferences, and has written over 150 articles on economics, the history and culture of Kazakh nomads, and current inter-ethnic relations in Kazakhstan.

As part of Dr. Shapiro's



Dr. Nurbulat Masanov (right) and colleagues.

team, Dr. Masanov is involved directly with the studies taking place in Kazakhstan. He is leading one of the two Kazakh field studies focusing on the socioeconomic aspects of livestock agriculture in the transition away from a command economy. Dr. Masanov was also the primary author of the questionnaire for the four field studies, one in Uzbekistan, one in Kyrgyzstan and two in Kazakhstan.

Project PI: Dr. Kenneth Shapiro, University of Wisconsin-Madison. kenneth.shapiro@ccmail.adp.wisc.edu

Women's Access to Resources Key to Improved Health of Children

A nation's wealth and prosperity depends on the well being of its people. Ultimately, the improvement of a nation's prosperity lies in the growth and development of the children of that nation. Charlotte Neumann's research in East Africa, "Role of Animal Source Foods (ASF) to Improve Diet Quality and Growth and Cognitive Development in Eastern African Children" will illuminate the relationship between diet quality and children's cognitive function.

Because the role that men and women play in the production and distribution of animal resource foods is not equivalent, these issues are also examined with a gendered perspective. The improvement of women's access to resources is key to the improvement of children's physical and intellectual health.

Previous studies show that micronutrient deficiencies, particularly of iron, zinc, and vitamin B₁₂, especially in young children and child-bearing

women, have serious functional consequences, including anemia, diminished cognitive function and poor school performance, and decreased resistance to infection and parasites. The Participatory Rapid Rural Appraisals conducted in the Embu district in Kenya offered critical guidelines for the development of appropriate interventions. Low ASF intake was found to be attributed to two main factors: 1) limited availability of

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PAC Visits Livestock Early Warning System Team in Texas

systems according to environmental factors, livestock and human population data. (See box).

In the afternoon, members of the PAC visited the Grazingland Animal Nutrition Lab (GANLab) in the Ranching Systems Group at Texas A&M University. The lab provides a nation-wide nutritional management service to livestock producers based on fecal profiling technology using near infrared reflectance spectroscopy (NIRS). The SR/GL-CRSP project on development of an Livestock Early Warning System is using the technology as an integral monitoring tool for pastoral livestock in East Africa.

Dr. Jerry Stuth provided a technical overview on how the technology works and how producers use the information generated to better manage their livestock in the USA. The chemical bonds in the feces of free-ranging livestock are detected by the NIRS system and these bond characteristics are compared to a large library of fecal NIR spectra where the diets of the animals are known. Using a powerful statistical analysis, equations are developed which can predict dietary protein and digestibility of the diets consumed from the chemical bonds in the feces created by those diets.

The LEWS subproject will be monitoring pastoral households in a manner that reflects the distribution of different environments across a 5-country region and attempting to predict changes in animal condition that warrant intervention or mediation by government and non-governmental organizations. The goal is a six to eight week lead time on the current early warning systems in place in East Africa.

The NUTBAL nutritional management model is another critical tool in this project and the PAC was provided an overview of the decision support tool. In addition, Dr. Stuth demonstrated how the PHYGROW model was to be

used in LEWS as a means to predict the forage supply situation across the region. PHYGROW is a hydrological based forage production/animal consumption model that allows prediction of forage yields by multiple species, dietary consumption by multiple herbivores, hydrology budgets, and restock/destock rules to project impact and potential decisions for managing herbivore populations (livestock and large wild herbivores). The PAC was able to see how the LEWS subproject was planning development of the NIRS lab capabilities in each of the five countries and also establishment of modeling analysis labs in East Africa to service needs for livestock early warning systems in each of the countries.

Spatial Characterization Tool

The Spatial Characterization Tool (SCT) is a GIS application tool which allows for cross-referencing information from various sources and efficiently compiling old and new data. It draws on a suite of geographically referenced gridded, point, vector and textual-based environmental information. Access to the data enables the rapid construction of simple empirical quantifications at a site or in a zone. The tool can also create transects which can demonstrate the change in a variable over space (5 km. segments).

With support from USAID, Country Almanacs are now being developed. These 'mini-SCTs' are stand alone applications focused on single countries.

For more information, contact J. Corbett or R. O'Brien at the Blackland Research Center, Texas Agriculture Experiment Station, 808 E. Blackland Rd., Temple, TX 76502. Email: corbett@brcsun0.tamu.edu, obrien@brcsun0.tamu.edu.

Local NGOs Facilitate Links Between Farmers and University Scientists

The project, "Livestock-Natural Resource Interfaces at the Internal Frontier", is studying livestock production in tropical montane forested systems in three Latin American countries: Mexico, Ecuador and Bolivia.

Focused on communities, the project explicitly involves and incorporates the people of the communities. Each country has its own team or group working together with one or more established NGOs. Local conservation/rural development NGOs provide a critical link between the farmers and scientists.

*Project PI: Dr. Timothy Moermond,
University of Wisconsin-Madison,
tmoermo@facstaff.wisc.edu*

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Access to Resources Key

livestock due to poverty, lack of credit, small farm size, and other economical factors; and 2) low utilization of animals for household consumption. There tends to be an inequality in the intra-household distribution of meat, favoring the men. Although women carry out most of the animal care-taking tasks, women lack decision making power over the use of animals for sale versus household consumption. They also lack animal ownership and control of income. Therefore, family diet quality is sacrificed for cash from animal sales.

GIS Working Group Meets

A meeting of the GIS working group was organized at the Natural Resource Ecology Lab at Colorado State University, Ft. Collins in April 1998. The SR/GL-CRSP workshop allowed those key individuals working with GIS applications in their respective subprojects to discuss coordination of activities and efficient use of scarce project resources. Each team provided overviews on their current GIS, modeling and household survey efforts.

The Almanac Characterization Tool developed by Dr. John Corbett of the TAMU team was identified as a useful tool to unify the GIS, modeling and general information process within the SR/GL-CRSP. Country Almanacs for East Africa have been funded by USAID - Office of Foreign Disaster Assistance. Additional funding is being sought for the Latin American and Central Asian countries.

With these guidelines in mind, the project aims to increase ASF intake by empowering women by improving their access to key resources. The project plans to establish women's livestock credit groups, thereby placing animal ownership and management directly in the hands of women. Gender sensitive training programs in animal care and health will be

A JAVA-based approach being used for model integration by the LEWS project was reviewed. The method involves using a JAVA input/output interface that allows developers to place their models on-line, make a few minor modifications to the code, provide a data table specification and create a netCDF data output table and then deliver the models in a uniform environment via the internet or intranet.

The group also discussed issues of weather data acquisition, the fecal NIRs technology and impact assessment methodology. In addition, it was agreed that all surveys and questionnaires will be shared amongst the teams and feedback provided.

The workshop facilitated technical integration and collaboration between the teams. Cross-team coordination is expected to maximize the limited funds available and provide standardized data.

implemented. A gender specialist, Dr. Kabutha, will be working with the project at all stages. She will be assisting investigations on gender issues in the feeding and nutrition of girls, time demands on school-aged girls, and their poorer attendance in school as compared to boys.

*Project PI: Dr. Charlotte Neumann, UCLA,
cneumann@ucla.edu*

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Solomon Desta Completes Studies in Southern Ethiopia

could preclude pastoralists from diversifying their investments outside of the pastoral sector to mitigate high rates of capital loss in the form of wasteful animal deaths due to drought, disease, etc.

Desta confirmed that pastoral households perceive their production system is becoming more unstable. High rates of human population growth, land annexation for farming, and high rates of herd growth with limited marketing opportunities all combine to reduce spatial refugia for herds during dry years and drought. More households are becoming poorer, and nearly 20% of

households are headed by women. One consequence of reduced spatial refugia is a higher frequency of catastrophic losses in animal inventories. Averaged over 60 households, the typical cattle loss to mortality over the past 17 years has been about 107 head per household, with a value of nearly USD 9,000. Extrapolated to the entire pastoral population in the southern rangelands, this figure grows to about USD 300,000,000 since 1982. A mixture of rainfall deficits and high stocking rates contributes to these losses. Desta was unable to identify any particular cultural constraints which could preclude the Boran from

diversifying their capital assets to include urban investment and banking. The wealthier households noted that a lack of information was their major constraint. The poorer households indicated that they lacked sufficient livestock to consider alternative investments. Desta's work continues to play an important role in the SR/GL-CRSP project entitled "Improving Pastoral Risk Management on East African Rangelands", which focuses intervention concepts on asset and income diversification, improved use of information and external resources.

Project PI: Layne Coppock, Utah State University: lcoppock@cc.usu.edu

Ruminations

Director: Montague W. Dement
Newsletter Editor: Susan L. Johnson
Production Assistants: Katherine Lui
and Tara Foster.

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E-Mail: srcrsp@ucdavis.edu
WWW: <http://www-srcrsp.ucdavis.edu>

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Upcoming Events

- *8 May 1998*
SR/GL-CRSP Grant Proposal Presentation
USAID, Washington D.C.
- *12 - 14 May 1998*
Livestock Policy Workshop
World Bank, Washington D.C.
- *11 - 14 May 1998*
Livestock and Human Nutrition ILRI, Addis Ababa, Ethiopia
- *1 - 11 June 1998*
Expert Consultation on Agricultural Research Policy, Organization and Management in Central Asia and the Caucasus
ISNAR, The Hague, Netherlands
- *31 August - 2 Sept. 1998*
SR/GL-CRSP Year-End Conference
Arusha, Tanzania
- *3 September 1998*
SR/GL-CRSP Policy Workshop
Arusha, Tanzania
- *14 October 1998*
Heifer Project International Symposium: Human Nutrition & Livestock in the Developing World
Little Rock, Arkansas
- *18 - 22 October 1998*
American Society of Agronomy Meeting
Baltimore, Maryland