

SR-CRSP:
Global Research That Benefits
The United States



A Report from the Small Ruminant Collaborative Research Support Program

SR-CRSP Research Benefits the United States



D'man x Sardi sheep in Morocco. Working with a broad spectrum of genetic diversity is one of many benefits SR-CRSP's global research brings to the United States.

The Small Ruminant Collaborative Research Support Program (SR-CRSP) benefits sheep and goat producers in the United States as well as producers in developing countries by linking the capabilities of agricultural universities and research institutions to the needs of developing countries. The program, as mandated by the International Development and Food Assistance Act of 1975, strives to apply more effective agricultural sciences to the goal of increasing food production around the world.

In 1978, the Small Ruminant Collaborative Research Support Program was organized and funded by the Agency for International Development. This program links ten universities and research institutions to 17 research projects in Indonesia, Kenya, Morocco, and Bolivia.

SR-CRSP is a major research effort that provides a knowledge base for improved production, marketing, and use of small ruminants. Results benefit small ruminant producers in both the United States and collaborating host countries, as well as other sectors of the livestock industry.

SR-CRSP research helps to ensure that the United States maintains a competitive advantage in the growing scope of international trade and development.

Participating institutions and fields of research include:

University of California, Davis
Breeding and Genetics

Colorado State University
Animal Health

University of Missouri, Columbia
Rural Sociology

Montana State University
Breeding and Genetics

North Carolina State University
Animal Nutrition

Texas A&M University
Systems Analysis, Animal Breeding

Texas Tech University
Range Management

Utah State University
Range Management

Washington State University
Animal Health

Winrock International Institute for Agricultural Development
Agricultural Economics, Production Systems



Sustainable agroforestry in Indonesia boosts forage production and reduces reliance on herbicides.

Broad-Based Economic Growth



Introduction of the Dual Purpose Goat (DPG) in Kenya contributes to the self-sufficiency of women by enhancing their roles in small ruminant production.

Broad-Based Economic Growth: Small ruminant production is an ideal agribusiness enterprise because an investor can enter the business with little capital. In most small holder situations, small ruminants represent a primary reserve of capital and a ready source of cash when necessary. Unlike most crops, these animals store well and improve in value the longer they are held. In many cases, surplus value from farming is invested in livestock rather than banked. Livestock provides bridging capital when crop yields fail, and is thus critical to the productivity and sustainability of agricultural production systems around the world. Through the distribution of Dual Purpose (meat and milk producing) Goats to farm households headed by women as well as to women's groups in Kenya, SR-CRSP has enhanced the role of women in the country's extensive livestock industry. SR-CRSP activities benefit small-scale producers in other countries also, thus substantially increasing disposable income and expanding international markets.

Human Resource Development:

Scientists are realizing that solutions to today's complex problems require a shift from conventional reductionist research to a more collaborative and multidisciplinary research strategy. SR-CRSP has been at the forefront of collaborative research, providing experience in multidisciplinary research and training for U.S. scientists and graduate students with scientists in other countries and U.S. research institutions. In addition, the program recognizes the value of including the social sciences in its biological research projects. Since 1978, more than 300 U.S. scientists have participated in extensive agricultural research with SR-CRSP projects. These scientists now hold research and other positions in the U.S. that are essential for maintaining long-term competitiveness and sustainability of U.S. agriculture. Many foreign scientists trained through SR-CRSP now hold high positions within their governments, thus providing important links to maintain and encourage free trade and international understanding. Further, knowledge gained through developing technology for sustainable agriculture in developing countries is of increasing importance to the United States. SR-CRSP-trained students and scientists are entering professions in the U.S. better equipped to deal with international problems and sustainable agriculture.



Training of scientists in an international and multidisciplinary setting provides a solid foundation for collaborative research by American and host country scientists for years to come.



The multidisciplinary, collaborative nature of SR-CRSP research is a valuable education tool. The program provides practical learning experiences to students in the United States.

SR-CRSP is a valuable training tool for small ruminant research in the United States: U.S. expertise in small ruminant production is declining. SR-CRSP helps to reverse or slow this trend by involving university faculty and graduate students in the field. SR-CRSP has spurred new interest in small ruminant production, and the work of this new generation of scientists is filling an important gap in small ruminant research in the United States. The success of SR-CRSP led to the development of a dairy goat research facility at the University of California, Davis. Collaboratively funded and maintained by the Departments of Animal Science and Veterinary Medicine, this facility houses important artificial insemination projects and provides hands-on learning experiences for university students.

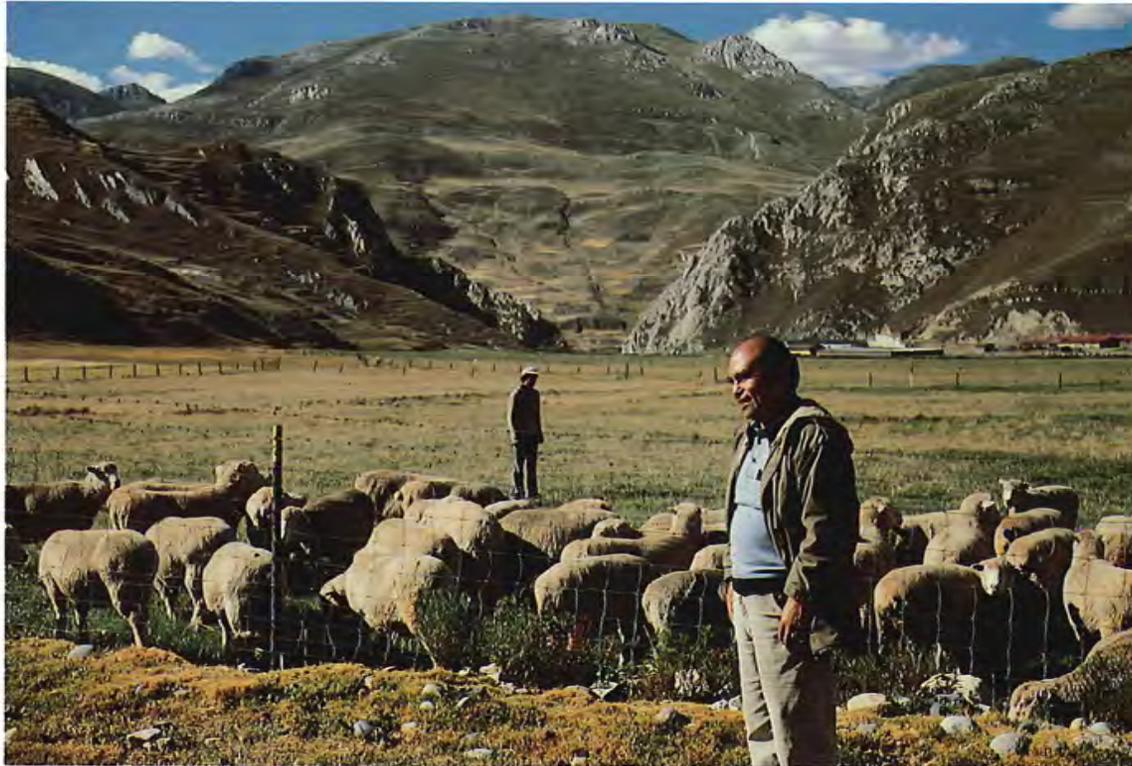
Enrichment of Teaching Programs: SR-CRSP significantly enhances general education in United States universities. Professors returning from international SR-CRSP research sites provide both graduate and undergraduate students with a broadened information base. Representing a breadth of academic disciplines, these professors are able to apply an important international perspective to their courses. This expanded understanding of applied international issues is important for the United States to maintain a competitive edge in the expanding global economy.

Cost Effectiveness: SR-CRSP is a long-term, multi-institutional, collaborative research project. USAID funds are matched by participating universities, private institutions and host-country governments. In 1991, 50% of the SR-CRSP budget was supported by matching grants, offsetting much of the cost for field research. While SR-CRSP relies on continued USAID support, the matching funds enhance the cost-effectiveness of such a program. Furthermore, SR-CRSP is a successful long-term program, thus minimizing the need for continuous start-up funds necessary to establish short-term projects. SR-CRSP funds as much research on sheep and goat diseases in the United States as does the USDA through its extramural competitive research grants program.



Since 1981, the Maseno Research Station in western Kenya has provided SR-CRSP researchers the facilities necessary to develop the Kenya Dual Purpose goat and other important contributions that have enhanced small ruminant production in both Kenya and the United States.

Disease Control



Investigation of disease problems in countries like Peru provides useful lessons for studying diseases in the United States.

Disease Control: The current ease of transportation and widespread movement of animals throughout the world increases the chance of illegal or accidental introduction of foreign animal diseases to the United States. SR-CRSP research addresses this risk in a number of ways. First, by working in international settings, SR-CRSP research enables scientists to gain a broad understanding of diseases that could potentially be introduced into the United States. Diagnostic procedures and vaccines can be developed prior to the introduction and spread of a foreign disease. Second, SR-CRSP research helps to control diseases in foreign countries, thus significantly reducing the likelihood that they will eventually reach the United States. In Kenya, SR-CRSP research resulted in the development of an effective vaccine to control *contagious caprine pleuropneumonia*, CCPP. This will reduce the spread of the disease worldwide, and will provide U.S. farmers with the technology necessary to prevent or treat the disease if it should accidentally enter the United States.

Disease Diagnosis and Resistance: SR-CRSP research in biotechnology has led to early disease diagnosis in small ruminants. The result has been an ability to develop cost-effective management measures and vaccines to prevent the spread of highly contagious diseases. In Kenya, SR-CRSP research has identified animals resistant to *Haemonchus contortus*, an intestinal parasite accounting for 92% of the total parasite infestation of the Kenya Dual Purpose Goat. Identification of genes and genome fragments responsible for the resistance to parasites will provide important benefits to livestock producers in the United States. Most significantly, this results in increased productivity coupled with reduced use of anthelmintics. This lowers treatment costs, slows the development of anthelmintic resistant strains of parasites, and decreases the potential for drug residues in meat and milk. Once the genetic base of resistance is established by SR-CRSP scientists in Kenya, it can be transported to the United States. The savings in lost productivity for U.S. producers could exceed \$40 million per year.



SR-CRSP research in Kenya has positive implications for disease control around the world.



In Peru, scientists using advanced laproscopic techniques are able to investigate animal reproduction traits.

Biototechnology: SR-CRSP is an important vehicle for testing and applying biotechnological innovations and procedures that benefit small ruminants and other animals as well. Biotechnology research has contributed information that provides a basis for development of vaccines and diagnostics for retrovirus-caused diseases such as *caprine arthritis-encephalitis* (CAE) and *ovine progressive pneumonia* (OPP), both of which are of great economic importance in the United States and in developing countries. Development of DNA probes that identify genetic markers have application in selecting for disease resistance. The interaction of viruses in the onset of ovine pulmonary carcinoma, a sheep lung disease found worldwide, is being investigated. SR-CRSP linkages with the Center for Disease Control and the U. S. Army Medical Research Institute have promoted the development and testing of recombinant vaccines and diagnostics which otherwise would probably not have been evaluated for potential application for controlling various sheep diseases. With the changes in international movement of livestock and public concerns over safety of the food supply, the ability to identify, diagnose, and control diseases is of increasing importance. SR-CRSP remains at the forefront of such biotechnology through extensive use of the global availability of biodiversity and collaborative development of new technologies.

Rangeland Management: Sustainable natural resource management requires successful manipulation of plant communities to maximize advantages for livestock and wildlife, while at the same time reducing the cost of inputs. SR-CRSP research in Brazil on plant growth rates, secondary biochemical compounds, palatability of specific plants to sheep and goats, and responses of these plants to fertilizer applications has led to more efficient rangeland management and improved livestock production. Such research benefits U.S. livestock production by providing knowledge necessary to promote the most appropriate plant species, and to efficiently use inputs such as fertilizers and herbicides. For more than a decade, research on grazing systems in the semiarid regions of the United States has been carried out with SR-CRSP support. The knowledge base generated from this research assists ranchers in the United States to implement successful and sustainable grazing systems.



Development of sustainable management techniques improves quality forage production while reducing the risk of environmental degradation problems such as soil erosion.



Using sheep and goats for biological control of weeds increases profits and sustainability for tree plantations in Indonesia.

Integrated Production Systems: In Indonesia, SR-CRSP scientists researching animal nutrition through grazing and strategic nutrition supplementation developed a production system enabling sheep to graze on forages cultivated among tree crops. Using previously wasted crop residues, this farming system has resulted in reduced use of herbicides and expanded small ruminant production. As U.S. agricultural producers move toward more sustainable farming systems, creative solutions for the use of crop residues and by-products are becoming increasingly important. SR-CRSP research presents applicable models of sustainable production systems to U.S. farmers.

Computer Simulation: Appropriate use of computer models provides the U.S. agricultural industry with rapid and inexpensive alternatives to answering many applied research questions. SR-CRSP researchers have developed computer simulation models that enable U.S. sheep producers to evaluate the potential for leaner lamb meat production. Simulations indicate that traditional U.S. lamb producers can increase net profits by \$3 to \$6 per head. These profits, applied to the 1 million head fed annually in the United States, indicate projected increases to net returns each year of \$3 to \$6 million.

Sustainable Natural Resource Management: United States agriculture is focusing increased attention on more sustainable natural resource management, and SR-CRSP research provides practical applications for this. Research in Brazil and Morocco has enhanced scientific understanding of maintaining and improving sustainable range management practices. Research on grazing habits of sheep has been carried out simultaneously in Brazil, Peru, and the United States. While this research concentrates primarily on small ruminants, benefits from range management research on short duration and rotation grazing systems is applicable to all livestock species, including cattle. This research has considerable impact for the U.S. as more than 630 million acres of land is maintained as rangeland.



SR-CRSP research has also been conducted on grazing systems in arid and semiarid regions of the United States.

Support for Free Markets



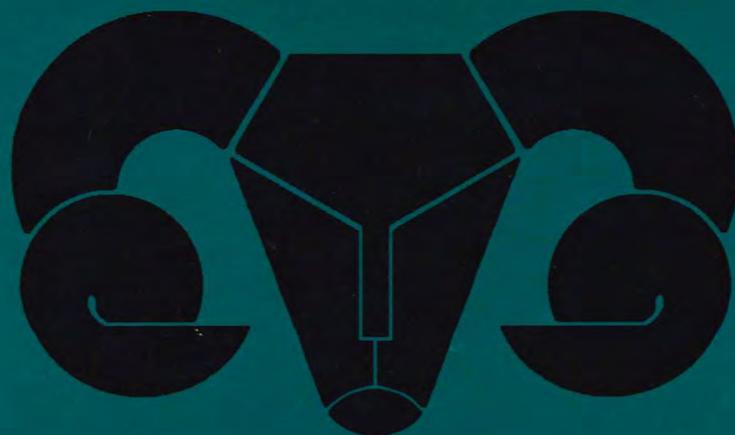
In Indonesia, SR-CRSP successfully works with private enterprises to satisfy local specialty markets.

Support for Free Markets: SR-CRSP projects develop important private-sector relationships that result in the expansion of free market systems with potential and current U.S. trading partners. In Indonesia, SR-CRSP is working with a semi-private agribusiness concern on the establishment of a commercial feedlot to supply the country's popular *satay* market, utilizing nutritious by-products from the palm oil processing industry. In Kenya, SR-CRSP has developed and tested a vaccine against *contagious caprine pleuropneumonia*, CCPP, a disease affecting goats throughout the world. This vaccine is now being produced by a parastatal organization, and negotiations are underway for marketing the product through a private distributor on a worldwide basis.

Support for Democracy: SR-CRSP provides a role model for democracy for those countries in which it works. The SR-CRSP administrative structure is based on consensus and collaboration between host country scientists and U.S. scientists, between U.S. scientists and the Management Entity, with agencies within the United States Government, and between the various administrative bodies such as the Board of Directors and the Technical Committee. In the host countries, democratic forums prioritize program activities and resource allocation. This gives direct evidence of the host country representatives and collaborating institutions participating in the democratic process. Thus, SR-CRSP provides a successful example of democracy, and this fosters similar actions within host countries. Extensive international networks and linkages forged by SR-CRSP scientists have further enhanced the concept of democracy at the global level.



The collaborative nature of SR-CRSP research fosters interaction and mutual understanding on a scientific as well as personal level.



This publication was made possible through support provided by the Office of Agriculture, Bureau for Research and Development,
U.S. Agency for International Development, under Grant No. DAN-1328-G-00-0046-00

For more information about the SR-CRSP, please contact:
Small Ruminant CRSP, University of California, Davis, California, 95616-8700, U.S.A.; telephone (916) 752-1721; fax (916) 752-7523

SR-CRSP does not discriminate on the basis of race, religion, color, national origin, sex or handicap.

Written and edited by Reed Merrill

 Printed on Recycled Paper