



RUMINATIONS

NEWSLETTER OF THE GLOBAL LIVESTOCK COLLABORATIVE RESEARCH SUPPORT PROGRAM

CRSP Director Attends Clinton Vit. A Luncheon

Dr. Montague Demment, Director of the Global Livestock CRSP recently attended a luncheon hosted by First Lady Hillary Rodham Clinton which focused on the global Vitamin A effort. Ambassador Harriet C. Babbitt, Deputy Administrator for USAID opened the event by highlighting the Agency's leading role in eradicating vitamin A

(continued on back page)



Pastoral women selling milk are now increasingly at risk when they walk from settlements to market in the East African rangelands. Problems of market access, violence, and implementing rural financial systems are interrelated. If these problems could be lessened, pastoral welfare would markedly improve. Photo by Solomon Desta.

Annual Meeting Held in Tashkent

The second Annual Meeting of the LDRCT project (Livestock Development and Rangeland Conservation Tools for Central Asia) took place in Tashkent, Uzbekistan March 16-18, 1999. The meeting was jointly organized by UC Davis and ICARDA, with the support of the Tashkent ICARDA office. Scientists, officials and students from Kazakstan, Turkmenistan, Kyrgystan, Uzbekistan and the US participated in the meeting. Among these were representatives of the following institutions and organizations: National Academic Center for Agricultural Research

(continued on page 4)

Observations from the Field Improving Pastoral Welfare in East Africa

By Dr Kevin Smith, Economic Anthropologist and Post-Doctoral Fellow, Department of Rangeland Resources, Utah State University

As the first scientist to undertake an extended field assignment on the Pastoral Risk Management Project of the GL-CRSP, my role was to conduct a broad reconnaissance of the study region in northern Kenya and southern Ethiopia. My mode of operation was to drive back and forth between Addis Ababa and Nairobi, using about 2-3 months on each journey. My total period of study was one year (March 1998 to March 1999). One of my main tasks was to help create a risk map by interviewing pastoralists

throughout the study region. I held dozens of informal surveys with local communities and gave them a chance to rank the most important risks they faced. This not only provided data for a project risk map, but it gave us a chance to confirm if the risk issues identified in project planning were indeed on target.

In the course of making a year's worth of observations I have arrived at some preliminary conclusions regarding what factors are most important in

(continued on page 8)



Pictured from left to right: Ato Mebratu Yalew - Drought Preparedness and Prevention Commission, Ethiopia; Mr. Maalim Mahboub Deputy National Coordinator, Arid Lands Resource Management Project, Programmes, Famine relief and Arid Lands Department Office of the President, Kenya; Ms Restituta Bogere - the Early Warning Unit of the Ministry of Agriculture, Animal Industries and Fisheries, Uganda; Dr James Msechu, Principal Livestock Research Officer, Department of Research and Development, Ministry of Agriculture & Cooperatives Tanzania.

Workshop Links Policy Makers with Livestock Early Warning Systems

Early warning system (EWS) policy decision makers from Ethiopia, Kenya, Tanzania and Uganda recently participated in a workshop coordinated by the GL-CRSP Livestock Early Warning System Project. The March workshop held in Entebbe, Uganda included twenty NARs scientists from nine zonal coordination teams in the LEWS GL-CRSP project,

four national early warning system policy makers, three ILRI scientists cooperating in the LEWS program, USAID's Famine Early Warning System (FEWS) regional coordinator, representatives of Land O'Lakes and Heifer Project

International, the ASARECA-AARNET Coordinator and four scientists from the LEWS team at Texas A&M University System. The workshop proved to be an effective forum for dialogue between the LEWS

(continued on page 3)

Cropping Systems and Ecological Analysis in North Kazakhstan

By Adam Wolf

The greatest problems in the grain belt in North Kazakhstan are land degradation and the economic risk of farming. Both of these problems are associated with the practicalities of spring wheat production in this dry area with an extraordinarily variable climate. Some researchers have pointed out that the likelihood of producing a successful wheat crop is about three years in ten. Summer fallow is frequently practiced in order to stabilize short-term grain production, but this comes at the cost of increased susceptibility to erosion. The low intensity of cropping practices, combined with the conventional tillage in use in Northern Kazakhstan provide

optimal conditions for soil organic matter loss, which is associated negatively with a number of soil properties, and more recently as an agent in global climate change. My research objectives are to analyze the factors which govern soil carbon storage at the landscape level, using landforms and management practices to explain some of the variability in observed soil organic matter content of soils. This research will take place at a number of active and formerly active collective farms in the Virgin Lands area around Akmola. This analysis will be useful in constructing a carbon budget at the regional scale which uses a predictive model in order to

(continued on page 5)

IN THIS ISSUE

LEWS Training Program Established	3
GIS Training Workshop in Turkmenistan.....	6
Profile: Fernando Larrea ..	7
REDSO Funds IMAS Workshop.....	7
African Wildlife: An Artist's Perspective	10
U.S. Foreign Aid: Africa	14
Nutrition Poster Presented at FASEB.....	19



TRAINING

Comprehensive Regional Training Program Established by LEWS

A comprehensive regional training program was established at the recent LEWS workshop in Entebbe, Uganda. The program allows MS and PhD students to be trained in the analytical tools and techniques used in LEWS. All of the PhD trainees met prior to the workshop to discuss sampling protocol, organizational structure issues and to coordinate their research topics into a regional program.

Mr. William Mnene, KARI-Kenya, will pursue a Ph.D. at the University of Nairobi and research the topic of growth characteristics of major rangeland species to support PHYGROW modeling efforts in LEWS. LEWS is paying for his field research in cooperation with EU funding for plant materials at the Kiboko research station.



Mr. Peter Kamau, Lecturer in Animal Science at Egerton University, Kenya, will pursue his Ph.D. at the Egerton University and research the topic of validation of the NIRS/NUTBAL nutritional management system at Chemeron Station and Kiboko for cattle, sheep and goats. LEWS will provide his annual school fees.

Mr Abule Ebro, Resident Director of the EARO research center at Adami Tulu, Ethiopia, will pursue his Ph.D. at Texas A&M via World Bank funds to EARO. His topic will be validation of the NIRS/ NUTBAL nutritional management system for Borana pastoralists and highland agro-pastoralists. LEWS will support his research costs.

Mr. Stephen Byenkya, NARO Research Scientist at Mbarara, will pursue his Ph.D. at Makerere University in Uganda in the Animal Science Department. His research topic will involve use of the PHYGROW model to study the impact of banana plantation expansion in the Ankole pastoral regional western Uganda. Danida is providing support funds as well. LEWS will support annual school fees.



Mr. Angello Mwilawa, Livestock Production Research Institute at Mpwapwa, Tanzania, will pursue his Ph.D. at Texas A&M University via World Bank funds. His topic will be characterization of the nutrient dynamics of livestock and pastoralists in the Masai Steppes of Tanzania. LEWS will provide his on-ground research costs.

(continued from page 2)

LEWS Policy Workshop

team, NARs scientists, the ASARECA-ILRI Crisis Mitigation Program and EWS policy makers in the region.

Through the workshop, EWS policy makers were made aware of the usefulness of the variety of analytical tools that are used in LEWS and they were able to reflect on strengths and weaknesses of their current systems and consider the needs and role of a LEWS. Policy officials from Ethiopia, Kenya, Tanzania and Uganda presented the structure and functionality of their respective early warning systems on the first day of the workshop.

Mr. Mahboub, Deputy National Project Coordinator of Arid Lands Resource Management Project in the Office of the President of Kenya provided a review of the current livestock monitoring program in Kenya. The primary linkages of the program occur with regional NGO networks in Northern Kenya. He indicated that they are planning to reorganize and expand the livestock aspect of their early warning system. A National Drought and Disaster Manager Secretariat will soon be launched in Kenya which can facilitate the reporting process by LEWS. Mr. Mahboub saw LEWS as a timely and welcome addition to the already existing EWS, which will greatly

(continued on page 13)

(continued from page 1)

Livestock Development and Rangeland Conservation Tools Meeting

of Kazakstan, Institute of Ecology and Sustainable Development of Kazakstan, USAID Central Asia Mission, ICARDA, Academy of Sciences of Uzbekistan, Institute of Deserts, Flora, and Fauna of Turkmenistan, Nutrition Institute of Kazakstan, Karakul Sheep Breeding Institute of Uzbekistan, Research Institute of Market Reforms of Uzbekistan, Uzbek Livestock Research Institute, Uzbek Scientific Production Center for Agriculture, Kyrgyz Agrarian Academy, Association of Cattle Breeding Joint Stock Companies of Turkmenistan, Institute of Biotechnology, North Dakota State University, South Dakota




Participants of the Second Annual Meeting of the LDRCT gather at the front of the Shodlik Palace Hotel in Tashkent.

State University, USDA-ARS Sheep Experiment Station, USDA-ARS Forage and Range Research Lab.

During the first day, members of the different LDRCT research modules met to discuss their results and to organize the

presentations. After these discussion sessions, Dr. M. Bounejmate (ICARDA) presented a seminar on how to organize and deliver presentations that was received with great enthusiasm.

During the next two days, representative of the GIS, Forage and CO₂ sequestration,

Animal Production Technologies, Socio-Economic Integration, and Human Nutrition and Welfare modules presented their results in plenary sessions. The meeting ended with a two-part session of planning of activities and plenary discussion. 

Natural Resource Conservation

The following article appeared in the Uzbek newspaper, "People's Voice" on March 18, 1999. Trans. by Abigail Breuer.

By B. Agzamov, Ph.D.

Noted foreign scientists in ecology and specialists in this field from Uzbekistan, Kazakstan, Kyrgystan, and Turkmenistan participated in the annual meeting of the Global Livestock CRSP, 15 – 17 March 1999. In his opening remarks, Dr. Emilio Laca of the University of California, director of the project on Integrated Methods for Livestock Development and Rangeland Conservation in Central Asia, underscored the importance of carrying out such a forum in Uzbekistan: "It is understood that the Central Asian republics span 226 million hectares of rangelands, making up 5% of rangelands worldwide."

The goal of the meeting was to review the research efforts of 1997-1998 and discuss the continued implementation of the project in 1999. This project is aimed at livestock development and the improvement of the welfare of animal holders themselves through sustainable and conservation measures for rangelands. The project evaluates different techniques for stabilization of rangeland yield according to: influence on the

condition of the local population, sustained vegetative cover on rangelands, and maintenance of the rangeland carbon dioxide flux. Qualitative evaluation of the carbon dioxide cycle in the Central Asian rangelands is of extreme importance for rational use of the vegetative cover. At the meeting, it was stated that modeling of the pasture feed production would enable a sustainable system of pasture use, on the one hand, and a positive carbon balance on the other, in order to help resolve the global greenhouse effect problem. The condition of the carbon balance in the ecosystem is one of the indicators of its health. One of the most important parts of the project is the development of complex measures to improve the productivity of farms. The meeting underlined the necessity of carrying out research in ecologically challenged regions where pasture degradation is ongoing, especially in the Pri-Aral (transl. note: near Aral) zone, and prognosis of the degradation process.

(continued from page 2)

Cropping Systems and Ecological Analysis in North Kazakhstan

consider possible carbon storage under different management regimes or in different locations. This research will contribute to the evolving study of factors governing soil carbon sequestration, with the understanding that this plays an important role in possibly mitigating global climate change.

The yearly risk of crop failure, seasonal impediments to animal nutrition, and severe wind erosion are also immediately pressing to Kazakhstan's farmers, many of whom have been driven to abandon their fields in the Virgin Lands area. The Soviet Union could afford the riskiness of crop production, because the demand for hard spring wheat in Russia was so great. Since privatization, this proposition is too much for small farms to bear. It may be desirable to return these lands to rangeland, but the weeds which proliferate on them are of low quality. Furthermore, land-tenure arrangements do not favor the extensive grazing which was normal in the past. One approach to these problems is to initiate a multi-year cropping rotation study, which would consider replacing the current fallow practice with a hay crop or a managed pasture, in order to build soil properties, and reduce the danger of wind erosion relative to following fallow. This study

will take place on the extensive land of the Baraev All-Union Institute for Grain Crops Research. Soil quality and productivity will be key criteria for this field study. Another approach will be to examine the hypothesis that pasture will have a lower risk of crop failure, and have a broader distribution of yields. By using information about historic climatic patterns, and determining crop responses to different rainfall and water scenarios, we could simulate how the likely yield outcomes would be distributed for wheat or hay over the long-term. Ideally, this simulation would take into account the previous year's management, because it has been demonstrated in North Kazakhstan that the yield of any particular crop is influenced by the previous year(s) crop, or fallow. This is mainly due to the moisture use of the crop in the previous year, relative to fallow water storage, but there are differences between wheat yields following hay versus following wheat. By using the costs of production of each enterprise, as well as the relative prices of each crop or animal product, taking into account the need for risk aversion, and using historic climate patterns, we may be able to optimize the amount of land which is placed under hay, pasture or wheat.

The two research projects will be complementary; the first

experiment considering soil organic matter will necessarily imply differences in the hydrologic regime of any particular location, which would lead to the conclusion that replication for different landscape locations may be an important consideration. If there seem to be strong relationships between different management practices (e.g. pasture versus wheat production) and soil organic carbon, then it may be possible to include this goal into our optimization function. It may be that the risk of crop production as a function of soil water storage may differ according to different landform elements (e.g. sloping land versus level ground), which would imply that ideal crop production should be stratified in such a way as to minimize this risk. ☞☞



Kyrgystan MOU Signed

The Prime Minister Ibraimov of Kyrgystan (left) shakes hands with Dr. Montague Demment, GL-CRSP Director after a memorandum of understanding was signed between the Kyrgystan Ministry of Education, Science and Culture and the GL-CRSP.

NIDFF in Turkmenistan Hosts GIS Training Workshop

By Karen Olmstead

A Geographic Information Systems (GIS) workshop was conducted by UC Davis graduate student Karen Olmstead at the National Institute of Deserts, Flora and Fauna (NIDFF) in Ashgabad, Turkmenistan. This workshop was conducted as a training component of the Livestock Development and Rangeland Conservation Tools (LDRCT) for Central Asia. The 4-day workshop was attended by members of the NIDFF including Dr. Valerii Nikolaev, Dr. Chary Muradov, Nabat Mamedova, Jamal Annaklycheva, Rimma Gluhih and Alexi Bayev. Dr.



Dr. Valerii Nikolaev, head of GIS work at the National Institute of Deserts, Flora and Fauna (NIDFF) in Ashgabad, Turkmenistan.

Tachdurdy Gedenov from the Turkmenistan Academy of Sciences, Dr. Mukhtar Nasyrov from Samarkand University, Dr. Tolib Mukimov from the Karakul Sheep Breeding Institute and Dr. Bachtiyor Mardonov from the Samarkand Division of the Uzbekistan Academy of Sciences also attended. The workshop



GIS workshop participants at the Karakul Institute. Front row (left to right): Moukhamet Dourikov, Nabat Mamedova, Karen Olmstead and Bachtiyor Mardonov. Back row: Tachdurdy Gedenov, Mukhtar Nasyrov, Tolib Mukimov, Batyr Mamedov.


covered basic GIS concepts, modeling principles and the use of the Idrisi software.

The training will allow a GIS to be established in Uzbekistan and Turkmenistan, following the successful pilot experiment in Kazakstan. GIS is an integral component of the LDRCT project. The GIS database will be used to store environmental and economic information for Central Asia and will be used as a basis for modeling forage production, livestock production technologies and the local carbon flux.

Information which will be incorporated into the GIS include: topography, soil classification, vegetation type and productivity, location of water sources, meteorology and human and livestock population density. This basic information will be combined with remote sensing and CO₂ measurements to develop a spatial and

temporal understanding of the carbon cycle and forage production dynamics of the Central Asian rangelands.

The workshop included discussion of the following issues:

- A comparison of vector and raster components of GIS
- Sources of spatial/ environmental information and how to incorporate them into the GIS
- Sources of error for GIS
- Datum and projection concepts as applied to Central Asian maps
- GIS modeling principles
- Introduction to Idrisi software 

For more information on the LDRCT project, please contact Dr. Emilio Laca, University of California, Davis, Dept. of Agronomy and Range Science, Davis, CA 95616. Email: ealaca@ucdavis.edu.

Phase One of Transboundary Ecosystem Management Project Initiated

A proposal was submitted by the GL-CRSP Integrated Modeling and Assessment System (IMAS) Project in May, 1998 to USAID/REDSO in Nairobi, to begin a multi-year project on transboundary ecosystem management, focusing on the Greater Serengeti-Mara Ecosystem of Kenya and Tanzania. The first phase of the 2.5 year project has been funded by REDSO.

Phase I was initiated in October 1998. The objectives of the initial assessment phase are to 1) conduct a preliminary problem assessment of interactions between pastoralists, wildlife, and other natural resources in Mara portion of the Mara-Serengeti Ecosystem; and 2) conduct a workshop to demonstrate the application of the IMAS.

The model and its application in the Ngorongoro Conservation Area (NCA) will be presented to stakeholders from Kenya and Tanzania at a three day workshop in Nairobi, Kenya at ILRI, July 6-8, 1999. This demonstration will be used to initiate specific discussion of the potential role and use of

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PROFILE

Ecuadorian Fernando Larrea Brings Community Experience to PLAN

A strong community-based process of planning, implementation and evaluation is the cornerstone of the GL-CRSP Livestock-Natural Resource Interfaces (PLAN) project. Anthropologist Fernando Larrea Maldonado is coordinator for the project in Ecuador. He has been one of the core people who have designed and implemented project PLAN from its inception. Based in Quito, he has served as the principal coordinator and as a research participant.

As coordinator, Fernando has operated in the spirit of an equal team of participants where ideas, suggestions, critiques and initiatives are freely exchanged. As a researcher in the project, Fernando has been advising and participating with the other team members in analyses of community production strategies, study of community perspectives,

and impacts of social and cultural aspects on sustainability.

Fernando is an anthropologist with broad experience. He has 15 years of experience in development programs and investigation with various national NGOs and campesino organizations. His professional work, on which he has published numerous papers, has been oriented preferentially towards agrarian studies, particularly on themes related to indigenous organizations, rural development, campesino agriculture and sustainable development. Since 1995, Fernando has been executive coordinator on the Committee for Continental Coordination of the Interamerican Network of Agriculture and Democracy.

Currently, Fernando is the Director of Heifer Project International-Ecuador.



Fernando Larrea (center) with Michel Wattiaux (left) and Ed Price (right) at the GL-CRSP year-end conference in Tanzania.

Fernando and the HPI-Ecuador staff have served Project PLAN generously as a central meeting place and base of operations for visitors. Within the PLAN project, HPI is working directly with communities to organize autodiagnosics and interviews within households. 📍

The PLAN project is using a participatory community process to establish a system of long-term community planning for sustainable natural resource use and livestock production within forested watershed. For more information, please contact Timothy Moermond, tmoermo@facstaff.wisc.edu.

(continued from page 1)

Observations from the Field: Improving Pastoral Welfare in East Africa

improving pastoral welfare in the region. To me the critical factors are as follows: (1) better markets from the pastoralists' point of view; (2) adequate places to save money and take loans; and (3) a conflict-free environment in which to live and raise animals. Having access to the first two— and minimizing conflict— would permit pastoralists to diversify their incomes and assets away from a sole emphasis on livestock and enhance the livestock they currently have (e.g., by improving their ability to procure veterinary inputs and increasing the forage supply per head by reducing stocking rates).

There are differences between southern Ethiopia and northern Kenya regarding market organization and access. The Boran in Ethiopia have created their own schedules and located livestock markets in areas convenient to them. This has occurred in part because of their high degree of social organization. The multiple levels of Borana social organization facilitates neighboring elders to organize their communities. On the Kenya side, the other major ethnic groups in our study area, namely the Gabra, Il Chamus, Rendille and Samburu, do not have such organizational attributes.

In northern Kenya, the environment of the Kaisut and Chalbi deserts inhibits the development of market centers among the Rendille and Gabra. There are very few potential market sites accessible to the (few) traders in Marsabit District. Those living in Samburu District, however, receive the best prices for their animals. A regularly scheduled market and easy road access for traders make it easy to sell to the Nairobi market. In

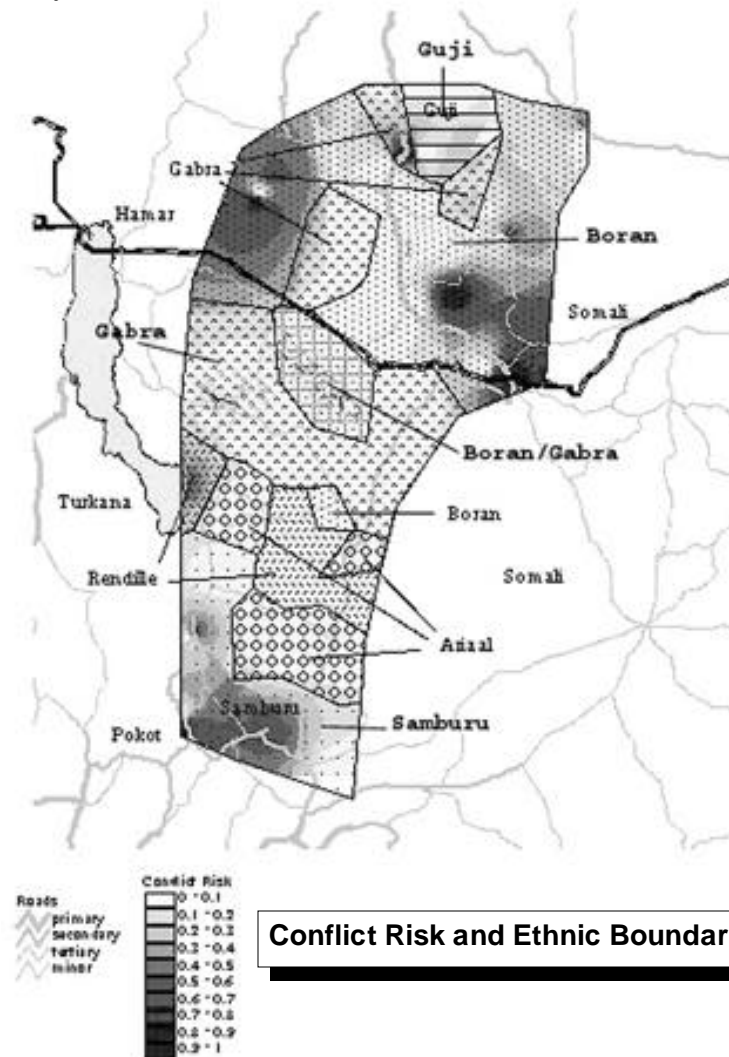
addition, the Samburu County Council is relatively wealthy (largely because of revenue from Samburu National Park) and has greatly assisted livestock market organization among Samburu pastoralists.

Access to good markets is one problem pastoralists in northern Kenya and southern Ethiopia face. Another problem is having a nearby place to save money and take loans. The banks available to pastoralists in our study are few and far between. They also cater more to business

people rather than pastoralists, with livestock not considered collateral for loans. Keeping in mind that many of the wealthiest pastoralists live far from towns and have little education, dealing with banks managed by those outside their ethnic group is both inconvenient and intimidating.

The problem of banking can be best addressed by having conveniently located savings cooperatives to encourage pastoralists to save more money and diversify the pastoral

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Conflict Risk and Ethnic Boundaries

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economy. The Kenya Rural Enterprise Program (K-REP) has recently begun to work in Marsabit District. The K-REP has opened two savings cooperatives (or community credit unions), one in the Gabra town of North Horr and the other in the Rendille town of Korr. The K-REP plans to open two more in the Gabra towns of Maikona or Kalacha and the Rendille town of Kargi. Response to the savings cooperative in North Horr has been positive. Membership includes many pastoralists from outside of town thanks to elders ensuring that information was passed to other Gabra towns. Women are also members of the savings cooperatives. Of the 214 men and 132 women who have become members in just a few months, there are 80 men and 20 women from pastoral areas. Thus, rural pastoralists and women have access to the loans which are now beginning to be granted. Out of six loans granted thus far, one man and one woman from pastoral areas have received loans.

The Korr savings cooperative is still too new to gauge response. One of the problems was that pastoralists in the area were given less advance notice when the cooperative was initiated. In one Rendille encampment the elders were not aware of the cooperative, but said they were interested. This finding suggests that pastoralists living far from towns are ignored, although these are the wealthiest pastoralists in general and are the most able to join savings cooperatives.

Conflict has proven to be of great concern to pastoralists throughout the study area. It inhibits movement, whether searching for pasture or

trekking animals to market, and thus the ability to mitigate against various forms of risk. In extreme cases, whole families are forced to move from their home areas as a result of loss of livestock and murder of family members. When conflict occurs around towns, pastoralists as well as buyers of their milk, animals, and other products are afraid to do business with each other, discouraging pastoralists from participating in the most accessible markets.

Along the Elbarta plains of Samburu District, many Samburu families were forced to leave in the wake of extensive raiding by Turkana

Conflict is the most difficult issue to resolve without government support.

that started in August, 1996. They have settled around Maralal with their remaining animals, unhappy to be living in an area unfamiliar to them. As a result of this insecurity one sees vast expanses of high quality pasture that is unused where normally large numbers of cattle could graze. Even the few roadside towns between Maralal and Baragoi are virtually abandoned.

Movement is less of an option in some areas, particularly where people have built permanent houses or have relatively reliable farming. On Marsabit Mountain this year alone, numerous raids and attacks have disrupted the patterns of herding animals, farming, and selling products with the occasional loss of life to both humans

and livestock. Insecurity has forced Rendille pastoralists to bring their animals from *fora* (or mobile satellite camps) to a close proximity to settlements where high-quality pasture is less available. In recent months Rendille women selling milk and other products in Marsabit town have risked their lives merely by walking to and from neighboring settlements. They now have to be escorted by homeguards on alternate days, thereby flooding the market and driving down prices of their goods.

Addressing the major issues of (1) livestock marketing, (2) rural finance, and (3) conflict resolution have their difficulties. Conflict is the most difficult to resolve without government support, as it may require armed force to prevent banditry and raiding. Our study area, however, is far from commercial centers and is sparsely populated by people who have few representatives in their governments. As it stands, the already financially strapped governments of Ethiopia and Kenya are concentrating their resources on the more highly populated interiors of their respective countries.

Livestock marketing and banking go hand-in-hand. At present, virtually all pastoralists in our study area sell animals only when they need money. Better prices may lead to pastoralists selling fewer animals because of the cultural preference for keeping animals over money. This logic is understandable given the inflation in Kenya and Ethiopia. Livestock also serve many social and ritual purposes, such as use for sacrifice at weddings and other ceremonies held dear to

(continued on page 19)

Wildlife in Africa: An Artist's Perspective

by Joyce Turk, USAID Program Officer for the Global Livestock CRSP

The following is a summary of the presentation by Ms. Turk at the GL-CRSP 1998 annual conference in Tarangire National Park, Tanzania. All illustrations accompanying this article are by Joyce Turk.

Each morning before I leave for work, I step into my studio and look at my most recent painting. It sits on my father's old easel awaiting my next touch. When I was a baby, my father set up this easel next to my cradle and rocked me with his foot while he painted. Through his brush lightly stroking the canvas and his foot gently rocking me, he created a circle of energy that connected me to his paintings. My father was my first teacher, and with



My primary interest in this painting was the geometric design of tree limbs and vines. I placed the monkey so that its tail became a part of the design.

my mother, my devoted supporter. Throughout my childhood and adolescence, my parents furnished me with art supplies and lessons and I increasingly enjoyed the process of creating my own works of art. Yet the call of science was stronger and I followed a career in international livestock development. I found that studying science was a natural outlet for my proclivity to memorize detail. I illustrated my school notes with intricate drawings that I always remembered more easily than the text.

In college, science was exciting. It was an adventure into the unknown and the path I've followed has been most rewarding. My career in international livestock work has taken me on this path many times around the world, from the jungles of Borneo to the Himalayas, from African savannahs to the high plains of South America. Now I discover the path has led me in a wide circle. I'm back to my father's easel painting the wonders of a wonder-filled world. Oscar Wilde and I agree. "The true mystery of the world is the visible, not the invisible."

I'm a pastelist. Pastels allow me to paint spontaneously, to depict fleeting light patterns

that flit across the mountains, down a valley between cloud patches, or skip across glassy water. When I watch colors changing in nature, I can see them on my palette - orange or blue shadows, purple fog, green mountains stippled with pink or mauve. Pastels are crystalline magic, the rainbow of my life, the paving stones of my circular path.

Pastel must never be confused with colored chalk. Chalk is a limestone substance impregnated with dyes. Pastel is pure pigment, the same pigment used in making all the art paints. The most permanent of all media, when applied to conservation ground and properly framed, pastel has no liquid binder that may cause other media to darken, fade, yellow, crack or blister with time.

Perhaps the origins of wildlife painting can be traced to the cave paintings of Lascaux France, the San paintings of southern Africa, and those found in Algeria. Neolithic rock paintings show that African elephants inhabited the Sahara before it became desert. Over the millennia, man has painted or sculpted animals for royalty as well as for the common man.

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Like goats, the giraffe is a selective feeder. Over 100 different plants have been recorded in the giraffe's diet, but various species of acacia form the bulk of its nutrition.

For three hours we cut our way through the Rwandan bush to find the Susa Group of 32 gorillas placidly feeding and grooming. The silverback of this group was killed by the Rwandan army during the war.

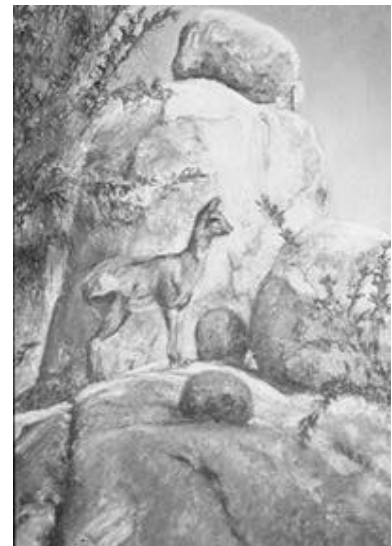


I have been painting animals since I could hold a crayon. I prefer to paint alla prima, composing without initial sketches, then massing form and color to develop the painting as I work.

To paint landscapes, domestic animals, livestock and wildlife, I use field sketches and slides or photos I've taken. With regard to

wildlife, I refer to textbooks to learn about animal behavior as well as habitat so that my paintings are not only pleasing, but anatomically and environmentally correct. I then use artistic liberty to heighten the drama of a scene with color, light, or semi-abstract shapes.

(continued on page 12)



A small antelope that lives on cliffs and rock outcrops, the klipspringer is able to live at high and low elevations, and in areas of both high and low rainfall. I spotted this one in Matopos National Park, Zimbabwe.



This lioness is an example of one of my habitat studies. When I work with farmers in East Africa, they often complain about lions killing their livestock. But when the lion lay down with the lamb, were not both their lives of value?



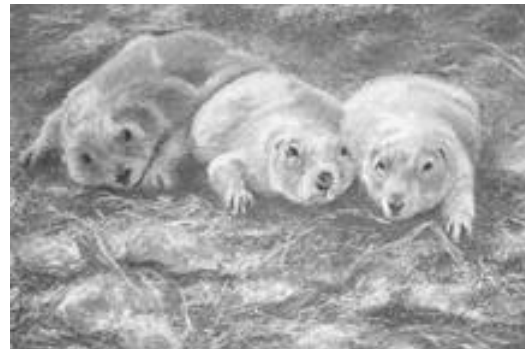
One of the most endangered animals in East Africa, the sable changes color from reddish brown to black as it grows older. This signals their age to others, thus granting them status and dominance in their social system. This handsome buck displays a set of horns that hunters would prize as a trophy specimen.

Many reference photos or slides are pretty scenes but carry no impact, yet they are useful for small details, as references, or for composites. To create a painting that engages you and continues to hold your attention, I incorporate the many elements of design. At the GL-CRSP year-end conference, I showed slides of the wildlife from which I draw inspiration, and related them to the elements of design necessary to make an appealing painting. My presentation focused on how I see wildlife in the context of painting and how I interpret what I see. 🐾🐾

Joyce Turk has participated in group and solo shows, art festivals and other types of exhibitions. For more information, please contact Ms. Turk at 703-237-4516 (home), 202-712-1424 (work), or by email: jturk@usaid.gov.



Zebras are avid grazers, but even those that are adapted to semi-arid conditions compete with domestic livestock for water and have suffered heavy poaching for their meat and skins.



Said to be the elephant's nearest relative, the hyrax is also called the rock rabbit or dassie. I found these three basking in the sun on Table Mountain, South Africa.



Where livestock have been allowed to overgraze rangeland, they provide habitation for the bat-eared fox. Foxes are normally seen in pairs or family groups and try to hide by flattening themselves on the bare ground, casting long shadows in the late afternoon sun.

(continued from page 3)

Workshop Links Policy Makers with Livestock Early Warning Systems

enhance their national livestock monitoring capacity.

Atto Mebratu Yalew, Livestock Coordinator for the Drought Preparedness and Prevention Commission of Ethiopia provided a detailed overview of the complex structure of the drought preparedness program in Ethiopia. The program is in over 450 sublocations in the country. Atto Yalew felt that LEWS would be a critical analytical component added to their largely observational system. He requested that an improved information system for Ethiopia's program be designed and implemented by LEWS with assistance from the ASARECA Crisis Mitigation Office. The Director-General of EARO has made similar requests.


Dr. James Msechu, Principal Livestock Research Officer, Division for Research and Development, Ministry of Agriculture, was asked by the Tanzanian Ministry of Agriculture to represent the agricultural EWS program in the ministry. Dr. Msechu has partial responsibilities for EWS in Tanzania due to limited infrastructure for monitoring the status of livestock other than disease reporting by local extension vets. EWS is administered out of the Disaster Relief Unit in the Prime Minister's Office. Crop monitoring has a formal

structure for EWS in Tanzania but there is no mechanism to report the impact of drought and high rainfall on livestock in the country. He indicated that he was going to go back to the ministry and begin the process of building consensus that the LEWS program should be integrated into the Ministry at the same level as the crops EWS. This will provide a direct tie to the EWS decision making process in Tanzania.

Madame Restituta Bogere, Commissioner for the Agricultural Planning Department, provided an overview of Uganda's EWS. Uganda is still undergoing reorganization issues and they are experiencing difficulties in maintaining EWS infrastructure. She felt that LEWS would be critical player in helping address livestock issues in Uganda and assist them with rebuilding their information systems for EWS.

A consensus building process followed with all attendees participating in the discussions. Robert Rose, FEWS Regional Coordinator, provided comments and suggestions on how LEWS could best fill a much needed niche in the FEWS program. The FEWS program does not focus on pastoral regions of East Africa and the drier agro-pastoral regions.

The discussions resulted in the development of the LEWS monitoring and information flow protocol. Detailed route monitoring plans were presented by each zone coordinator in the 4-country regional LEWS program. A tentative protocol was agreed to by all parties including the EWS policy people, NAR, USAID FEWS and NGO's attending the meeting. Final route plans and maps indicating location of zone coordinators, weather stations, fecal sample pick-up points, extension and NGO site monitor locations, household sampling sites and all local livestock markets will be presented to government, local villages and local extension personnel for final comments before implementing a pilot program in June 1999.

The workshop was sponsored by the LEWS project of the Global Livestock CRSP, SPAN through ILRI and ASARECA Crisis Mitigation and Early Warning Program. Funds for the workshop were provided by the United States Agency for International Development. 

For more information on the LEWS project or to obtain a copy of the proceedings, please contact: Abdi Jama at Texas A&M University, Department of Rangeland Ecology & Management, College Station, TX 77843. Fax: (409) 845-6430. Email: aajama@cnrit.tamu.edu.

What to do about Africa

By John W. Mellor

United States foreign aid was initially intended as a temporary program, setting countries on the path to self-sustaining growth. It has been extraordinarily successful by that standard. Europe and Japan graduated quickly, after massive infusions of capital, food, and technical assistance. Essentially all of Asia, some three billion people, has now attained unprecedented growth rates. It has done so with relatively more technical assistance, over a far longer period of time, than Europe and Japan, and with relatively smaller concessional capital infusions.

Putting Africa on a path of self-sustaining growth would provide the final chapter on foreign aid. However, the way things have been going in Africa, that chapter will never be written. The fault lies substantially with the conduct of foreign aid in Africa. This article deals explicitly with U.S. foreign aid, but foreign aid from most other sources has fallen victim to the same forces.

Not only has Africa not moved forward like Asia, it has retrogressed. In Africa, famines continue to occur, per capita incomes have declined, major agricultural export markets have been lost, poverty indices have risen, environmental destruction has increased, and women are increasingly impoverished. Of course, there are exceptions. Some countries show temporarily high growth rates as they simply recover to past levels of attainment; diamonds have helped Botswana; and a very few African countries have opted for agriculture-based growth with consequent broad participation in rising incomes.

To understand what to do in Africa and how difficult it will be, we must first understand what went right in Asia and then why matters have come to such an impasse in Africa. One must also understand that there are basic principles guiding growth and that they are not entirely *laissez faire*. U.S. foreign aid is important to successful development strategy when recipient governments are poor and weak.

The success in Asia

Everyone recognizes all Asian countries are growing rapidly (notwithstanding the current blip in three Asian countries), doubling per capita income every ten to twelve years, and rapidly closing the income gap with the wealthy countries. The proportion of population in poverty has declined precipitously over the past two decades; by one-third in India, far more in Southeast Asia, and to virtual elimination in East Asia. The immense famines of over thirty years ago seem from a vague and distant past. Women are increasingly active in causing and in benefiting from growth.

Foreign aid and the Asian success

Taiwan President Teng-hui Lee, in his 1995 Cornell University address, drew attention to the immense contribution of U.S. aid to Taiwan. In his earlier, scholarly work, he noted the particular importance of technical assistance to agriculture (Lee). The foreign technical assistance to agriculture that was so successful in Taiwan was roughly duplicated, with modest modification, in other Asian countries. Foreign aid to Africa, coming later, differed sharply from that

To understand what to do in Africa... we must first understand what went right in Asia...

to Asia. What are the differences?

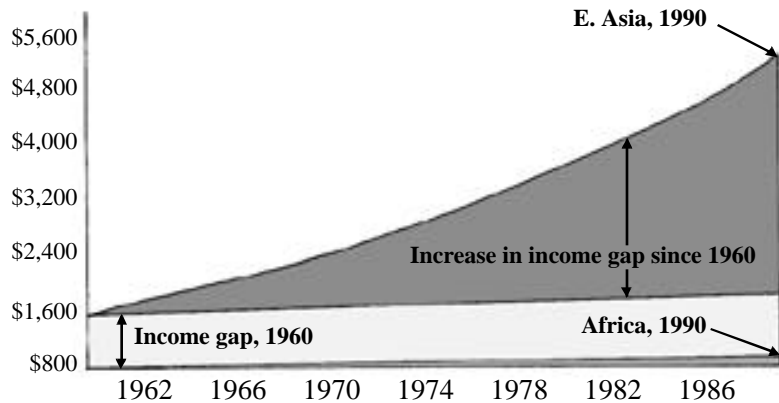
First, senior administrators and counselors realized that U.S. foreign aid had to affect aggregate growth if the target countries were to graduate from aid. In contrast, recent aid projects have tended toward field projects that are measured only in terms of their impact on a small geographic area or group of people.

Second, because aid went to agricultural countries, where 80 to 90 percent of the population depended directly or indirectly on agricultural income, the focus was on getting agriculture moving. Concurrently it was noted that human capital was important, and in a deplorable state, so health (including family planning) and education were combined with the focus on agriculture.

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The growth gap between Asia and Africa



Source: World Bank Economic Growth Project

Third, just as for the family farm economy of the United States, public institutions were seen as critical to the growth of agriculture. Foreign aid concentrated on the long, slow process of building effective institutions of agricultural education, research, and extension. And the focus of these institutions was on growth. The United States occupied a privileged position in the world in the strength of its own institutions in these key areas. The corollary was a high degree of agricultural professionalism and a major role for the land grant institutions as the repository of that professionalism.

Fourth, as in Europe, albeit for different reasons, physical infrastructure was needed. Unlike for institution-building, the international financial institutions, and to a growing extent foreign private capital, have effectively taken over this function.

Fifth, foreign aid, arriving as foreign exchange, was primarily spent to finance imported physical capital and technical assistance. The recipient countries were expected to pay for local costs. Now, foreign aid to many low-income countries, particularly in Africa, finances the bulk of public expenditure and essentially all public investment. That encourages public officials to maximize aid flows rather than to respond to national development needs. Such high levels of foreign aid also result in overvalued exchange rates and, hence, in disincentives to export, an outcome that penalizes the high-employment-level export activities so helpful to the poor.

Sixth, aid administrators recognized that independence movements in the poor countries of Asia and Africa were largely urban based, and so the new governments were also urban-based. Foreign aid, albeit sometimes clumsily, pressured for pro-agriculture policies until reluctant governments gradually relented. Of course, as democracy became more widespread, rural people could begin to look after their own interests.

The result of application of these six features of foreign aid was slow but massive building of the institutions critical to agricultural progress and to human capital development.

Largely due to U.S. foreign aid, swimming against the national currents, all Asian countries have institutionalized the basic tenets of agricultural development (technology development and dissemination, purchased input supply, rural finance, and marketing of high-value commodities).

Massive research conducted over the past few decades confirms and documents the success of the sensible approach to foreign aid in Asia. See for example, the several hundred references in the AAEA review of the postwar literature on agricultural development (Martin). Three thrusts in that research record are notable: the large multipliers from agricultural to overall economic growth, the importance of the basic institutional structures and the role of public policy in their development, and the preminent role of agricultural growth in the abatement of poverty (Ravallion and Datt, Timmer). From the literature on Asia and specific analyses of Africa, we know what to do in Africa to accelerate agricultural growth, both for overall economic growth and for poverty reduction (Eicher in Martin).

The failure in Africa

Over the past thirty years the population in Africa has doubled from a quarter billion to a half billion, and per capita income levels have declined from levels once above those of the bulk of Asian countries to levels far below. As the population doubles again to one billion, income levels are pointed toward further decline. In Rwanda, as the population grew and the soil became depleted, the per

(continued on page 16)

(continued from page 15)

Africa: Closing the Last Chapter on U.S. Foreign Aid

capita food supplies declined and the ethnic slaughter began (FAMS). The experience of Rwanda and Zaire will multiply, with no evidence that the world's rich countries will be able to insulate themselves from the increasingly large disorder and migration that follows.

Yet, Africa has a good resource base. Indeed, literature of the 1960s (*Famine 1975* by the Paddock brothers, for example) suggested triage for "hopeless, overpopulated" countries of Asia, while Africa, with its low population densities and large agricultural exports, merited a helping hand to realize its potentials. Anthropology courses taught that Africa would develop more easily than Asia because most of Africa was not hobbled by rigid cultures and long, stultifying traditions.

What, then, did go wrong in Africa?

Causes of foreign aid failure in Africa

How can we explain why foreign aid has become less effective, while learning by doing should have made it more effective? Overall, foreign aid in Africa, and particularly U.S. foreign aid, bears no resemblance to what succeeded in Asia. Four basic factors explain why. They are all related to Africa generally entering the development assistance field later than Asia.

First, and most important, foreign aid is now captive to myriad special interest groups (see the massive documentation of this point by Vernon Ruttan). Today they include child survival, vitamin A, microcredit, poverty, microenterprise (but excluding agriculture!), empowerment of women, environment, wildlife preservation, and on and on. Extrapolation of the history of special interests in foreign aid suggests that tomorrow the list will be different and longer. Priorities and strategy cannot coexist with such a panoply of special interests, each with its own objectives.

An immediate consequence of the proliferation of special interests is loss of focus on the basic processes of agricultural growth. Concurrently, recipient governments are encouraged to attempt to maximize aid flows by responding to the myriad special interests rather than on the tight priorities of getting growth underway.

Of course, each of these interests is laudable, but not when it distracts attention from the basic processes that will do the most to forward those interests. In Asia, each

of those interests has been advanced rapidly; in Africa, where special interests run foreign aid, progress on each is abysmal. It is also notable that many of these interests are ones in which, unlike for agricultural growth, the United States brings precious little relevant knowledge from American experience. Poverty reduction, women's participation, the health of poor children, microcredit, and microenterprise are examples of areas in which the United States is not a leader in institutional development. And in some cases—microcredit for example—the U.S. is adapting institutional structures from developing countries like Bangladesh. The interest groups have generally been content with success in tiny projects, with little attention to what is happening to national aggregates.

Second, and very much related to the first, foreign aid has treated Africa as though it has achieved rapid growth, like Asia. What justification there is for the myriad special interest groups arose out of the success in Asia, particularly the green revolution success, which spawned a legitimate concern for second-generation problems—of women, children, and the poor, and of environmental enhancement. Those concerns inevitably branched off in many directions. But Africa never had the first-generation solutions. Indeed, the quest for second-generation solutions has stood squarely in the way.

Third, the contemporary focus of foreign aid on free markets has removed support for sectoral programs and hence for agriculture. The free-market orientation is not against agriculture. It simply assumes that if it makes sense to develop agriculture, that's how the market will operate. The view that market price changes will induce changes in innovation and public expenditures has reinforced that assumption. As a result, the agricultural sector does not receive the attention required by its public sector institutional base, such as in ensuring a technology generation and dissemination system, competitive input and output markets, and institutional credit. Along the way, attempts to develop strategy and priorities for sectoral development have also been lost. Of course, agricultural growth requires development of free markets, but for agriculture that is not a sufficient condition.

A corollary is notable. In the early days of emphasis on Asia, general economists normally made a bow to the

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proposition that agricultural countries required an emphasis on getting agriculture moving—and then they returned to their specialization. Now, general economists looking at development problems tend to be strongly neo-classical, believing that if agriculture needs emphasis, the market will see to it. Rarely nowadays does a general economics point to the need to emphasize agriculture in development.

An immediate consequence of the proliferation of special interests is loss of focus on the basic processes of agricultural growth.

Fourth, and deriving from the preceding, professionalism stands in the way of bureaucratic adaptation to the constantly changing fashions of foreign aid. It is the generalists who can quickly adapt. Thus, U.S. foreign aid has lost the capacity to distinguish sound projects from mere fluff. That, in turn, has driven the land grant colleges largely out of the foreign assistance business, leaving it to private consulting firms adept at winning contracts scored mechanically against minute criteria that have little relevance to development. At the moment, large consulting firms are merging, consolidating, and making joint proposals, with a radical decline in competition. The quality of technical assistance has greatly deteriorated.

The decline in professionalism has been accelerated by staff reductions at the Agency for International Development, thereby largely eliminating the professionally competent and more senior technical persons, especially in agriculture. Similarly, a competitive bidding system for technical assistance has virtually ensured lack of continuity. It used to be that developing countries notoriously lacked personnel continuity. Now foreign aid is a far worse offender.

The need for drastic action

Reform in foreign aid is virtually impossible because of the multitude of allied special interests. Those interests, by marshalling substantial constituencies, now drive Congress and therefore aid administrators who must raise their funds from Congress (see Ruttan for detail on this

point). There is no room for the focus on growth, strategic thinking, and tight priorities that is the only means of success in early stages of development.

The many vested interests in foreign aid are now so immense that the system seemingly cannot be reformed. But the problem in Africa will only get worse and ultimately must be addressed. Helping Africa now is far more difficult than if it had been done correctly twenty years ago, and it will be far worse in another twenty years. The task becomes more difficult as population pressure increases and urban orientation becomes more entrenched.

The drastic action

Leadership from the United States is important. The United States has the experience and the personnel for the institutional change that is so crucial to long-term development. The big international financial institutions can do the bricks and mortar.

To succeed, we must recognize that it is Africa and only Africa that has a growth crisis and needs foreign aid focused on growth. With that recognition, the on-again, off-again proposal in the Senate Foreign Relations Committee (but not included in the current legislation) to merge AID into the State Department would have some merit.

Such integration would serve two purposes. One, it could lead the Senate to focus on the long-term problem of economic growth in Africa, an issue that overrides all other issues including strife, human rights, environmental degradation, and women's concerns. Two, it would further sharpen the regional differences within foreign aid. When

To succeed, we must recognize that it is Africa and only Africa that has a growth crisis and needs foreign aid focused on growth.

most the Third World was characterized by similarly low incomes and development problems there was sense in bringing all the geographic areas into one agency to obtain economies across those area. There is now little to be gained in Russia from knowledge of aid programs in Africa and vice versa.

(continued on page 18)

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Africa: Closing the Last Chapter on U.S. Foreign Aid

Asia doesn't need development aid; it needs Fulbright-type programs to tie our institutions more closely together. Development aid will not help the former Soviet Union's political problems that interfere with the needed economic transition. Political problems in the Middle East beg for sanity and negotiation, not for development assistance. Those regions may require money, but not in the development assistance mode. The State Department is the logical forum for those decisions.

With recognition that all other problems in Africa are subserved under development assistance for growth, the Africa bureau of the State Department would then become the development assistance wind and would be staffed for development assistance. It would be well to elevate the head of that effort to under secretary level to spotlight not only the importance of the issue but also the focus on long-term problems subsumed under achieving economic growth. That person must have the strength to stand up to the vested interests and keep a sensible, focused, prioritized approach with a clear growth objective.

We know what to do to make steady progress over the next decade or two. We must promote a clear, prioritized focus on agriculture, education, and health. We must return to technically competent professional staff. Only with such radical return to the basic tenets of development can we close the final chapter on development.

Postscript: Has nothing changed in development?

Of course, there are immense changes since the Asian success began to consolidate – all helpful to the late starters. International capital flows are now so large that, if a favorable environment is created, no country must wait for slow processes of domestic capital formation to rapidly expand its infrastructure. In India, for example, foreign investments of several billion dollars in electric power generation are moving to implementation. More resources can be left for the rural infrastructure not likely to be financed by foreign capital flows.

The potential for high-value agricultural exports (driven as much by technology as by trade negotiations) is now so great that the 6 percent growth rates in agriculture that could only come at later stages of development can now be achieved early. Even some African countries, such as

Kenya, have participated in this growth, setting an example for other African countries to follow.

We are now much more confident about setting priorities for agricultural growth and need make fewer mistakes than forty years ago. And, yes, we have learned important lessons about the role of women (especially in Africa) and about resource productivity (especially inorganic nitrogen) that favor even faster growth when applied in the laggard countries.

Over the long run, the massive additions to global GDP that will continue to come from Asia open vast opportunities not only for rich countries to benefit from but poor ones as well. The educational base in even the poorest countries has grown immensely. That is to say, Africa should be able to accomplish what Asia achieved in more nearly twenty than in forty years. The broad strategy must be the same; the details must adapt to the new potentials. And, the results in growth can come sooner.

John W. Mellor is president of John Mellor Associates, Inc., a policy consulting firm. This article first appeared in the Fourth Quarter 1998 edition of CHOICES, a quarterly magazine of the American Agricultural Economics Association. Reprinted by permission.

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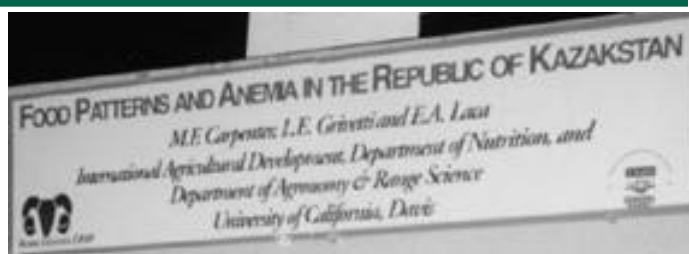
Carpenter and Grivetti Present Poster at FASEB

By Mary Carpenter

A poster titled "Food patterns and anemia in Kazakstan" was presented by the Livestock Development and Rangeland Conservation in Central Asia at the Federation of American Societies for Experimental Biology (FASEB) in Washington, DC April 17-21 1999. Authors included Mary Carpenter, Louis Grivetti and Emilio Laca from UC Davis. Household food production, food frequencies and sources, and nutritional indicators of the sample population in three



*Poster authors
Dr. Louis Grivetti
(left) and Mary
Carpenter.*



children was slightly higher than previous reports, while other anthropometric indicators were similar. As stunting is an indicator of long term nutritional status, the increased stunting may be a result of changes in household food security during the period of privatization which the other surveys would not have captured. There was a high percent of women overweight

(BMI>25 kgm²) (36%) and regional differences were significant.

There were no significant differences in prevalence of anemia regionally in women or children. Prevalence of anemia in mothers and children were not related, nor was IUDs related to women anemia.

Dietary habit differed between the regions according to the food frequency which suggests that diet may not be the main cause of anemia in the region. It appears that hemoglobin and anthropometric data are not related to dietary patterns, although analysis the of power of the tests is pending. Other possible causes of anemia need to be evaluated such as folate and B12 intake, infection, and bioavailability. 🇺🇸

ecological regions were presented. The sample included households maintaining at least 10 sheep units. Nutritional status of women and children were assessed.

The results indicate that nutritional health of rural women and children compared favorably with previous reports done in 1995 although prevalence of anemia is still high (38% for women and 47% for children). Stunting among

(continued from page 9)

pastoral cultures. Continuing to keep as many animals as possible, however, sets pastoralists up for large herd losses in the event of inevitable droughts. More pastoralists are then bumped from the traditional system when herd losses become excessive. The problem is aggravated when they resettle around towns and villages and need food and social services. It may take time to convince them that insecurity, drought, and increased

sedentarization make it in their best interest to keep less of their assets in livestock. It will take an even longer time to do so if there are no viable means to facilitate change, including better livestock markets and convenient places to save money and take loans for non-pastoral economic pursuits. 🇺🇸

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(continued from page 1)

GL-CRSP Director Attends Lunch Hosted By First Lady Hillary Clinton

deficiencies worldwide. Mr. J. Brian Atwood, Administrator for USAID and the Honorable Tony Hall, Congressman from Ohio were presented with the Helen Keller Spirit Award for their contributions to improving the health of children.

Speakers at the luncheon represented both the private and public sector and included the Executive Director of UNICEF, Canadian Minister for International Cooperation, First Lady of the Philippines, Land O'Lakes Vice President of International Development, President of Monsanto, CEO for Kellogg Company,


Chairman of the Board for Proctor & Gamble and Director of the Global Nutritional Program for Roche Vitamins.

The World Health Organization estimates that more than 250 million young children are vitamin A deficient. USAID supported research has shown that vitamin A decreases child mortality by 23 - 24 %. "From the start, USAID has been at the forefront of the fight to eliminate vitamin A deficiency as a public health problem," said Carol Bellamy, Executive Director, UNICEF.

In November 1997, USAID launched VITA, an enhanced

effort by the Agency to improve child survival through expanded delivery of vitamin A to vulnerable populations worldwide.

"The Agency is mobilizing to create domestic and global alliances to enhance and coordinate efforts to eliminate vitamin A deficiency and save children's lives," said USAID Administrator, Brian Atwood.

A memorandum of cooperation in support of Mrs. Clinton's outreach efforts was signed at the conclusion of the luncheon. The declaration will vastly increase the availability of food staples fortified with Vitamin A. 

Ruminations

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(continued from page 7)

Phase One of Transboundary Project Initiated

IMAS output to improve decision making for natural resource management in the Serengeti-Mara region. The results of the workshop will include a list of action points describing how the IMAS can be used to address some of the key issues concerning stakeholders in the region.

A proposal for the remaining two years of research will be prepared based upon input from the workshop. The proposed work would involve a phase of application of the IMAS to resource management problems in each country, and a subsequent phase of integration for more effective

transboundary ecosystem management.

The Serengeti-Mara region is ecologically and socio-economically connected by migratory wildlife populations, legal and illegal movements of humans across the border. The migratory wildlife do not recognize international boundaries, yet their fate is influenced by the independent policies of two different countries. Poachers based in one country can create problems for wildlife management based in the neighboring country. Land use change on either side of the border affects wildlife populations and wildlife carrying capacity for the system as a whole. 