



# 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?

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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.

### 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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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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## 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



*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.*

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.

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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## 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 19<sup>th</sup> century).

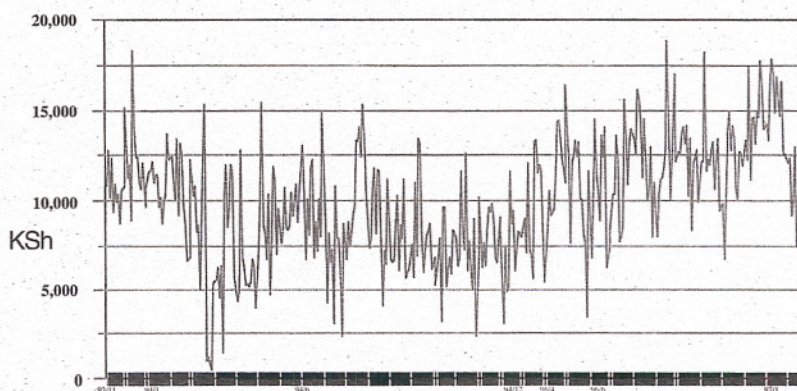
These issues merit attention, for example, in Kenya's northern rangelands. These districts suffer Kenya's highest rates of poverty, are plagued by physical insecurity, and are confronted with serious challenges to biodiversity conservation in the ASAL. In researching how best

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

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**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.

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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.

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