Fall 1998

RUMINATIONS

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

How Might Infrastructure Improvements Mitigate the Risks Faced By Pastoralists in Arid and Semiarid Lands?

By Drs. Christopher B. Barrett, Cornell University; Peter D. Little, University of Kentucky; DeeVon Bailey, Utah State University; Francis Chabari, GTZ-Marsabit Development Program; and Kevin Smith, Utah State University

Arid and semiarid lands (ASAL) have long been less favored by both nature and states. Not only are soil quality and rainfall lower on average and more variable than in "high potential" zones, but these areas also suffer a lower density of public physical and institutional infrastructure, such as roads and markets.

Policymakers and donor organizations worldwide increasingly recognize that more attention must be paid to these less favored ASAL, which are home to most of the world's pastoralists and more than one-third of the world's rural poor. Growing ASAL populations without corresponding growth in private or public investment have led to falling per capita incomes, rising rates of poverty and malnutrition, and high rates of environmental degradation. The issue of ASAL infrastructure thus touches on concerns of efficiency, equity, and environmental protection, and is prominent in the east African region under study by the Pastoral Risk Management project led by Utah State University, in collaboration with Egerton University, Cornell University, the University of Kentucky, and several other institutions.

Efficiency issues arise from the impact of infrastructure on the integration of markets across space and time. Poor roads, communications (including

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GL-CRSP Represented at Human Nutrition & Livestock Symposium

Heifer Project International recently sponsored a symposium highlighting livestock's role in ensuring healthy human development. The GL-CRSP's Dr. Charlotte Neumann of UCLA was an invited guest speaker. Dr. Neumann shared results of her research in micronutrient deficiencies and explored the role of animal source foods in child growth and development.

In addition, three poster sessions presented the Global Livestock CRSP's current work in nutrition.

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Indonesian Poultry Sector Subject of GL-CRSP Study

Last February a delegation of the US/ASEAN Business Council's Food and Agriculture Working Group conducted a trade mission to examine Indonesia's poultry sector and find ways in which U.S. companies could assist in rebuilding the industry. Texas A&M University Poultry Science graduate student Jason Mooney was sponsored by the Council to accompany the group and write their report and recommendations. Among their recommendations was the need to improve training of mid and upper level management in the poultry industry, reduce aflatoxins in feed, and improve refrigerated storage and shipping.

In July Texas A&M University Agricultural Economics graduate student Andy Hale and Dr. Rudy Naga, Assistant Professor of Agricultural Economics at Texas A&M, began a study in Indonesia of the refrigerated and frozen poultry, under sponsorship of the US/ASEAN Business Council and the Small Ruminant/Global Livestock CRSP.

Studies revealed that due to the current economic crisis, poultry production in Indonesia is down to only 15% of previous levels. Almost 80% of broilers grown in Indonesia are sold in traditional wet markets. The cold chain is utilized primarily by the food service industry such as restaurants, caterers and hotels. The unfavorable view of frozen poultry by domestic consumers keeps household consumption low. A number of inefficiencies were found in the distribution systems including ineffective usage of Indonesia's coastal waters as a major mode of transport.

Thanks to a grant provided by USAID, Hale remained in Jakarta through August 14 to work with the U.S. Embassy, U.S. Commerce Department and private sector individuals. His thrust was to analyze opportunities for frozen poultry handling and shipping in Greater Jakarta, overland to Surabaya, and by coastal vessel to Medan.

The Texas A&M University Poultry Sciences Department has also offered two assistantships in the Department of Poultry Sciences that will further research and help nurture ideas for future U.S. private-sector involvement. US/ASEAN Business Council is currently screening candidates for these assistantships.

Ed Price, SR/GL-CRSP Program Administrative Council Chair, participated in the February mission and the July study, and will continue to encourage and facilitate Texas A&M cooperation with the Quick Service Restaurant industry to improve efficiency among the separate elements of food commodity supply chains in developing countries.

The final report for the July study is available from the GL-CRSP Managment Entity, University of California Davis and will be published in the 1998 Annual Report.

Year-End Conference Rescheduled

In the wake of the tragedy in Kenya and Tanzania, the Small Ruminant/Global Livestock CRSP postponed its year-end conference. The conference has been rescheduled for December 7 - 11, 1998. An External Evaluation review will precede the conference.

Our thoughts are with our partners in East Africa and the people of Kenya and Tanzania. All of the people involved in the Global Livestock CRSP wish to extend their sympathies and express their grief for the losses suffered. Please accept our deepest condolences.

USU PhD Student Wraps Up Research in Cosapa, Bolivia

Vista of Cosapa, Bolivia. Llamas and alpacas grazing a bofedale site with the town of Cosapa and Mount Sajama in the background. Photo by Lita Buttolph.

The SR-CRSP carried out a research program in Bolivia from 1991-95. Work in this program was carried out at several locations on the semi-arid Altiplano, a plateau enclosed by parallel chains of Andean mountains. The main research site was a semi-arid agropastoral community called San José Llanga. At San José Llanga the production system was dominated by sheep, dairy cattle and potato cultivation and was analyzed in detail by an interdisciplinary team, with most of the field work performed by 27 Bolivian BSc students supervised by SR-CRSP resident scientists.

A secondary research site, however, was located at a higher elevation (i.e., 3,900 meters above sea level) than San José Llanga. This secondary site was an *Aymara* pastoral community called Cosapa where the climate is drier and colder than that at San José and where the risk of frost largely prohibits any crop cultivation. Instead, the campesinos of Cosapa are much more dependent on production from livestock such as alpaca, llama and sheep. The llama and sheep yield meat, while the main product from alpaca is a high-value wool.

The landscape of Cosapa is dramatic and dominated by Mount Sajama, which at 6,542 meters above sea level is Bolivia's highest peak. Lower elevations are often covered by large areas of key resources called *bofedales*; these are bog-like wetlands comprised of low-growing, perennial herbaceous plants essential for alpaca production and nutrition. Traditionally, *bofedales* have been used under a regime of communal grazing access. Many livestock crowd on to *bofedales* to feed at the height of the dry season when forage at upland sites becomes senescent and of poor nutritional value.

U.S. PhD student, Ms. Lita Buttolph, carried out her research project at Cosapa. Her work was funded by the SR-CRSP and Utah State University. An important collaborator in her work was AIGACAA (Asociación Integral de Ganaderos en Camélidos de los Andes Altos or the Integral Association of Camelid herders of the high Andes). The AIGACAA helped Lita in terms of access to the local community and general logistics. The AIGACAA was also in the process of implementing "Project Alpaca" at Cosapa and neighboring communities. Project Alpaca is ambitious. The intent of Project Alpaca is to empower camelid producers in Bolivia by giving them more control over the marketing and production of alpaca wool. A major competitor in alpaca production has been Peru, and AIGACAA needed to come up with a vertically integrated plan for Bolivia to become a viable competitior with Peru in the international marketplace for alpaca fiber. For example, with financial assistance from UNDP, AIGACAA through Project Alpaca constructed a new alpaca fiber-processing plant near La Paz. The plant was owned and operated by AIGACAA— local campesinos are share-holders in the entire enterprise. Project Alpaca also worked at the "farm gate" in places like Cosapa by extending technical packages intended to enhance alpaca wool production. Technical inputs included drugs to improve alpaca health, importation of breeding males with more marketable wool colors to improve the local herd genetics, and inputs to promote range management. The latter included several activities. One aspect was expansion of *bofedales* through irrigation projects. Another was provision of materials and credit to allow campesinos to fence-off (and thus privatize) sections of *bofedales.*

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Risk Management Research in Bolivia Concluded

It was thought that the fencing would allow the forage plants on the *bofedale* to rest and recover from years of continuous grazing pressure. Lita had several objectives for her research, but results for only two objectives will be reported here.

One of her main objectives was to assess the utility of fencing for improving *bofedale* vegetation. A number of campesinos had erected fenced paddocks over the past few years, and these could be compared with adjacent sites still under continous grazing. It was thought by AIGACAA that fencing off sections of *bofedale* should result in marked improvements in the productivity and composition of forage— this, in turn, should enhance alpaca production. Afterall, these sites were almost continuously irrigated with glacial run-off, so given a chance to rest forage improvements could be quite notable.

Another objective was that she wanted to evaluate the overall philosophy of the livestock development program at Cosapa in relation to system constraints. For example, was it likely that the program of AIGACAA would achieve the intended results, or not? What were the assumptions of the program, and did they consider the conditions of a variable rangeland environment? What could be some unintended, negative consequences of the development program, and how could these be planned for?

One of the most interesting findings was that up to three years of protection from grazing did not result in marked changes in *bofedale* vegetation, either in terms of end-of-season standing biomass, species composition, or net primary productivity. These observations indicated that the vegetation was very resistant to grazing pressure— a highly stable, yet non-equilibrial community that performed rather independently of current grazing regimes. The fact

that the plants had evolved under heavy grazing pressure and constraints of a harsh climate were probably vital forces that contributed to the situation.

If the fencing had little effect on *bofedale* vegetation, then why were resource-poor campesinos making the effort to put up the fences? Buttolph's analysis of alpaca mortality revealed that the main positive effect of the fencing was to reduce the mortality rate of *crias* (e.g., alpaca lambs). Sickly adult alpacas and *crias* were placed in the fenced paddocks in the dry season by herdowners. Apparently, the reduced stocking rate that resulted from excluding communal grazing was the key factor that led to improved *cria* nutrition and health, simply because access to adequate quantities of forage was maintained. This suggested that, in contrast to the non-equilibrial or non-interactive *bofedale* vegetation, the livestock had equilibrial or interactive effects on each other because stocking rates were too high. This led to a conclusion of theoretical merit that the production system at Cosapa could not merely be characterized as equilibrial or non-equilibrial on the basis of climate (as has been argued in recent years by range ecology scholars)— it actually exhibited features of both equilibrial and non-equilibrial systems depending on whether one was examining the forage or livestock dimension.

What about the prospects for development impact and success for the AIGACAA program? Certainly many positive things have occurred. The fiber-processing plant became operational a couple years ago and there has been ample enthusiam among campesinos at Cosapa for the spectrum of new development activities. Buttolph concluded, however, that some of the programs' benefits must be viewed in light of potential risks. One prominent risk is the problem of campesinos fencing-off and thus privatizing *bofedales*. Analysis of long-term population dynamics for livestock revealed that population crashes for all livestock species at Cosapa were most likely in a year having a pronounced drought— such an event last occured in 1983

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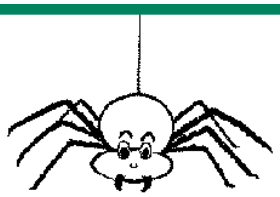
PROFILE

Field Coordinator Joins Nutrition Project Team

By Dr. Suzanne Murphy, University of California, Davis

Dr. Edith Mukudi started as the new Field Coordinator for the Child Nutrition Project in Embu on September 12th.

Dr. Mukudi received her B. Ed. (in Home Economics) and M.A. (in Education) from Kenyatta University in Nairobi, Kenya, and has just received a Ph.D. in Comparative and Global Studies in Education (with a minor in Nutrition/Research Methods) from the State University of New York at Buffalo. Her dissertation was on the linkages between nutritional status and school participation among Kenyan primary school children, so she is well-qualified to coordinate the Child Nutrition Project in Kenya, which is a feeding intervention study to examine the effect of improved diet quality on growth, cognitive function and school performance in Std I school children in Kenya. Diet quality is being enhanced with meat, milk, and extra calories in each of three groups and a control group. Her professional interests include the interaction of nutrition, learning and school performance, gender and development. She also is interested in program design, monitoring, and evaluation. Dr. Mukudi is a native of Kenya, and has participated in nutrition-related field work in Embu in the past. She has had a faculty appointment at Kenyatta University in the Dept. of Education. We look forward to her leadership in coordinating the many facets of the child nutrition study.



The Small Ruminant/ Global Livestock CRSP web site has MOVED...

Visit us at our new address:

http:// glcrsp.ucdavis.edu

CRSP Exhibit Opens in Washington D.C.

The Council of the Collaborative Research Support Programs (CRSPs) and the US Agency for International Development (USAID) invite you to visit an exhibit highlighting the many development activities and achievements of the nine CRSPs.

The exhibit will be on display at the USAID Information Center, Ronald Reagan Building and International Trade Center, 1300 Pennsylvania Avenue, NW, Suite M1, Washington, DC through December 31, 1998 and is open to the public. The exhibit hall is open Monday through Friday from 9:00 a.m. -5:00 p.m., except Federal holidays. The exhibit hall is located on the Mezzanine level, opposite the 14th Street entrance. For further information regarding the exhibit, please contact Howard Salter or Joe Fredericks by phone at 202-712-4810 or by fax at 202-216-3524. Inquires by email should be sent to <pinquiries@usaid.gov.

If you are unable to visit the exhibit in Washington, DC, please feel free to browse the CRSP web site at http:// www.ianr.unl.edu/crsps/ for a "virtual tour" and also for more detailed information regarding the mission, activities, and results of the Collaborative Research Support Programs.

Africa's Agricultural Rebirth

Production Soars as Ethiopia, Others Recast Farm Policies

By Stephen Buckley
Washington Post Foreign Service

WELISSO, Ethiopia – In the dark days of Ethiopia's Marxist dictatorship, which ended in 1991, Mergia Hirko perpetually suffered a farmer's most humiliating indignity. Year after year, he could not feed his wife and their nine children.

Today, his family – he now cares for his seven grandchildren – has more than enough to eat. In fact, he has moved out of a thatch-roofed hut and into a spacious, tin-roofed house. He can even afford to buy clothes for himself and the grandchildren.

But "the most important thing is that we have enough food for my family," Mergia, 68, said, sitting outside his house in this town 80 miles west of Addis Ababa, the capital. "We always had shortages in the past. We were always eating the donated food."

Mergia and his family can eat because in the past five years this East African country has transformed its agricultural policy by, among other things, investing more money, providing farmers with more services and, perhaps most important, allowing them to sell their crops on the open market.

Those changes in this nation of 60 million people, 85 percent of them farmers, have led to a 100 percent increase in production of principal grains since 1990. Some agricultural experts even predict that Ethiopia could be feeding itself in a decade.

Ethiopia, which endured one of Africa's most devastating famines just 14 years ago and has constantly struggled to produce enough food for its people, still has plenty of work to do. Farmers still depend primarily on rain-fed crops, leaving them vulnerable to the vagaries of nature.

Last year, the country got too much rain and needed thousands of tons of food aid from foreign governments and relief groups. Yet no one is talking of famine. And, just as significant, the setbacks in

agriculture did not sent Ethiopia's economy tumbling. It still managed to grow by about 5 percent.

Ethiopia "has a long way to go," but it has " come quite far," said Fayez Omar, the World Bank representative in the country. "Even in years where you don't have adequate rainfall, the gross domestic product doesn't shrink, he said. "In the old days, when rainfall was bad, GDP would be a minus 6, minus 7 percent: from one year to the next.

Ethiopia's renewed focus on agriculture is part of a widening trend in sub-Saharan Africa, where governments largely ignored, or sabotaged, their farmers for much of the past three decades. Consequently, annual food production has lagged behind population growth in most countries.

These days, more governments allow farmers to sell their goods at market prices, instead of forcing them to sell to a government grain board. They provide more credit, more seeds, more fertilizer. They are rushing to improve facilities to help farmers get their goods to market.

And they are reaping the rewards. Ghana doubled its corn production between 1986 and 1996. Nigeria's corn output leaped by 50 percent between 1990 and 1996. Mozambique, emerging from nearly two decades of civil conflict, has seen agricultural output grow by 50 percent. In the past decade, Ugandans have doubled or tripled production of several main crops.

The rebirth of agriculture in Africa, where 65 percent of the people are farmers, has come with help from such organizations as the Sasakawa Africa Association. Primarily through technical advice and training, the association, working with the Atlanta-based Carter Center, has helped governments such as Ethiopia's reshape agriculture policies that had strangled farmers for decades.

Throughout the continent, said Mario Quinones, who runs the Sasakawa project in Ethiopia, the problem has been "policies that don't encourage farmers to be more productive."

Perhaps nowhere were the government's polices more wrongheaded than in Ethiopia, a vast,

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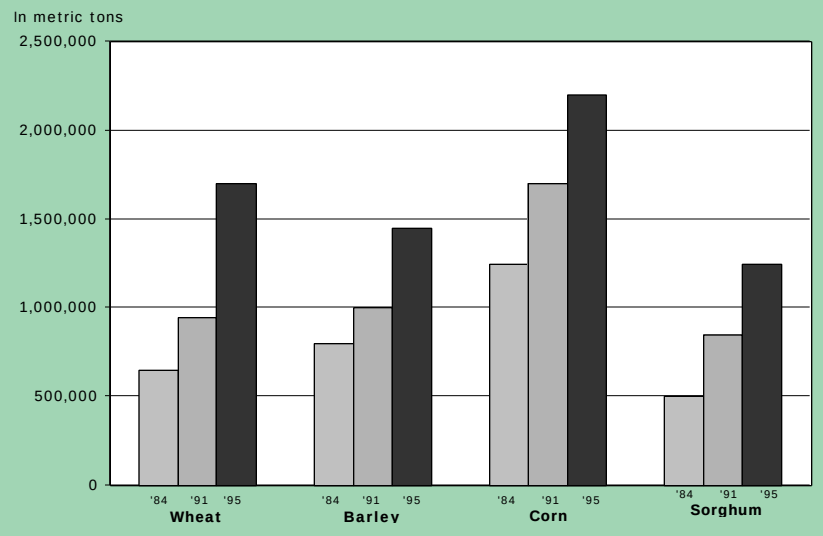
Growing Harvest

Ethiopia's ability to produce food has been increasing since a worldwide relief effort began in 1984 and since then-president Mengistu Haile Mariam resigned in 1991. A look at the production of several of the nation's major crops.



1995 latest year figures are available
SOURCE: EUROPA PUBLICATIONS

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verdant, mountainous country, in which most family huts are days from the nearest road. Dictator Mengistu Haile Mariam's socialist regime, which ruled for 16 years and was known as the Dergue, forced peasants into cooperatives, stirring profound resentment among farmers who had to share their crops with less hard-working countrymen.

Farmers felt helpless. Security was such a problem that they never knew if they would return safely from the market. Government officials regularly snatched their sons away for army duty. On top of that, the Dergue made farmers sell crops to the state Grain Marketing Crop., which paid them prices that were sometimes one-fifth of what they could get in an open market.

The regime of Meles Zenawi, who became president after his rebel group deposed the Dergue in May 1991 and is now prime minister, has largely dismantled those policies. "We are back on our plots, for one," Mergia said. "We grow any crop we want. There's no fear. You do what you want for yourself."

The transformation here has not been total; it is still illegal to own land in Ethiopia. But Meles has fully embraced the Sasakawa Association's advice: Encourage the use of moderate amounts of fertilizer; provide more seeds and credit; provide more government agricultural experts to advise and help farmers.

Those experts exhort farmers to, among other things, prepare their land properly, weed in a timely manner, plant seeds in rows. In 1993, only 167 farmers were using the techniques pushed by the government and the association. Last year, 690,000 adopted the methods, known as "the package," and by the end of this year, the total is expected to reach 3 million.

Many farmers converted reluctantly. "In the past, we used to scatter the seed, and every piece of area was covered," said Legese Muluneh, who lives in nearby Gurura. Now, "the space between the rows was idle. We thought, "These people are destroying us. That are we going to do with that space?"

Legese, who cares for seven children and his wife, mother and brother, leases 25 acres from the government. His crops include corn, wheat, coffee and teff, the most popular staple grain in Ethiopia.

A few years ago, he owned one dairy cow and three oxen. Today, money from increased crop production the past two years has allowed him to buy seven more oxen, nine more cows for milking and 10 cattle that he is fattening up for their meat.

"There's a lot of improvement," said Legese, 38. "I'm able to get better seeds, especially for corn, and now I have more crops, like wheat. We also get more support from the extension services than before."

Like Legese's yields, Mergia's have been overwhelming. He used to eke out about a ton of corn per hectare – a metric unit equal to about 2 1/2 acres – before trying the new techniques. Now he gets five to six times as much yield per hectare. He once grew 1,300 to 1,400 pounds of teff per hectare; now he reaps 4,000 pounds, sometimes 6,000 per hectare.

He credits the agricultural advisers for much of the gains. Unlike in the past, these farmer's helpers – known technically as development agents – live among the peasants.

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First Outreach Workshop on Improving Pastoral Risk Management on East African Rangelands Held in Addis Ababa

The first GL-CRSP workshop concerning outreach to improve pastoral risk management was held at the campus of the International Livestock Research Institute (ILRI), Addis Ababa, Ethiopia, on August 18. The objectives of the workshop were to review progress in research and training for the first year of the project, and to have workshop participants, who largely represented governmental and non-governmental grass-roots organizations, prioritize risk management issues that most need attention for the region of southern Ethiopia that is predominantly home to Boran

and Gugi pastoral ethnic groups. Using a hierarchy of risk management options as a starting point (see figure above), participants broke-out into working groups to set priorities. The three intervention priorities forwarded to mitigate risk management problems were: (1) resource-based, conflict resolution; (2) public education; and (3) formation of voluntary cooperatives to facilitate empowering pastoralists to market their products, diversify their economies, and invest their savings. Another follow-up workshop will be held in Ethiopia during late November to build on this momentum. Other workshops with similar objectives will be held in Kenya.

Photo by Wzo. Membere W/Giorgis

Workshop participants included: *Front row (kneeling, l to r)*: Ato Feyera Abdi (SOS Sahel), Ato Abdi Abdullahi [Pastoral Concern Association of Ethiopia (PCAE)], Wzt Tihut Yirgu [an MA student with Norwegian Agricultural University (NAU) having partial support from the GL-CRSP]; *Second row (l to r):* Ms. Kirsi Saaristo (also an MA student with NAU with partial support from the GL-CRSP]; Ato Alemayhu Sintayehu [Ethiopian Evangelical Church Mekane Yesus (EECMY)]; Ato Galma Halake (EECMY); Ato Aliyu Hussen (Oromia State Agricultural Development Bureau (OADB); Dr Zinash Sileshi [Ethiopian Agricultural Research Institute (EARO)]; Mr. Florian Menzel [German Aid (GTZ)]; Wzt. Bogalech Kutae (OADB); Wzo. Hadera Gebru [Federal Ministry of Agriculture (MoA)]; Dr. Tafesse Mesfin (MoA); Ato Tsegaye G/Medhin [Commercial Bank of Ethiopia (CBE)]; *Back row (l to r):* Ms. Maureen Forsyth [World Food Program (UNWFP)], Ato Shanu Godana (GL-CRSP); Dr. Kevin Smith (GL-CRSP); Dr. Fisseha Meketa [Save the Children Fund (SCF/USA)]; Mr Ben Okumu (ILRI); Dr. Layne Coppock (GL-CRSP); Mr. Ken Byrd (SCF/USA); and Ato Yilma Tadesse (EECMY).

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Utah State University's Risk Management Research in Cosapa, Bolivia Concluded

when up to 50% of some household flocks died of starvation. Market channels were apparently insufficient to preclude large death losses at that time. The *bofedales* may be most important to the production system during a drought year when they provide the only patches of green forage for miles around. Access to a patch of *bofedale* may thus be the difference between a flock surviving or getting completely decimated. Privatization could thus compromise the stability and social equitability of the production system if communal access to *bofedales* is denied during drought. One way to deal with this is to make sure that the community is evolving a means to make *bofedale* property rights flexible depending on the type of precipitation year encountered.

Finally, it was concluded by Buttolph that despite the indigenous roots and goals of AIGACAA, the assumptions of the AIGACAA development program were largely Western and highly technical in origin. Project implementation thus clearly advocated intensification of production— a situation that could lead to over-investment by resource-poor people as well as land tenure problems as illustrated above. The fiber-processing plant needs an adequate supply of raw material to function and maintain profitability, and the international market for alpaca fiber has its ups and downs like any other market. Potential for future problems therefore exists. Buttolph recommended that more attention to risk management for campesinos was important— e.g., focusing more on how to market existing levels of output at attractive prices and emphasizing extensification of resource development rather than intensification in this variable environment.

Lita Buttolph was awarded her PhD *with distinction* by the Department of Rangeland Resources at Utah State University in July. She hopes to stay involved in international work involving range ecology, agriculture and development studies. She currently resides in Portland, Oregon.

CRSP Symposium in Baltimore

This year's annual meeting of the American Society of Agronomy held October 18 - 22 in Baltimore featured a symposium highlighting all the CRSP programs. Dr. John Yohe of the INTSORMIL CRSP opened the symposium with an overview and summary of the historical development of the CRSPs. This was followed by a presentation on USAID's unique partnership with higher education through the CRSPs by Dr. Harvey Hortik of USAID.

The symposium, organized by Dr. David Sammons of Purdue University and GL-CRSP External Evaluation Panel Chair, also featured presenters from the Peanut CRSP, Soil Managment CRSP, INTSORMIL CRSP and Bean/Cowpea CRSP. A panel with representatives of BIFAD, the private sector and CRSP Techncial Committee discussed the role of the CRSPs within the global agricultural system.

Ms. Emmy Simmons, Director, Center for the Economic Growth and Agricultural Development USAID, concluded the symposium with a look at the future of the CRSPs within the research agenda for USAID. A poster session followed the symposium. The Global Livestock CRSP presented a poster which highlighted the global breadth of its projects.

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Africa's Ag Rebirth

They go from farm to farm daily, visiting mornings, evenings, whenever they are called upon. Mergia recalls that one day during last year's main planting season, a half dozen advisors came to his field to help him.

Government officials acknowledge that despite their remarkable progress, they must find a way to reduce dependence on rain-fed crops. They also must improve roads and draw commercial farming. They fear that without agricultural developments, Ethiopia will remain among the world's poorest countries. Its people now earn an average of about $135 a year.

"Economic development has to start with that king of development," said Getachew Teklamedhin, vice minister of agriculture. "You cannot detach economic development from food self sufficiency."

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Infrastructure Improvements to Mitigate Risks Faced by Pastoralists?

public price reporting services), and power service isolate communities, raise the costs of market intermediation, and dampen responsiveness by both market and nonmarket actors to emerging opportunities or shocks. Our research shows that although pastoralists are quite willing to market livestock, poor infrastructure leads to thin markets and thus low and variable prices for sellers. Infrastructure quality matters also because the best pasture is rarely near existing trading centers, so herders risk productivity loss by moving toward market. Because of the costs and risks imposed by weak infrastructure, banks do not open branches in the ASAL despite mounting evidence of unmet demand there for commercial financial services, NGO response to emergencies tends to be slower and more expensive per beneficiary in ASAL regions, and governments and donors have a harder time recruiting skilled staff to ASAL posts. Such impediments leave pastoralist communities extraordinarily exposed to covariate risks such as drought, floods, and disease epidemics and magnifies the price risk they face. The costs of relief operations to deal *ex post* with these problems have been considerable and rapidly increasing this decade. There is growing recognition that investments in physical and institutional infrastructure to ameliorate such problems *ex ante* may prove a wiser, long-run strategy for development of less favored areas.

A paved road from Isiolo (Kenya) to Moyale (on the Kenya/Ethiopia border) would do much to solve the economic and security problems in the region. Opening markets via improved roads and loosening cross-border restrictions on flows of animals could be the keys that eventually end the dependence of northern Kenya, in particular, on the massive amounts of humanitarian assistance that currently occurs.

The returns to ASAL infrastructure are likely great. Recent work by the International Food Policy Research Institute (IFPRI) finds that investments in rural infrastructure — roads and markets — in India's less favored lands offer the highest marginal returns terms within the agricultural sector, both financially and in terms of numbers of people moved above the poverty line. Infrastructure investments in less favored lands are estimated to yield marginal returns one hundred to one thousand times greater than those available from, for instance, irrigation in high-potential rainfed agriculture, rural education, or high yielding seed varieties. While we are not aware of analogous studies from Africa, the qualitative point – infrastructural investment in less favored areas promises high relative and absolute rates of return – is likely transferable.

Equity issues also arise because ASAL residents tend to earn below-average incomes and have less access to public health and education services. When ecoregional boundaries between low and high potential zones correspond with ethnic boundaries, as is so often the case in Africa, these equity issues too often feed ethnic divisions that sometimes explode into civil strife. Such strife, which often develops hand-in-hand with violent banditry, further degrades infrastructure and fuels the costs and risks of market

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At a Glance…

SELIAN AGRICULTURAL RESEARCH INSTITUTE

Originally founded in 1978 as a wheat research institute, SARI has, over the course of time, expanded to include other crops and livestock in the research mandate. Since 1989 SARI has been the zonal headquarter for agricultural research in the Northern Zone (Arusha and Kilimanjaro regions of Northern Tanzania).

Objectives of Agricultural Research

- To attain sustainable food self-sufficiency at household and zonal level
- Increased income generation, employment growth and enhanced earnings through the development and dissemination of appropriate and environmentally friendly technology packages.

Client Oriented Research (COR)

In order to achieve the above objectives, the institute has adopted the COR policy which implies that all research conducted must address the actual needs of the farming communities in that particular zone. All relevant stakeholders are involved in the identification of constraints, formulation and funding of research, and dissemination of the research results.

Research Departments

- Crop research – maize, beans, wheat, barley, coffee, pigeon peas
- Livestock research - beef and dairy cattle, small ruminants, pastures
- Special programmes – soils, agroforestry
- Socio-economic research – farming systems management of information and evaluation of technologies

Research Staff as of January 1998

7 PhD.
15 Msc.
5 Bsc.
About 30 assistants (Field officers who are diploma holders)

Collaboration

SARI is currently working in collaboration with the CRSP's Livestock Early Warning System project. This fall, livestock research officers Margaret Kingamkono and Stella Bitende are organizing household surveys to collect data from pastoralists of the Northern Tanzanian zone. Margaret Kingamkono is also serving as coordinator for the SR/GL-CRSP year-end conference.

There is also collaboration with different national, regional, and international organizations such as ILRI, CYMMIT, ASARECA, AFREMA, Tanzanian universities and more.

For more information, please contact:
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Fax: 255-57-8557

ACT Training in Ethiopia, Kenya and Uganda

Almanac Characterization Tools (ACT) were developed for Kenya, Uganda, Tanzania and Ethiopia. ACT is a stand alone geographic information systems (GIS) application designed to geographically quantify the environment for specific research and management objectives. It is a packaged set of spatial data and query tools targeted for use in agricultural and natural resource management activities. The ACT data includes climate, topography, land cover, demographics, soils information, major watersheds, as well as ancillary information, such as towns and political boundaries. The ACT provides a flexible, iterative process for highly specific environmental classification. John Corbett and other members of the Characterization and Assessment Applications group at Integrated Information Management Laboratory, Blackland Research Center - Temple, Texas delivered the Almanacs to the LEWS teams in East Africa. This was followed up by conducting a series of workshops consisting of seminars and hands-on team training on the use and applications of ACT in Kenya, Uganda and Ethiopia in September 1998.

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Mitigating Risk through Infrastructure Improvements

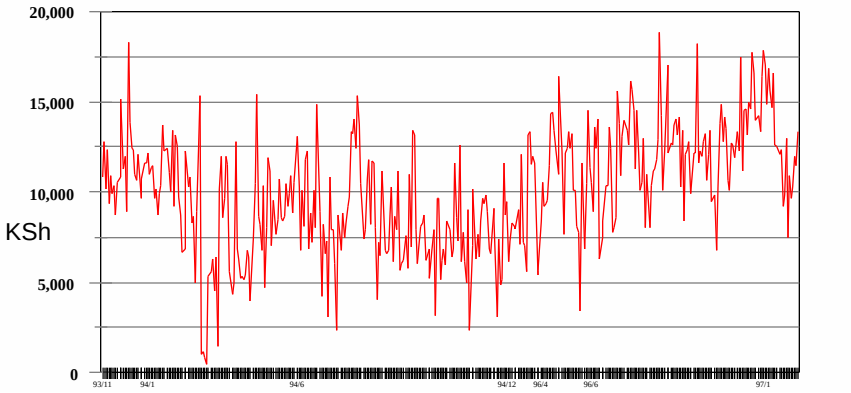
intermediation, igniting a vicious cycle of insecurity that further immiserizes pastoralists. Ethnic conflict also induces pastoralists to settle around towns for security, thereby reducing their access to some of the best pasture and seasonal water sources.

Because these especially poor subpopulations confront relatively greater climatic, market, and institutional risk, they predictably rely on the natural environment for quasi-insurance. So when drought or floods come, pastoralists rationally turn to protected areas for forage, water, or game meat. Without access to formal financial institutions for savings, credit or insurance, pastoralists are forced to store wealth in livestock, thereby contributing to overgrazing pressures. And without good access to public or private veterinary services, animal disease epidemics among domestic stock can rapidly threaten wildlife populations (recall the devastating rinderpest outbreaks of the late 19th century).

These issues merit attention, for example, in Kenya's northern rangelands. These districts suffer Kenya's highest rates of poverty, are plagued by physical insecurity, and are confronted with serious challenges to biodiversity conservation in the ASAL. In researching how best to help herders in the region manage the multi-faceted risks they face, the project has been conducting participatory risk analysis in its study area. Among the 83 community interviews conducted to date, access to human and animal health services, water, and markets (especially for livestock) have emerged as the most frequently cited sources of pastoralists' perceived vulnerability. Rural infrastructure deficiencies frequently arise as fundamental to these problems, particularly with respect to livestock marketing. Detailed data collected by the GTZ Marsabit Development Program bear this out. Between June 1995 and December 1997, the Nairobi-Marsabit marketing margins for adult male cattle averaged 180% of the Marsabit (seller's) price, and the coefficient of variation in the Marsabit price series was more than twice that of the Nairobi series (0.78 to 0.36). This is reflected in the accompanying figure, which depicts the discontinuous, November 1993-February 1997, time series of Nairobi-Marsabit adult male cattle marketing margins. By comparison, the price differentials between Garissa and Nairobi, a similar distance but with all but 35 kilometers of the road paved average only about 40 percent of the Garissa price. Northern Kenyan pastoralists thus face considerably lower and more variable prices for the livestock they sell than do herders in areas with better access to major urban markets, apparently attributable in part to the costliness and riskiness of the rudimentary infrastructure supporting the marketing system. The connection to infrastructural deficiencies is reflected in one statistic: more than 85 percent of the sample's cattle sold were trekked — not trucked — away from market. Trekking has high costs, in

(continued on next page)

Nairobi-Marsabit Marketing Margins
Adult Male Cattle,1993-97 (broken)



NIRS Labs Established in Host Countries

A FOSS 5000 NIRS and associated computer, printer and other support equipment were standardized, calibrated and installed at the International Livestock Research Institute's (ILRI) Animal Nutrition Laboratory at Debre Zeit, Ethiopia.

The NIR System laboratory will support the first year's monitoring of livestock across all sites until each country can be established. An ILRI technician, Mr. Dawit Negassa was trained at Grazingland Animal Nutrition Laboratory at Texas A&M University for 6 weeks. The lab has received validation site samples from the other GL-CRSP LEWS teams in East Africa as of May 1998. The Kenya NIRS lab equipment has been ordered and will be set up in early 1999. The Uganda LEWS team has received permission from DANIDA to establish a NIRS lab in early 1999.

For more information, please contact Dr. Jerry Stuth, Texas A&M Univ., tel: 409-845-5548, email: j-stuth@tamu.edu.

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Mitigating Risk Through Infrastructure Improvements

terms of animal mortality and weight loss, trekker time, greater risk of raiding, and environmental and social stress along trekking routes. But without better institutional or physical infrastructure, the cost and availability of motorized transport services precludes more socially efficient, environmentally friendly, and less risky forms of livestock transport. Poor rural infrastructure feeds ethnic tensions as well. For example, in the southwestern reaches of our study area (Baringo and Samburu), where roads and markets are better established and one finds well-organized livestock auctions and significantly more traders, pastoralists complain that other groups coming from the north depress prices because the distance traveled puts them at a serious bargaining disadvantage with urban buyers. Weak rural infrastructure also hurts pastoral communities by impeding movement into the region, of grains, relief supplies, animal and human vaccines and medicines, etc. Sluggish commercial activity then retards private investment in micro-enterprise and rural, nonagricultural industry. The remarkable estimated rates of return noted earlier largely reflect the potential for public infrastructural investments to "crowd in" private investment.

There is reason to believe that investments in rural infrastructure in less-favored ASAL may be a win-win proposition, helping pastoralists mitigate and cope better with existing risks, fostering more private investment and more rapid rural agricultural and nonagricultural growth, and stemming the need for relief shipments into the area. The USU-Egerton-Cornell-Kentucky project is examining these issues in the context of its study region of southern Ethiopia and northern Kenya, both through intensive field research and through collaborative activities with partner organizations.

For more information on this project, please contact Drs. Layne Coppock (lcoppock@cc.usu.edu), Abdillahi Aboud (eu-cs@net2000ke.com), Chris Barrett (cbb2@cornell.edu), or Peter Little (pdlit1@ukcc.uky.edu).

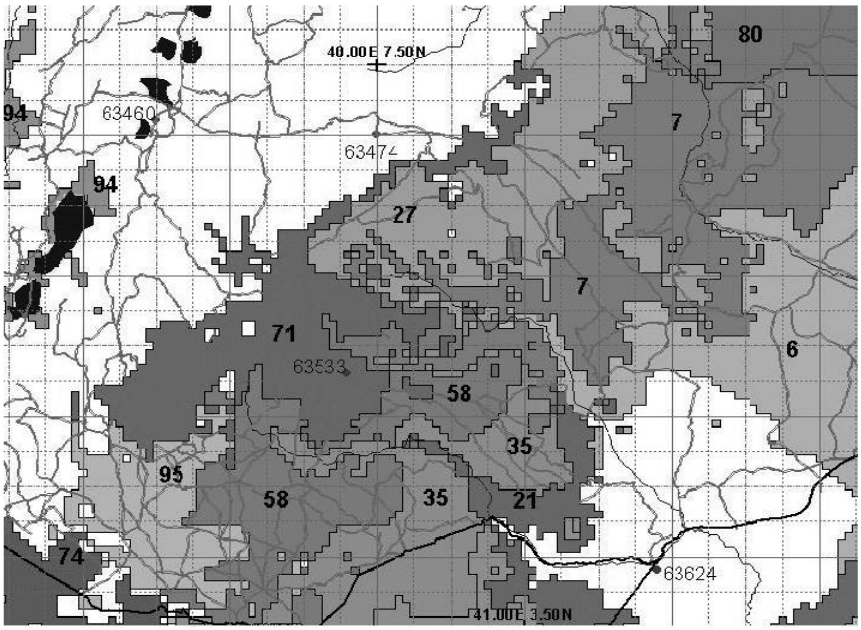
LEWS Coping Mechanism Survey Initiated

A coping mechanism survey, sponsored by the Association for Strengthening Agricultural Research for East and Central Africa (ASARECA), was designed by LEWS TAMU and in-country team members. The survey has been initiated with expected completion in Fall 1998. Survey forms with enumerator instructions, climatic cluster maps and GPS units, needed for sampling, were distributed to all the LEWS in-country team members in Africa. The purpose of the survey will be to determine current status of pastoralists in the region with a primary focus on ascertaining impact and actions taken to cope with the 1996-97 drought and 1997-98 floods. This survey will also provide baseline information needed for establishing pastoral fecal profiling routes that will be included in next year's work tasks. The funds for this survey are provided by USAID and implemented through ASARECA's Crisis Mitigation program. The map below and the table to the right provide an example of the climatic clusters and sample stratification for one of the areas where the survey scheme is being implemented in Southern Ethiopia.

S. Ethiopia

Cluster ID	Area	No. Samples
6	52210.4	17
7	39645.3	13
21	54609.0	18
27	34876	11
35	24170.1	8
58	24922.3	8
71	24330.4	8
74	12616.8	4
80	29022.8	9
95	12144.2	4
	308547.3	**100**

The need to bring national decision-makers and policy advisors into discussions with the collaborating National Agricultural Research Systems (NARS) and universities right from the project outset was reinforced with the in-country teams. A workshop for policy-makers and LEWS team members to create a two-way information flow was planned and potential participants were identified. A proposal was submitted to USAID through SPAN/ILRI for funding of this workshop. A decision on funding is pending.



Sample of the Climatic Clusters (with Roads) Map. This one is for Southern Ethiopia.

Adami Tulu Field Day

The Adami Tulu center, a LEWS validation site in Ethiopia, organized a Field Day on Saturday, September 19, 1998. Many national and international organizations were invited and attended the field day. One of the projects visited was the LEWS project. The LEWS in-country team showed the visitors the validation trials. Posters describing the objectives, work plan, activities and accomplishments of the project were presented.

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Global Livestock CRSP Represented at HPI Human Nutrition & Livestock Symposium

The link between nutrition and agriculture was the subject of a poster by GL-CRSP Program Director, Dr. Tag Demment. Dr. Demment presented a conceptual model of development with a nutrition focus. The CRSP's projects in East Africa, Latin America and Central Asia were highlighted.

Mary Carpenter speaks with Jim Durbin of World Neighbors and other participants at the Heifer Project International's Human Nutrition and Livestock Symposium in Little Rock, Arkansas. Photo by Susan Johnson.

Dr. Kathy Galvin's work in the Ngorongoro Conservation Area was the subject of a second poster. Her research explores food security and natural resource balances in pastoral regions of East Africa. The research combines ecological information and human health and nutritional data in an integrated modeling and assessment system (IMAS). The IMAS system is presently being developed by Dr. Mike Coughenour's team. Dr. Galvin is co-PI on the GL-CRSP CSU Project.

A third poster was prepared by Mary Carpenter, Dr. Louis Grivetti and Dr. Emilio Laca. The poster was entitled "Linking Livestock Production to Human Nutrition in Kazakhstan". The project is studying the effect of recent political and economic changes on the livestock sector and the resultant decline in the consumption of animal products. The poster highlighted the project's integration of livestock production, environmental health and human welfare. It also presented preliminary analysis of data collected through household surveys conducted this summer.

The symposium provided information on the nutritional impact of animals and animal products and aimed to strengthen the links between livestock programs and human nutrition. A diverse group of participants attended the symposium including HPI volunteers, NGO representatives, donors and research scientists.

The Global Livestock CRSP presented three posters at the October HPI symposium. Participants included development workers, scientists and policy makers. Photo by Mary Carpenter.

Workshops, conducted by HPI field staff, addressed issues of measuring nutritional impact from livestock and modifying livestock programs for improved nutritional impact.

The HPI Symposium was followed by a three-day International Conference on World Hunger.

For more information on the Global Livestock CRSP's nutrition component, contact the Management Entity, University of California, Davis, California 95616 or email: srcrsp@ucdavis.edu.

LEWS Long-Term Training Program Gets Underway

LEWS has funded a Ph.D. program for *Mr. Steven Byenkya* in the Animal Science Dept. at Makerere under the joint supervision of Dr. Felix Bareeba and Dr. Jerry Stuth. NARO has agreed to pay his salary and provide him the necessary equipment and facilities as well as relief time to pursue research and academic studies. Mr. Byenkya is a critical member of the LEWS team in charge of the coordination of all the field work, monitoring and validation studies. A NARO vehicle was repaired for his use via USAID/ASARECA crisis mitigation funds. A preliminary title for his research would be "Impact of Changing Land Use on Traditional Ankole Pastoralist Systems".

Discussions are under way for *Mr. Angello Mwilawa* to get sponsorship for a Ph.D. study under Dr. Jerry Stuth at Texas A&M University through the Tanzanian Agricultural Research Program II funded by the World bank /IDA. A likely scenario will be for Angello to come to Texas A&M for his course work and return to Tanzania for his field work in an area that fits within the LEWS subproject. The topic of his research will be developed jointly by the Department of Rangeland Ecology and Management at Texas A&M and the Department of Animal Science at Sokoine University at Morogoro, Tanzania.

A joint proposal by the Animal Nutrition Group of ILRI Debre Zeit and LEWS subproject has been approved and funded by ILRI/Span. The study will focus on the use of NIRS for estimating condensed tannins, NDF and intake prediction. There is also a possibility this project will be merged with another one by the ruminant Nutrition Group at the University of Florida. Our counterparts at ILRI have indicated to us that they would like to fund a graduate training (MS) for *Dawit Negassa* at Texas A&M University under the Joint supervision of Dr. Jerry Stuth and Dr. Victor Ummuna (ILRI Debre Zeit). Dawit was already trained on the use of NIRS machines at GAN lab, Texas A&M and is currently running the LEWS NIR lab at ILRI Debre Zeit, Ethiopia.

Ruminations

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Publications Available

The following publications are available by request:

Sheep Production and Management in a Mediterranean Climate, The Agropastoral System of Morocco. Edited by Y.M. Berger, A. Kabbali and G.E. Bradford.

HairSheep Production in Tropical and Sub-Tropical Regions. Edited by M. Shelton and E.A.P. Figueiredo.

Improving Andean Sheep and Alpaca Production, Recommendations from a Decade of Research in Peru. Edited by Constance M. McCorkle.

For a complete listing of all our publications, please access our web site at:
http://glcrsp.ucdavis.edu

Upcoming Events

- *7 - 11 December 1998*
  SR/GL-CRSP Year-End Conference
  Arusha, Tanzania

- *9 - 10 January 1999*
  Impact of Economic Reform Project Workshop
  Almaty, Kazakhstan