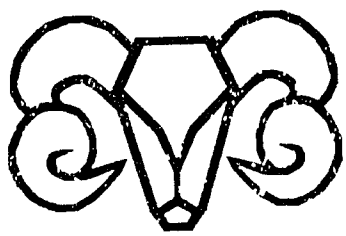
Small Ruminant Collaborative Research Support Program

Summary Report

Program Year Eight

1986-87



Small Ruminant CRSP
University of California
Davis, California 95616

COUNTRY	SR-CRSP DISCIPLINE	PRINCIPAL INVESTIGATOR	PRINCIPAL COUNTERPART
Brazil:	Animal Breeding & Management	M. Shelton	E.Figueiredo
	Animal Health	H. Olander	F.S. Alves
	Animal Nutrition	W.L. Johnson	N.N. Barros
	Economics	H. Knipscheer	J. Souza-Neto
	Range Management	J. Malechek	E. Oliveira
	Sociology	M. Nolan	M.C. Neumaier
Indonesia:	Animal Nutrition	W.L. Johnson	M. Rangkuti
	Economics	H. Knipscheer	A. Muljadi
	Genetic Improvement	E. Bradford	Subandriyo
	Sociology	M. Nolan	K. Suradisastra
Kenya:	Animal Breeding Systems Analysis	T. Cartwright	F. Ruvuna S. Tallum
	Animal Health	T. McGuire	F. Rurangirwa
	Economics	H. Knipscheer	F. Nyaribo
	Production Systems Feed Resources Nutrition/Management	H. Fitzhugh	M. Onim P. Semenye
	Sociology	M. Nolan	A.N. Mbabu
Morocco:	Genetic Improvement	G.E. Bradford	A. Lahlou-Kassi
	Nutrition	W.L. Johnson	F. Guessous
	Range	J. Malechek	H. Narjisse
	Sociology	M. Nolan	A. Hammoudi
Peru:	Animal Health	J. DeMartini	E. Ameghino
	Breeding & Management	P. Burfening	M. Carpio
	Economics	H. Knipscheer	D. Martinez
	Range Management Sociology	F. Bryant M. Nolan	A. Florez M. Fernandez

THE SMALL RUMINANT

COLLABORATIVE RESEARCH SUPPORT PROGRAM

(SR-CRSP)

SUMMARY REPORT

PROGRAM YEAR EIGHT

1986-1987

Edited and Compiled by the Management Entity

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SUMMARY OF ACCOMPLISHMENTS

The Concept of the CRSPs

The US, as the world's largest generator of surplus food, has provided aid to millions of hunger victims. Abundant harvests in the US have been widely distributed in acute disaster relief programs and on a regular basis to food deficient nations. However, as the world's populations burgeon, it has become apparent that supplying the hungry world with food through surplus distribution does not permanently alter the cycle of poverty and deprivation in LDCs. Recent famine in Africa has again demonstrated that the only long-term solution is to improve the capability of these areas to supply their own food.

To promote this goal, the US Congress passed the International Development and Food Assistance Act of 1975. Included in the act was Title XII - Famine Prevention and Freedom from Hunger which states: "...in order to prevent famine and establish freedom from hunger, the US should strengthen the capabilities of US land grant...universities in program-related agricultural institution development and research, ...improve their participation in the US government's international efforts to apply more effective agricultural sciences to the goal of increasing world food production, and in general should supply increased and longer-term support to the application of science to solving food and nutrition problems of the developing countries."

The act also specified that USAID administer and fund Title XII with money from their existing budget and authorized the President to create the Board of International Food and Agricultural Development (BIFAD) to initiate implementation of the act. BIFAD appointed the Joint Research Committee (JRC) to oversee the research-related aspects of Title XII. It was their recommendation that Title XII-sponsored research be implemented through Collaborative Research Support Programs (CRSPs). Among their suggested topics was small ruminants.

Fifty-six percent of the world's sheep and ninety-six percent of the world's goats are located in LDCs. They are owned primarily by small pastoralists and farmers of very limited means. Despite their low production, these animals contribute significantly to the economy and food supply in these regions and demand for their products exceeds the supply.

Improving the performance of small ruminants would directly improve the diet and standard of living of a great many people because the animals are inherently well-suited to the needs of smallholders and the conditions prevailing in the LDCs. For example, they:

- Have low initial and maintenance costs
- Are able to use marginal land and crop residues
- Produce milk and meat in small, readily usable quantities
- Produce fiber and skins which sustain cottage industries
- Are easily cared for by any member of the family

Statement of Goals

The primary goal of the Small Ruminant CRSP is to improve meat, milk and fiber production from sheep, alpacas and goats in order to increase the food supply and raise the income of the smallholder. In addition to gaining a better understanding and increasing the efficiency of subsistence level small ruminant production systems, a major objective of the program is to strengthen the research capacity of overseas and US agricultural institutions.

To accomplish these broad objectives, the SR-CRSP is providing leadership for interdisciplinary research programs and furnishing opportunities for advanced training of scientists interested in small ruminants. This results in increased numbers of professionals with the necessary analytical skills and motivation to engage in an organized effort to alleviate the problems confronting small ruminant producers. Publishing and disseminating SR-CRSP project results contributes to an enhanced data base for directing future research, designing sound management recommendations and formulating policy guidelines which mitigate the constraints on small ruminant productivity. Increased attention is being given to preparation of extension type material to inform developing country professionals who, in turn, will be expected to adapt it to their local conditions. The various projects involved in research in the overseas sites play a vital role in the fulfillment of these goals.

The individual projects of the SR-CRSP were designed to help alleviate some of the major problems which severely hinder small ruminant productivity in the less developed countries (LDCs).

Problem Area	Research Area
Inadequate year-round feed supply	Nutrition and Feeding
Improper grazing practices	Range Management
Poor reproductive performance	Research on reproduction in the male and female
Non-selective breeding	Genetic improvement of local breeds and crossbreds
Disease-Parasitism	Animal Health
Sub-optimum utilization of available resources	Management
Cultural constraints and lack of capital	Socio-Economic Research
Lack of coordination and integration in improvement efforts	Systems Research

The Small Ruminant CRSP has been in active operation since the middle of 1979 when the first subcontracts were awarded to participating institutions. The accomplishments of the SR-CRSP during the last eight years fall into three categories: research, training, and public service. A major report that describes these accomplishments is titled "Partners in Research" and was published in lieu of the 1982-1983 annual report. Further progress was documented in the 1983-84 Annual Report and 1985-86 Annual Reports. The 1986-87 Annual Report is assembled by Host Country with separate booklets for each country - Brazil, Indonesia, Kenya, Morocco and Kenya. This summary document only contains a brief report for each project by country. Further information is available from the Management Entity office.

The SR-CRSP Scientists, both US and foreign, have generated over 1,500 research reports, papers, abstracts and verbal presentation related to SR-CRSP activity. The publications generated within this program year are included in the country reports. A composite listing of all SR-CRSP program publications was also published this year.

The Organization of the SR-CRSP

The Management Entity (ME). Seventeen research proposals were selected to embark upon the first CRSP and the University of California, Davis, (UCD) was designated the Management Entity. A program director was appointed and three committees, each of which play a distinct role in the function of the SR-CRSP, were established. The organization structure was modified in program year eight to more closely follow the guidelines established by BIFAD.

The Technical Committee (TC) is an executive committee of the SR-CRSP which develops and implements research projects in the US and overseas. It consists of all Principal Investigators as well as one designated host country scientist.

The Board of Directors (BD) consists of seven members elected from the Administrative Council. The Board meets at least once annually to assess the content and balance of the Program and the adequacy of funding and resources, review the progress and accomplishments of the Program including research and training elements and technical services, review the general expenditure pattern of the Program and approve the annual budget plan for allocation of funds to component projects and work in host country sites, approves the addition or deletion of component projects and program elements and changes in program objectives.

The Administrative Council (AC) is an executive committee primarly concerned with budget review and policy issues. It consists of representatives from the administrations of the participating institutions and each participating host country. Meetings of the Administrative Council are convened from time to time by the Chairman or upon the written request of four or more members of the Council.

The External Evaluation Panel (EEP) is an advisory committee responsible for reviewing and evaluating CRSP research activities and

progress. It consists of a multi-disciplinary group of eminent scientists from institutions not participating in the CRSP.

Overseas Counterparts. Overseas counterparts at the level of higher administration and at the scientific levels have regularly attended and participated in the Technical Committee and Joint Technical Committee and Board meetings. In some countries, there are Program Administrative Committees (PACs) which solicit input about the SR-CRSP from ministry, university and international agencies. Host Country Representatives have full voting privileges on the Administrative Council and elect one representative to the Board of Directors. In program year nine host country representation will be added to the Technical Committee.

The SR-CRSP Budget

Initially the grants were favorable for research providing a two year funding horizon and a three year planning horizon for participants. Unfortunately this is no longer the situation. Three budget reductions were received for the 1984-85 and 1985-86 budget years. As of January 1987 the ME has received assurance of funding through April 30, 1988 at a reduced level.

SR-CRSP Overseas Worksites

The group of people toward whom the activities of SR-CRSP are directed are the limited resource producers in LDCs, such as smallholders and nomadic husbandmen. The problems unique to their situation make research overseas not only appropriate but essential if meaningful progress is to be made in improving small ruminant productivity under these conditions. Because the overseas research component of the SR-CRSP was considered the cornerstone of the project, great care was taken to select appropriate overseas worksites which met the following criteria.

- The sites are representative of the various ecozones and production systems encountered in the tropics. The applicability of SR-CRSP findings should extend beyond the borders of any nation in which the research was conducted and be useful in other areas of similar climate and topography.

- The countries in which the sites are located have established agricultural institutions which are staffed by scientists, trained personnel and students with whom the SR-CRSP investigators have an opportunity to collaborate. These institutions also provide the extension links which are pivotal to the implementation of SR-CRSP findings. The current overseas and collaborating institutions are:

  Brazil: Empresa Brasileira de Pesquisa Agropecuaria (EMBRAPA)
  Peru: Instituto Nacional de Investigacion y Promocion Agropecuaria (INIPA)

  Indonesia: Agency for Agricultural Research and Development (AARD)

Morocco:	Institut Agronomique et Veterinaire-Hassan II University (IAV)
Kenya:	Ministry of Agriculture and Livestock Development (MALD)

SUMMARY

ANNUAL REPORT FOR BRAZIL

1986/87

(Detailed Report Available as a Separate)

INTRODUCTION

Emphasis in 1986-87 was on summarization and presentation of results and accomplishments of the collaborative work in Brazil.

In April, 1986 a "State of the Art" Workshop involving Brazilian coworkers and U.S. counterparts was held at the Centro Nacional de Pesquisa de Caprinos, Sobral, Ceara, Brazil (CNPC). Forty four verbal presentations were made. The Proceedings entitled "Goats and Sheep in Northeast Brazil" in both Portuguese and English prepared by an editorial committee totaled 447 pages. Copies are available from the CNPC, Sobral or the Management Entity at the University of California, Davis (UCD).

The International Conference on Goats in Brasilia in March, 1987 offered another opportunity to extend CNPC-SR CRSP results to a world audience. The Conference was attended by 651 goat specialists from 45 countries. Small Ruminant Collaborative Research Support Program (SR-CRSP) personnel were prominent participants presenting 18 of the invited papers and reporting research results in 68 abstracts. The Proceedings are available from the Departmento de Difusao de Techologia - (DDT) - Empresa Brasiliera de Pesquisa Agropecuaria (EMBRAPA,) Brasilia, Brasil.

Although active research was phased down in 1987, communication between U.S. scientists and Brazilian scientists continues with minimal monetary support. As a summarization and to place the research accomplishments in context, two volumes are in preparation with joint authorship between former Principal Investigators and Brazilian scientists with PhD degrees obtained under SR-CRSP sponsorship. Professor William Johnson and Dr. Ederlon R. de Oliveira are writing "Improving Meat Goat Production in the Semi-arid Tropics" and Professor Shelton and Dr. Elsio A. P. Figueiredo are preparing "Tropical Hair Sheep Production." These should be available for distribution in 1988.

Maintaining linkages between Brazilian scientists and U.S. counterparts will be encouraged.

SUMMARY

ANNUAL REPORT FOR INDONESIA

1986/87

(Detailed Report Available as a Separate)

INTRODUCTION

Over the last decade there has been a significant increase in interest in the potential contribution that small ruminants (sheep and goats) can make in both traditional and transitional agricultural systems toward sustainable agricultural development. Currently, the levels of consumption of animal protein in Indonesia are quite low particularly in rural areas, due to a multiple of socioeconomic and institutional factors. Although sheep and goats contribute a relatively minor amount to the national protein supply, these animals play a major role in providing employment, food, income, and manure for the direct benefit of many small farmers and landless laborers.

The SR-CRSP is focused on bridging the gap between animal protein availability and minimum dietary requirements by directing research efforts on increasing sheep and goat production. In Indonesia, where there are nearly 20 million small farming households, small ruminants have several advantages over large ruminants such as buffalo and cattle. Sheep and goats are easier to care for and have a ready market. The initial investment required as well as maintenance costs are low. Furthermore, in the typical Indonesian mixed crop-livestock farming system, they are able to utilize marginal land and crop residues. They are also effective as a means to accumulate wealth while concurrently providing manure for fertilizer.

Recent research has illustrated that a significant gap exists between present village sheep and goat productivity and their potential. While a range of technologies exist to bridge this gap, there is inadequate communication between scientists, extension agents, and farmers. To meet the challenge of focusing relevant research on the variety of constraints of the small farmers and landless laborers, the Farming Systems Research and Development (FSR/D) model has been implemented at the Research Institute for Animal Production at Ciawi near Bogor, West Java.

The FSR/D approach has enjoyed significant expansion in many countries and illustrates on of the most up-to-date methodologies in agricultural research. The SR-CRSP has investigated the small farmers' social and economic objectives, institutional, financial, and environmental constraints and has analyzed this data in terms of national development objectives and improving small ruminant productivity at the farm level. The farming systems methodology for research provides a model for incorporating the diversity that exists among farmers throughout Indonesia into programmed efforts directed toward a variety of constraints in the small farming system. In Indonesia, the emphasis was

placed on two major systems, the cut-and-carry system which is dominant in Java, and the integrated rubber-sheep grazing system which has great potential for the Outer Islands, especially Sumatra.

The SR-CRSP has brought about close collaboration of a multidisciplinary team of Indonesian and expatriate scientists. The Central Research Institute for Animal Sciences (CRIAS) operates as the umbrella organization for implementing this research. The SR-CRSP involves collaboration of scientists from Research Institute for Animal Production (RIAP), Research Institute for Rubber (North Sumatra), University of California (Davis), North Carolina State University, University of Missouri, and Winrock International. The majority of this research concentrates on improvements in nutrition and breeding management.

During the project year 1986-1987, four major research areas were investigated: Genetic Improvement of Sheep and Goats; Economic Analysis of Small Ruminant Production and Marketing Systems, Nutrition and Feeding Systems for Small Ruminants, and a Sociological Analysis of Small Ruminant Production Systems. This research has provided a significant amount of relevant information for small ruminant production systems as well as identifying a number of critical genetic, nutritional, managerial, and sociological limitations to increasing productivity. The SR-CRSP has continued its effort to improve record collection and mating plans to avoid inbreeding and to record farmers' attitudes toward both sheep and goats. A comprehensive study of blood samples from sheep has been initiated to determine electrophoretic variants among selected geographic areas.

At the Cicadas station, ovulation rate data were collected to test the hypothesis of the major gene for prolificacy. The preliminary results have not yet provided conclusive evidence due to low nutrition levels of the flock throughout much of 1986. Evaluation research on contemporary hair sheep (local North Sumatra sheep x hair sheep) was conducted to investigate the survival and growth rate of animals grazed under rubber trees and on measurement of heat load stress. Indications are that the hair sheep crossbreds have excellent viability and illustrate superior growth rates compared to the local sheep.

As the economic analysis of small ruminant production and marketing systems continues, results thus far have been significant. Data gathered from farmers was analyzed to identify crucial problems in the adoption of technology packages. The data collection and analysis procedures have enhanced the training goals of the SR-CRSP professional staff. Data on research impact will be utilized to develop policy guidelines for improving small ruminant productivity and farmer incomes. This research illustrates the farming system/collaborative approach between agricultural institutions and farmers in order to ensure that the new technologies meet farmers needs.

Results from the Bogor research station on tree legumes as a dietary supplement have been encouraging. An analysis of the data indicates that with the addition of a relatively small amount of these legumes for sheep a significant improvement in animal performance occurs. In experiments on fiber utilization by mature goats, data analysis suggests that

zinc and a nitrogen supplement have positive effects on growth rates on goats fed native grasses. Preliminary research is continuing on sheep and goats fed banana leaves and stems as roughage. The data from this research will be summarized at a later date. In another research effort, feeding trials were conducted on the effect of sulfus on cyanide detoxification in diets for sheep and goats which contain cassava leaves. Research findings are pending final data analysis.

Research results from the Sungai Putih station on dietary supplementation for sheep have yielded significant results. Examples of this research include studies on the minimum level of energy supplementation for ewes grazed in rubber plantations, and investigations on palm kernel sludge as a supplement for sheep. Supporting research for the SR-CRSP was also conducted at North Carolina State University.

The sociological analysis sector of the project focused primarily on training and testing technology packages. These technology packages were developed through the Outreach Pilot Project (OPP), focusing on increasing farmers' management awareness of sheep and goats and demonstrating the viability of an integrated approach to agricultural research. Through the collaboration among the SR-CRSP subprograms, Indonesian and U.S. institutions, and farmers there is a continuous exchange of information to advance dynamic research process.

In collaboration with the breeding and nutrition programs, the sociology and economic programs are continuing to experiment with innovative ways to involve farmers in small ruminant research. In the past methods have included farmer meetings (RRFH: regular research field hearings), field trips, a video film, and competitions. This aspect of the research program will gain even more importance in the next 3 years as distinct management recommendations are being formulated.

Advanced training continues to be an integral component throughout the SR-CRSP project for degree-oriented study within Indonesia and in the U.S. At this juncture 18 students are pursuing graduate studies directed toward small ruminant research. A number of these are being funded in collaboration with the National Agricultural Research II (NAR-II) project which is funded by the World Bank and managed by Winrock International.

SUMMARY

ANNUAL REPORT FOR KENYA

1986/87

(Detailed Report Available as a Separate)

INTRODUCTION

Much of Western Kenya is blessed with fertile soils and a bimodal rainfall pattern allowing two cropping seasons per year. Unfortunately, wherever agricultural potential is high, human population is likely to be growing rapidly. Traditional agricultural systems become inappropriate--producing less food than is needed even for subsistence while often severely eroding the natural resource base. Changes in traditional systems are needed, if they are to provide the necessary balance of protein and energy food and generate additional income to improve the family living standard.

The Small Ruminant CRSP is addressing this problem in Kenya. The goal of the SR-CRSP is to develop dual-purpose goat (DPG) productions systems suited to the needs and resources of smallholders. Goats have many potential advantages in such systems. Their diet can consist of feeds which are by-products of food crops and browse from marginal lands. Keeping 3 to 5 does instead of a cow adds a small, but consistent, milk protein supplement to family diet year-round. Litters of 2 to 3 kids at 7- to 8-month intervals can also substantially increase offtake of slaughter stock for family consumption or marketing. Because goat meat is a highly desired product, goats have potential as a significant new "cash crop."

To meet the needs of smallholders, DPG production systems must be based on low-cost, low-risk technology and be minimally competitive--preferably complementary--with cropping activities. Research to develop appropriate DPG production systems involves the close collaboration among Kenyan and expatriate scientists. The Kenya Agricultural Research Institute and the Ministries of Agriculture and Livestock Development are the principal host country institutions. In addition, the SR-CRSP collaborates with scientists from the University of Nairobi, Egerton College, and other Kenyan institutions.

U.S. institutions participating in the SR-CRSP/Kenya include:
Texas A&M University--breeding, systems analysis
Washington State University--health
University of Missouri--sociology
Winrock International--economics, production systems (goat nutrition/management, feed resources)

The implementation strategy followed by the SR-CRSP in Kenya has involved a 3-stage process:

Stage 1 (1980-1982). Characterization of social-economic-biological activities of traditional farming systems; on-station component research in breeding health, goat nutrition, and agronomy.

Stage 2 (1983-1985). Monitor limited numbers of DPG on farms; scientist-managed, on-farm component research (agronomy, goat nutrition, health management); on-station component research in breeding, health, nutrition, and agronomy; preliminary cost/benefit and social feasibility analyses.

Stage 3 (1986-1990). Large-scale technical, economic, and social evaluation of DPG production systems under farmer management; component research--both on station and farm--continues.

Emphasis has been placed on a farming systems approach to ensure that research will be relevant to needs and resources of farmers in Western Kenya. In addition, the general principles and many of the specific technologies development by SR-CRSP should prove adaptable to farming systems in other parts of the tropics.

During 1986-1987, the potential of SR-CRSP research results for improving the welfare of small farm families became readily apparent. Research generated technologies such as vaccine for contagious caprine pleuropneumonia (CCP), which can be safely stored at room temperature, are ready for commercial utilization. Agronomic interventions such as fast-growing tree legumes (leucaena and sesbania) are being incorporated by private voluntary organizations (PVOs) in their local community development programs. Socioeconomic field surveys established the strong demand for milk by the people in the test region and the availability of sufficient family labor to support a dual-purpose goat component in the local farming systems.

Good progress was made in multiplication of dairy x local cross goats needed for the large scale on-farm evaluation of DPG technology packages slated to start in June 1988. Development of the four breed synthetic entered the breed stabilization and selection phase.

Additional highlights and details of research programs are presented in the separate project reports which follow.

The success of the SR-CRSP in Kenya demonstrates the advantages of a multidisciplinary farming systems approach. Significant benefits can be expected from the milk and meat produced by dual-purpose goats. Unfortunately, sharp reductions in available funding have and will continue to impact on the progress toward these research goals. Nevertheless, all involved in the SR-CRSP/Kenya team remain optimistic that research progress will continue and that the DPG technology packages will be successfully evaluated as planned.

SUMMARY

ANNUAL REPORT FOR MOROCCO

1986/87

(Detailed Report Available as a Separate)

INTRODUCTION

During 1986-87 three SR-CRSP projects were involved in work in Morocco: Sociology, Nutrition and Breeding. Cuts in USAID funding for the program as a whole, announced in early 1986, led to interruption of support for the Range project. One-year funding from the USAID Mission (Rabat) was provided to the Moroccan range scientists who have been working in the SR-CRSP, to continue portions of that work. However, no U.S. PI was involved, and the work is not included in this year's report. With the phase-out of the SR CRSP in Brazil at the end of 1986-87, the PI of the Brazil range project has been funded to work on range in Morocco, so there will be a range project included in 1987-88.

This was also a transition year for the Sociology project. The External Evaluation Panel, following a review in Morocco in mid-1985, recommended that the Sociology project shift the site of its activity from the High Atlas to the Tadla region, a different but also important sheep production area, where the biological projects have focused their work. This was agreed, but further funding cuts at the start of the 1986-87 program year necessitated a decision to terminate the Sociology project at the end of that year. This therefore represents the final report for the Sociology project in Morocco. As detailed in the attached project report, the year was devoted to summarizing the work from the High Atlas; one thesis research project is still in progress. Among results of particular interest from the project are identification of the units (family, village, tribe) involved in decisions on range land use, and the fact that different patterns exist in different areas. Results also showed that production was higher in transhumant systems utilizing zones from the plains to the mountains than in those utilizing a more limited range of ecological zones.

Work on the breeding project involved two principal emphases. Evaluation of D'Man and Sardi breeds, F_1's, F_2's and backcrosses continued at the Tadla Farm. Several papers detailing results on ovulation rate, prenatal survival, litter size and growth rate are nearly ready for submission to scientific journals. Three doctoral students at IAV are using data from the project for their dissertations, and senior faculty members from IAV presented papers in 1987 at meetings of the International Atomic Energy Commission and the European Association of Animal Production, on response of D'Man and Sardi ewes to different photoperiods, and on effect of natural heat stress on growth of lambs, respectively. Both studies involved several different genotypes from the Tadla flock.

The comprehensive sheep production manual being prepared for publication in English and in French brings together information from the CRSP in Morocco and from other sources. The focus is on cereal-sheep agricultural systems in Mediterranean climates, with particular emphasis on Morocco. The publication is expected to be ready for printing in early 1988.

The Nutrition project report presents information from several different trials. Cereal stubble and straw are very important sources of sheep feed in Morocco and in Mediterranean climates generally, and a major emphasis of the nutrition project at Tadla has been studies of stubble grazing. Work in earlier years involved pregnant ewes and showed that some supplementation late in the stubble grazing period was needed for normal lamb birth weights. Growing lambs were used in the 1986-87 trials, which showed that stubble without supplement promoted gain of lambs for about 4 weeks. After that, unsupplemented lambs lost weight, whereas those supplemented with 300g/day alfalfa or 130 g cottonseed meal continued to gain an additional 4 weeks but lost weight during the final 4 weeks of the 12-week trial. Both the ewe and lamb trials provided data on possible stocking rates on wheat stubble. Supporting work on strategies for supplementing straw-based diets were carried out in the U.S. Other studies in Morocco involved evaluation of feeding value of local by-products, and value of different mineral supplements.

All projects involved in the Morocco CRSP continued to be involved during 1986-87 in training of Moroccan scientists in the participating U.S. Institutions.

SUMMARY

ANNUAL REPORT FOR PERU

1986-87

(Detailed Report Available as a Separate)

INTRODUCTION

As Peruvian and U.S. researchers continue to investigate small ruminant production in Peru, new findings continue to emerge. Thus, the results also continue to have application to similiar eco-regions of other Andean countries like Bolivia, Ecuador, Columbia, Argentina, and Chile. Research has focused on sheep, and to a lesser extent, alpacas and llamas.

Genetic improvement and more recently, reproduction has been the mission of the Montana State University project. Their findings indicate that, for example, lambs born later in the lambing season had heavier birth weights, but decreased survival rates, and lighter body and fleece weights. Further, the heavier the dam at parturition, the greater the lamb birth weight, and the greater the chance the lamb will survive. It is interesting to note that even in the harsh Andean environment, genetic progress can be made from selection because all heritable estimates ranged from 0.04 to .24. They also found that traits like the survival and birth weight was .10 and .34 heritable, respectively. Working in the U.S., these researchers also have shown that long-term selection programs can markedly improve litter size in sheep.

Three important diseases found in Peru, which also occur in the U.S., have been targeted by Colorado State University for major research emphasis. These include ovine pulmonary carcinoma (OPC), ovine progressive pneumonia (OPP) and caprine arthritis-encephalitis (CAE). All three cause severe losses in Peru. Diseases of reproduction also have been studied to understand causes of infertility, abortion, stillbirth and perinatal mortality in Peru. The high prevalence of neonatal mortality in alpacas has been attributed to Clostridium perfringes, type A, enteropathogenic E. coli, and because dams apparently fail to transfer maternal antibodies. Peruvian colleagues of Colorado State University have launched massive research in Peru and the U.S. to understand all these diseases. Research in peasant communities also is underway to test livestock management and parasite control strategies.

Improved management strategies of small ruminants require knowledge of how herbivores grazing in common, partition the herbage resource. Furthermore, understanding the nutritional status of free-ranging animals is fundamental to improved management aimed at enhancing their nutrition. Peruvian colleagues of Texas Tech University have sought to define these relationships for small ruminants grazing native rangelands. Results show that alpacas have the most opportunistic feeding strategy and compete directly with llamas and/or sheep when range conditions vary. Thus, llamas and sheep could be managed together in a

production system, while alpacas should be managed alone. Current stocking ratios used in Peru are incorrect because, until now, no one has investigated voluntary intake levels of sheep, llamas, and alpacas. Their research shows that sheep consume more forage by far per kg of metabolic body weight ($BW^{.75}$) than either camelid. Stocking rates and ratios should be adjusted accordingly. In a related study, water deprivation of goats and sheep on the north coast of Peru indicated weight gain of both small ruminants are similarly affected.

Efforts by rural sociologists of the University of Missouri and economists of Winrock International have both focused on research in peasant communities. Their work has led to the development of strong linkages with communities and will provide the foundation of future research aimed at validating how well technology will transfer to family-oriented, community production systems in Peru. Termed "Participatory Action Research", their research approach goes beyond on-farm-trials to use peasants in identifying basic research problems. Further, they work with peasant families and strive to address organizational problems often associated with peasants, by increasing self confidence, organizational capabilities, and awareness of a collective ability to overcome problems. This important role of sociology and economics is required to test and refine technology packages which incorporate the research findings of Montana State, Colorado State, and Texas Tech Universities.

TRAINING-SR-CRSP SPONSORED STUDENTS IN DEGREE PROGRAMS IN US.

NAME	DEGREE	PROGRAM	TRAINING DATES	NATIVE COUNTRY
Aboud, Abdillahi[1]	MS Rural Sociology	Missouri	9/79 - 3/82	Kenya
Abunadba, Martha	MS Rural Sociology	Missouri	9/87 - 8/88	Peru
Adegoke, Adewald	MS Reproduction	Cal Poly	9/81 - 6/84	Nigeria
Aguirre-Terrazas, Lucrecia	MS Range Science	Texas Tech	12/83 - 12/85	Peru
Ahuya, C.O.	BS Animal Science	Texas A&M/Breeding	1/84 - 5/85	Kenya
Ahuya, C.O.	MS Animal Science	Texas A&B/Breeding	6/85 - 1/87	Kenya
El Aich, Ahmed[2]	PhD Range Management	Utah/Range	6/81 - 9/86	Morocco
Aitboulahsen, Ahmed[3]	PhD Animal Nutrition	North Carolina	1/86 - 12/89	Morocco
Ali Musa, Osheik[3]	PhD Pathology	Colorado	9/83 - 12/84	Sudan
Alves, Francisco Selmo A.	MS Comp. Pathology	UCD Health	5/85 - 5/88	Brazil
Anderson, Val[32]	MS Range Management	Utah/Range	6/82 - 5/85	US
Arnold, K[3]	MS Clinical Sciences	Colorado	6/82 - 6/83	Australian
Artz, Neil[32]	PhD Range Management	Utah/Range	6/81 - 3/83	US
Artz, Neil[32,43]	PhD Range Management	Missouri	8/84 - 12/84	US
Baker, Jerry[3]	PhD Animal Breeding	Texas A&M/Systems	9/79 - 12/81	US
Barbosa, Eneas L. R.	MS Range Management	Texas A&M/Breeding	6/83 - 9/85	Brazil
Bari, Johnson	MS Veterinary Microbiology	Washington	9/80 - 6/84	Kenya
Berkat, Omar[4]	PhD Range Science	Utah/Range	10/81 - 7/84	Morocco
Bilinsky, Paula[33]	MS Rural Sociology	Missouri	9/82 - 12/85	US
Blackburn, Harvey[35]	PhD Animal Breeding	Texas A&M/Systems	10/79 - 12/84	US
Boujenane, Ismail[40]	PhD Genetics	UCD Breeding	9/83 - 6/88	Morocco
Bojorquez, Custodio	MS Range Science	Texas Tech	1/84 - 12/86	Peru
Boor, Kathryn[3,53]	MS Food Science	Winrock/Systems	9/81 - 9/83	US

NAME	DEGREE	PROGRAM	TRAINING DATES	NATIVE COUNTRY
Bougi, Natalie[3]	MS Animal Breeding	Texas A&M/Breeding	1/84 - 5/86	Ivory Coast
Bourfia, Mohamed[38]	PhD Animal Breeding	UCD Breeding	9/85 - 1/86	Morocco
Bravo, Walter	MS Reproduction	Utah/Reproduction	3/84 - 6/86	Peru
Brenni, Geanlucca[3]	PhD Animal Breeding	Texas A&M/Systems	1/79 - 6/83	Switzerland
Brown, Lynn E.	MS/PhD Animal Nutrition	North Carolina	9/78 - 12/83	US
Brown, Corrie[34]	PhD Comp. Pathology	UCD Health	8/83 - 1/86	US
Burstein, Helaine[34]	PhD Animal Nutrition	North Carolina	9/81 - 12/85	US
Chafik, Azziz[28]	MS Animal Breeding	UCD Breeding	9/84 - 9/85	Morocco
Carey, Jim	MS Animal Science	Texas Tech	8/82 - 8/84	US
Castilla, Domingo Martinez[5]	MS Production Economics	Winrock/Economics	1/81 - 12/82	Peru
Castilla, Domingo Martinez[5]	PhD Agr. Economics	Winrock/Economics	8/86 - 8/89	Peru
Chavez, Juan F.[3]	PhD Biology	Montana	3/83 - 7/86	Peru
Clark, Dana	MS Reproduction	Utah/Reproduction	9/81 - 6/82	US
Coronado, Luis	MS Animal Breeding	Texas A&M/Systems	2/81 - 12/83	Peru
Derquaoui, Lahsen[41]	PhD Endocrinology	UCD Breeding	9/86 - 3/86	Morocco
Drobnis, Erma[3]	MS Animal Science	Cal Poly	4/79 - 8/81	US
East, Nancy[34]	MPVM	UCD Health	8/79 - 1/80	US
Ellis, John DVM[33]	PhD Pathology	Colorado	8/80 - 7/83	US
Elzo, Mauricio[3]	PhD Genetics	UCD Breeding	9/79 - 6/83	Chile
Estofanero, Manuel	MS Rural Sociology	Missouri	1/87 - 12/88	Peru
Farfan, Ramiro[6]	MS Range Management	Texas Tech	9/80 - 12/82	Peru
Fernandes, Antonio Amaury Oria[3]	MS Animal Breeding	Texas A&M/Breeding	9/82 - 12/84	Brazil

NAME	DEGREE	PROGRAM	TRAINING DATES	NATIVE COUNTRY
Fernandez, Maria [23]	MA Rural Social Dev.	Missouri	9/84 - 9/851	Peru
Fernandez, Maria [23]	PhD Development Studies	Missouri	10/85 - 9/88	Peru
Ferris, Charles	MS Reproduction	Utah/Reproduction	9/79 - 6/83	US
Fierro-Garcia, Carlos	PhD Range Science	Texas Tech	1/82 - 5/85	Mexico/Peru
de Figueirido, Elsio Antonio Pereira[3]	PhD Animal Breeding	Texas A&M/Breeding	7/84 - 5/86	Brazil
Flores, Enrique[6]	MS Range Management	Utah/Range	9/80 - 12/83	Peru
Flores, Enrique[3]	PhD Range Management	Utah/Range	4/85 - 3/88	Peru
Garcia, Laura[3]	MS Animal Science	Cal Poly	4/81 - 4/83	US
Garcia, Omar[3]	PhD Genetics	UCD Breeding	9/78 - 8/81	Venezuela
Garmendia, Antonio[3]	PhD Vet. Immunology	WSU/CSU	9/82 - 9/85	Peru
Gaskins, Rex[3]	MS Animal Nutrition	North Carolina	8/81 - 5/86	US
Gathuka, Zachariah[7]	MS Animal Breeding	Texas A&M/Breeding	9/80 - 5/82	Kenya
Gobena, Amanuel	PhD Range Science	Utah Range	1/84 - 6/88	Ethiopia
Gonzales, Gonzalo[3]	PhD Genetics	UCD Breeding	7/80 - 9/82	Uruguay
Gutierrez, Nestor [3, 8]	PhD Agricultural Economics	Winrock/Economics	10/79 - 1/83	Columbia
Hardesty, Linda Howell[34]	PhD Range Science	Utah/Range	12/81 - 9/86	US
Haryanto, Budi	MS Animal Nutrition	North Carolina	1/81 - 5/84	Indonesia
Haryanto, Budi[3]	PhD Animal Nutrition	North Carolina	1/81 - 12/87	Indonesia
Hatch, Patricia[3]	MS Animal Science	North Carolina	8/82 - 12/84	US
Hawariatt, Girma[3]	PhD Animal Breeding	Texas A&M/Systems	9/78 - 12/82	Ethiopia
Hoffman, L.[3]	PhD Biochemistry	Colorado	9/83 - 6/s7	US
Howard, Pamela Jo[9]	MS Marketing	Winrock/Economics	1/81 - 12/81	US
Howard, Pamela Jo[3]	PhD Animal Breeding	Texas A&M/Systems	9/82 - 9/88	US
Huapaya, Gladys	Animal Breeding	Montana	4/85 - 7/85	Peru

NAME	DEGREE	PROGRAM	TRAINING DATES	NATIVE COUNTRY
Hussein, Mohamed[3]	MS Range Management	Utah/Range	12/80 - 12/83	Sudan
Ilham[42]	PhD Animal Nutrition	North Carolina	7/84 - 6/87	Morocco
Inounu, Ismeth[37]	MS Animal Science	UCD Breeding	1/85 - 8/86	Indonesia
Jamtgaard, Keith[33]	MS Rural Sociology	Missouri	1/79 - 12/82	US
Jaramillo, Mauricio	MS Ag. Econ.	Winrock/Econ	6/84 - 5/85	Peru
Jimenez, Lidia	MS Rural Sociology	Missouri	9/81 - 1/85	Peru
Job, Morgan[10,35]	PhD Agricultural Economics	Winrock/Economics	6/80 - 12/82	Trinidad/Tobago
Khainga, Mohammed Salim[22]	MS Range Science	Texas Tech	8/84 - 9/85	Kenya
Kibuchi, James N. [11]	MS Animal Management	Winrock/Management	9/80 - 7/82	Kenya
Kimotho, Judith W. [12]	MS Animal Science	Cal Poly	8/81 - 6/84	Kenya
Kiriro, Philip	BS Animal Breeding	Texas A&M/Breeding	1/81 - 6/83	Kenya
Kirmse, Robert[34]	PhD Range Science	Utah Range	4/82 - 12/84	US
Kooyman, David[3]	MS Animal Science	Cal Poly	8/82 - 6/84	US
Kronberg, Scott[34]	PhD Range Science	Utah Range	9/83 - 12/88	US
Krown, Kevin	MS Reproduction	Cal Poly	9/82 - 6/86	US
Lairmore, M.D.[3]	PhD Pathology	Colorado	9/83 - 7/87	US
Lasslo, Laurel[3]	PhD Genetics	UCD Breeding	9/78 - 6/82	US
Lentz, E. L.	PhD Animal Breeding	Texas A&M/Breeding	12/86 - 12/88	US
Leonard, Ellen	MS Animal Science	North Carolina	9/83 - 12/86	US
Lewis, Ron[3]	MS Animal Breeding	Texas A&M/Breeding	9/83 - 9/86	US
Luginbuhl, Jean-Marie[32]	PhD Animal Nutrition	North Carolina	6/79 - 1/83	Switzerland
Mann, Debora[3]	MS Animal Science	North Carolina	9/78 - 7/84	US
Mandari, Godfrey[12]	MS Animal Science	Cal Poly	8/80 - 8/82	Tanzania
Mathenge, James	MS Animal Breeding	Texas A&M/Breeding	6/80 - 12/81	Kenya

NAME	DEGREE	PROGRAM	TRAINING DATES	NATIVE COUNTRY
Mathuva, Moses[23]	MS Animal Production	Winrock/Management	9/82 - 12/83	Kenya
Mbabu, Adiel Nkonge	PhD Rural Sociology	Missouri	8/84 - 6/88	Kenya
Mbwiria, Stanley	MS Veterinary Physiology	Washington	4/81 - 4/84	Kenya
McCorkle, Constance[13,33]	PhD Anthropology	Missouri	2/80 - 12/82	US
Mendes, Lloyd[25,32]	PhD Range Management	Missouri	4/84 - 11/85	US
Mesquita, Roberto[3]	MS Range Science	Utah/Range	9/82 - 6/85	Brazil
Mink, Steve[3]	PhD Ag. Ecn.	Winrock/Economics	6/80 - 12/80	US
Mole, Jane	PhD Reproduction	Utah/Repro	1/82 - 6/84	US
de Moraes, Elino A.[3]	PhD Range Science	Texas A&M/Breeding	9/81 - 9/85	Brazil
Mortimer, Dana Lee[14,35]	MS Animal Health	Winrock/Economics Washington	6/79 - 5/82	US
Mounsif, Mohamed[39]	MS Range Science	Texas Tech	5/85 - 12/86	Morocco
Muhuyi, William [12]	MS Animal Science	Cal Poly	6/80 - 6/82	Kenya
Mukisira, Ephraim[15]	MS Ruminant Nutrition	Winrock/Management	8/82 - 8/84	Kenya
Muljadi, Agus[3],	PhD Production Economics	Winrock/Economics	9/87 - 9/90	Indonesia
Muljadi, Agus[16]	MS Production Economics	Winrock/Economics	5/81 - 7/83	Indonesia
Mwamachi, Derrick	MS Veterinary Immunology	Washington	3/83 - 3/86	Kenya
Mwandotto, Bonfance[3]	PhD Animal Breeding	Texas A&M/Systems	9/81 - 6/84	Kenya
Narjisse, Hamid[3]	PhD Range Management	Utah/Range	8/79 - 5/81	Morocco
Neira, Roberto[3]	PhD Animal Genetics	UCD Breeding	4/81 - 8/82	Chile
Nelson, T.C.	PhD Animal Breeding	Texas A&M/Systems	8/79 - 7/80	US
Nelson, Dennis[22]	PhD Comp. Pathology	Colorado	7/83 - 7/84	US
Neumaier, Marisa[3]	MS Rural Sociology	Missouri	6/81 - 8/83	Brazil
Nieves, R.[3]	MS Microbiology	Colorado	1/85 - 3/87	US
Njanja, J.	MS Veterinary Parasitology	Washington	4/82 - 4/85	Kenya

NAME	DEGREE	PROGRAM	TRAINING DATES	NATIVE COUNTRY
Noble, Amanda[35]	MS Rural Sociology	Missouri	9/79 - 8/82	US
Nolte, M. Enrique[17]	PhD Agronomy	Ohio St./Texas Tech	8/81 - 11/84	Peru
Norris, Therese[3]	MS Physiology/Reproduction	Texas A&M/Systems	9/84 - 9/86	US
Novoa, Cesar	PhD Repro. Physiology	Utah/Reproduction	1/81 - 9/84	Peru
Nyaribo, Fanny[14]	PhD Agricultural Econ.	Winrock/Economics	8/84 - 6/88	Kenya
Odenya, William[7]	MS Animal Science	UCD Breeding	9/80 - 9/82	Kenya
Okeyo-Mwai, Alfeyo[31]	MS Animal Science	Texas A&M/Breeding	9/81 - 6/84	Kenya
Oliveira, Ederlon[3]	PhD Range Science	Utah/Range	9/83 - 5/87	Brazil
Oluoch, Elizabeth[3]	MS Veterinary Immunology	Washington	9/84 - 9/85	Kenya
Otieno, Kenneth[23]	MS Science & Plant Ag	Winrock/Systems	9/84 - 10/85	Kenya
Padilha C., Terezinha	PhD Comp. Pathology	UCD Health	1/82 - 12/85	Brazil
Page, Frank[3]	MS Ag. Econ.	Winrock/Economics	7/83 - 9/83	US
Perevolotsky, Avi[18,33]	PhD Anthropology	Missouri	8/81 - 9/83	Israel
Pfister, James A.[34]	PhD Range Science	Utah/Range	9/79 - 6/83	US
Pitts, John	MS Range Science	Texas Tech	1/82 - 12/83	US
Prabowo, Achmed[3], [9]	PhD Animal Nutrition	North Carolina	10/86 - 9/88	
Prabowo, Achmed[3]	MS Animal Nutrition	North Carolina	1/84 - 9/86	Indonesia
Queiroz, Joao S. de[34]	PhD Range Management	Utah/Range	4/80 - 12/85	Brazil
Quiroz, Roberto	MS Animal Nutrition	North Carolina	5/82 - 8/84	Panama
Quiroz, Roberto	PhD Animal nutrition	North Carolina	8/84 - 8/86	Panama
Ramirez, Antonio	PhD Microbiology	Colorado	6/82 - 3/87	Peru
Reeh, Donald[3]	MS Animal Production	Texas A&M/Breeding	9/84 - 9/86	US
Reese, Alice[36]	PhD Nutrition	North Carolina	8/84 - 8/86	US
Rege, Edward [44]	PhD Genetics	UCD Breeding	9/80 - 12/84	Kenya
Reiner, Richard[33]	PhD Range Science	Texas Tech	6/82 - 5/85	US

NAME	DEGREE	PROGRAM	TRAINING DATES	NATIVE COUNTRY
Rihani, Nacif[31]	PhD Animal Nutrition	North Carlina	8/85 - 8/88	Morocco
Ripley, Laura[3]	PhD Animal Nutrition.	Texas A&M/Breeding	1/86 - 12/87	US
Rivera, Linda[30]	Virology/Serology	Colorado	2/84 - 2/85	Peru
Rosadio, Raul	PhD Vet Pathology	Colorado	9/83 - 3/87	Peru
Rotich, Daniel[3]	MS Animal Science	Cal Poly	6/82 - 6/85	Kenya
Samsell, Lennie[3]	MS Animal Science	North Carolina	9/83 - 7/86	US
Sands, Michael[19,35]	PhD Animal Science	Winrock/Management	1/80 - 8/82	US
San Martin, Felipe	PhD Range Science	Texas Tech	1/84 - 10/87	Peru
Schacht, Walter[34]	PhD Range Science	Utah/Range	1/84 - 12/86	US
Schoenian, S.[3]	MS Animal & Range Sciences	Montana	8/84 - 8/86	US
Shavulimo, R.[23]	MS Parasitology	Washington	10/83 - 10/85	Kenya
Shompole, Patrick	MS Veterinary Microbiology	Washington	3/85 - 9/88	Kenya
daSilva, Jose. E.[3]	PhD Animal Nutrition	North Carolina	1/79 - 2/81	Brazil
Silitonga, Sorta[20]	MS Animal Nutrition	North Carolina	4/81 - 12/82	Indonesia
Simplicio, Aurino [3]	PhD Repro. Physiology	Utah/Reproduction	8/82 - 12/85	Brazil
Smith, Barbara[3]	MS Animal Science	North Carolina	1/84 - 12/87	US
Snowder, Gary	PhD Animal Breeding	Texas A&M/Breeding	9/84 - 12/87	US
Soedjana, Tjeddy[26]	PhD Agricultual Econ.	Winrock/Economics	8/84 - 8/87	Indonesia
Soltero, Segio	MS Range Management	Texas Tech	1/85 - 12/86	Mexico
de Sousa, Wandrick Haus	MS Animal Breeding	Texas A&M/Breeding	7/85 - 12/87	Brazil
Spinhove, Ginette	MS Agr. Sciences	Winrock/Economics	10/85 - 4/86	Holland
Subandriyo [5]	PhD Animal Breeding	UCD Genetics	8/87 - 8/90	Indonesia
Subandriyo[21]	MS Animal Breeding	UCD Genetics	3/82 - 6/84	Indonesia
Suda, Collette[3]	PhD Rural Sociology	Missouri	6/82 - 5/86	Kenya
Suradisastra, Kedi	MS Rural Sociology	Missouri	1/81 - 1/83	Indonesia

NAME	DEGREE	PROGRAM	TRAINING DATES	NATIVE COUNTRY
Suradisastra, Kedi[3]	PhD Agricultural Ed.	Missouri	2/83 - 12/87	Indonesia
Schwartz, Maura[3]	MS Int. Agr. Devel.	UCD Breeding	9/85 - 9/87	US
Swindale, Anne[27,33]	MS Rural Sociology	Winrock/Econ	1/84 - 12/84	US
Tallum, Steven	MS Animal Science	Texas A&M/Systems	1/83 - 12/85	Kenya
Tiesnamurti, Bess[29]	MS Animal Science	UCD Breeding	1/85 - 6/87	Indonesia
Tulley, Druska	MS Repro Phys & An Sci	Montana	9/79 - 8/81	US
Ubiraci, Jose	MS Reproduction	Utah/Reproduction	5/81 - 6/84	Brazil
Valdivia, Corinne[5]	MS Agricultural Policy	Winrock/Economics	1/81 - 12/83	Peru
Valdivia, Corinne[5]	PhD Agr. Economics	Winrock/Economics	8/86 - 8/89	Peru
Villalta, Pedro	MS Reproduction	Utah/Reproduction	9/84 - 6/86	Peru
Villena, Francis[3]	MS Range Management	Texas Tech	12/85 - 10/87	Peru
Vivanco, H. William	MS Reproduction	Cal Poly	9/81 - 6/83	Peru
Vivanco, H. William	PhD Reproduction	Utah Reproduction	12/86 - 12/88	Peru
Waghela, Suryakant	PhD Veterinary Immunology	Washington	9/84 - 9/88	Kenya
Wilcox, Brad[33]	MS Range Management	Texas Tech	1/80 - 12/82	US
Willingham, Timothy [3]	MS Physiology Reproduction	Texas A&M/Breeding	9/82 - 9/87	US
Woldehawariat, G.	PhD Animal Breeding	Texas A&M/Systems	9/79 - 9/81	Ethiopia

FOOTNOTES

[1] Attending Ohio State University; thesis research supported by Missouri

[2] Attending Colorado State; partial support

[3] Partial support

[4] At Texas A&M, but overseas research supported by Utah and Texas Tech

[5] Attended University of Missouri

[6] Partially supported by LASPAU

[7] Partially supported by FAO

[8] Attended Purdue University

[9] Attended University of Florida

[10] Attended Purdue University

[11] Attended Tuskegee Institute

[12] Partially supported by USDA

[13] Attended Stanford University; thesis research supported by University of Missouri

[14] Attending Washington State University

[15] Attended Louisiana State University

[16] Attended Texas A&M University

[17] Final support by Texas Tech

[18] Attended University of California, Davis; thesis research supported by University of Missouri

[19] Attended Cornell University

[20] Attended University of Minnesota

[21] Attended Montana State

[22] Studies discontinuted student will not complete the program.

[23] Attending University of Reading, UK

[24] Study site, Sumatra

[25] Degree from Utah State, study site Morocco

[26] Attending Oklahoma State University

[27] Attended Tufts University

[28] Supported by Minnesota/IAV Training Program

[29]Attending UCD, support from World Bank fellowship.

[30]Attended one year of training, S. Dakota State University, SR-CRSP supported travel and per diem

[31]Attended University of California

[32]Research conducted in Morocco

[33]Research conducted in Peru

[34]Research conducted in Brazil

[35]Research conducted in Kenya

[36]Research conducted in Indonesia

[37]Attended Oregon State supported by World Bank Fellowship. Will complete degree at IPB Bogor

[38]Support 11 weeks at UCD working on doctoral disertation

[39]Supported by University of Minnesota program, training at Texas Tech

[40]Supported by Uiv. Of Minnesota/IAV Training Program

[41]Currently in Morocco conducting research SR-CRSP support provided for research work in Morocco

[42]Research support only

[43]Partial support, 1 semester at Missouri while working on dissertation

[44]Partially supported by World Bank Fellowship

[45]Studies at the University of the Philippines, Los Banos (UPLB)

TRAINING OF OVERSEAS DEGREE CANDIDATES OVERSEAS WITH CRSP SUPPORT

STUDENT	PROGRAM/INSTITUTION	SUPPORT	DATES	NATIVE COUNTRY
Abdoulhouda, Youssef	2eme Animal Production National School of Ag., Meknes	North Carolina	10/84 - 7/85	Comoro Islands
Acata, S. Ortega	MS Range Science UNA, La Molina	Texas Tech	1/84 - 12/85	Peru
Aguirre, Lucrecia[1]	Licenciatura-BA University of Cuzco	Missouri	9/81 - 9/82	Peru
Ait Mhamd, Thami[3]	3eme cycle Range Management Hassan II	Utah/Range	9/82 - 7/83	Morocco
Alarcon, Victor	MS Reproduction UNS, La Molina, Lima	Utah/Reproduction	1/85 - 12/86	Peru
Alarcon, Virgilio	BS UNA, Lima	Utah/Reproduction	1/85 - 12/86	Peru
Alcarraz, R. Roque	MS Range Science UNA, La Molina	Texas Tech	1/84 - 12/85	Peru
Alves, Jose U.	MS Mgmt. Reproduction Santa Maria University	Utah/Repro	5/82 - 4/85	Brazil
Amuhinda, P.[2]	Diploma Course Social Development Kenya Institute of Admin.	Missouri	2/86 - 9/86	Kenya
Aries, C. J.	MS Range Science UNA, La Molina	Texas Tech	12/81 - 12/83	Peru
de Assis-Arruda, Francisco	MS Animal Husbandry Federal University of Ceara	North Carolina	1/80 - 12/83	Brazil
Atamara, Ponce	MS Range Management UNTA, Puno	Texas Tech	1/86 - 10/87	Peru

STUDENT	PROGRAM/INSTITUTION	SUPPORT	DATES	NATIVE COUNTRY
Barrera, Mercedes[2]	BS Ag. Econ. Nat. Agrarian Univ. (La Molina)	MSU/Win. Econ.	10/84 - 9/85	Peru
Berrami, Ali	3eme cycle Animal Nutrition Hassan II	North Carolina	10/84 - 7/85	Morocco
Boumrifag, Mohamed	2eme Animal Production Nat. School of Ag., Meknes	North Carolina	10/84 - 7/85	Morocco
Boujenane, Ismail[3]	PhD Genetics IAV, Hassan II, Rabat	UCD Genetics	82-88	Morocco
Bouzekraoui, A[3]	2 eme Animal Science Nat. School of lAg., Meknes	North Carolina	10/81 - 7/83	Morocco
Bueno S., Juan	MS Animal Breeding Nat. Agrarian University, Lima	Montana	7/81 - indefinite	Peru
Bueno, Luiz Juan	Ing. Agr. Nat. Agrarian University, Lima	Texas Tech	1/80 - 12/82	Peru
Cabrera, Prospero	MS Animal Breeding Nat. Agrarian University, Lima	Montana State	3/80 - 1/87	Peru
Caldas, Willi[1]	BA Nat. Agrarian University, Lima	Missouri	9/81 - 9/82	Peru
Camara, Fode[3],	2eme Animal Production Nat. School of Ag., Meknes	North Carolina	10/86 - 9/87	Niger
Cavieri, A. [2]	BS Univ. Richardo Palma	Colorado	11/84 - 12/85	Peru
Chavez, Diana	Ing. Zootechista Nat. Agrarian University, Lima	Montana State	7/81 - 7/87	Peru

STUDENT	PROGRAM/INSTITUTION	SUPPORT	DATES	NATIVE COUNTRY
Chebabi, Hamid[3]	2eme Animal Production Nat. School of Ag., Meknes	North Carolina	10/86 - 9/87	Morocco
Chergaoui, Abdelaziz[3]	3eme cycle Range Management Hassan II	Utah/Range	9/80 - 3/82	Morocco
de Costa, Odorico	MS Marketing Federal University of Ceara	Winrock/Economics	11/80 - 2/82	Brazil
Coulibaly, Modibo	2eme Animal Production Nat. School of Ag., Meknes	North Carolina	10/84 - 7/85	Mali
Cruces, Martha	Ing. Agr. - Ag. Economics Nat. Agrarian University, Lima	Winrock/Economics	11/80 - 12/83	Peru
Cruz, Etelmira[2]	BS Anthropology Univ. of San Agustin (Arequipa)	Missouri	8/83 - 7/84	Peru
Cutipa, Flore[2]	BS Anthropology Univ. of San Agustin (Arequipa)	Missouri	8/83 - 7/84	Peru
Darfaoui, El Mostafa[3]	3eme cycle Range Management Hassan II	Utah/Range	9/81 - 7/82	Morocco
Derqaoui, Lahsen [3]	phD Endocrinology IAV, Hassan II, Rabat	UCD Genetics	82-88	Morocco
Diaz, Roxana	Ing. Agr. - Ag. Economics Nat. Agrarian University Lima	Winrock/Economics	11/80 - 9/82	Peru
Domingo, Santo	MS Clinical Pathology Fed. Univ. Of Pernambucei, Recife	UCD Health	6/85 - 6/87	Brazil
Ennaciri, Khadouj[3]	2eme Animal Production Nat. School of Ag., Meknes	North Carolina	10/86 - 9/87	Morocco

STUDENT	PROGRAM/INSTITUTION	SUPPORT	DATES	NATIVE COUNTRY
Escalante, Victor[1]	Licenciatura University of Cuzco	Missouri	9/81 - 9/82	Peru
Essadi, M[2]	2eme cycle Animal Science ENA Meknes	North Carolina	10/81 - 7/83	Morocco
Fadili, Moussa El	3eme cycle Animal Nutrition Hassan II	North Carolina	10/83 - 7/85	Morocco
Gamarra, Jorge[4]	Ing. Agr Nat. Agrarian University, Lima	Texas Tech	9/82 - 12/84	Peru
Garay, Gladys	Ing. Zootechista Nat. Agrarian University, Lima	Montana	3/82 - 3/85	Peru
Garay, Gladys	MS Animal Breeding Nat. Agrarian University, Lima	Montana	3/85 - indefinite	Peru
Garcia, H.	MS Range Science U.N. Pedro Ruiz Gallo, Lambayeque	Texas Tech	1/82 - 12/82	Peru
Garcia, J. Chafloque	MS Range Science U.N. Pedro Ruiz Gallo, Lambayeque	Texas Tech	1/82 - 12/82	Peru
Gonzalez, Cristobal[2]	MS Anthropology Univ. of San Agustin (Arequipa)	Missouri	8/83 - 7/84	Peru
Gonzalez, E.	MS Range Science UNA, La Molina	Texas Tech	9/83 - 5/85	Peru
Grados, Alfredo	Ing. Zootechnista Nat. Agrarian University, Lima	Montana	3/82 - 3/84	Peru
Grados, Alfredo	MS Animal Breeding Univ. Nacional Agraria, La Molina	Montana State	4/84 - indefinite	Peru

STUDENT	PROGRAM/INSTITUTION	SUPPORT	DATES	NATIVE COUNTRY
Guimaraes, Watson	MS - Nutrition Ceara Federal Univ.	North Carolina	1/86 - 12/87	Brazil
Gutierrez, Carlos	DVM San Marcos University, Lima	Texas Tech	1/80 - 5/83	Peru
el Haddani, Mohamed	2eme Animal Production National School of Ag., Meknes	North Carolina	10/84 - 7/85	Morocco
Hafidi, M[3]	2eme Animal Science National School of Ag., Meknes	North Carolina	10/81 - 7/83	Morocco
Hanafiah, Ahmed	B.S. Animal Science Bogor Agricultural Institute	North Carolina	9/84 - 9/87	Indonesia
Harkousse, Mohammed[2,3]	3eme cycle Range Management Hassan II	Utah/Range	9/81 - 7/82	Morocco
Hazzam, Rachida[3]	2eme Animal Production Nat. School of Ag., Meknes	North Carolina	10/86 - 9/87	Morocco
Hilali, Ahmed[3]	3eme cycle Animal Nutrition Hassan II	North Carolina	10/85 - 7/86	Morocco
El Honsali, Mohammed[3]	3eme cycle Range Management Hassan II	Utah/Range	9/82 - 7/83	Morocco
Huayhua, Juan	MS Animal Breeding Univ. Nacional Agraria, La Molina	Montana	9/84 - indefinite	Peru
Huapaya, Gladys	MS - Animal Breeding Nat. Agrarian University, Lima	Montana	3/80 - 4/85	Peru
Huisa, Timoteo	MS Range Enginero Cusco University	Texas Tech	1/84 - 8/85	Peru

STUDENT	PROGRAM/INSTITUTION	SUPPORT	DATES	NATIVE COUNTRY
Igmoullan, Ahmed	3eme cycle Animal Nutrition Hassan II	North Carolina	10/81 - 7/82	Morocco
Kabbali, Ahmed[3]	PhD Animal Nutrition Hassan II	North Carolina	11/86 - 2/86	Morocco
Khal, Mohamed	3eme cycle Animal Nutriton Hassan II	North Caroiina	10/81 - 7/82	Morocco
Kiguhi, H. [2]	Certificate Course -Social Development, Maseno Gov. Training Institute	Missouri	2/86 - 9/86	Kenya
Kitivo, Daniel	MS Grassland Science Reading University	CRSP Exchange Funds	8/82 - 12/83	Kenya
Koundouno, Angeline[3]	2eme Animal Production Nat. School of Ag., Meknes	North Carolina	10/86 - 9/87	Guinea
Koyandondri, Leon	2eme Agricultural Economics National School of Ag., Meknes	North Carolina	10/84 - 7/85	Central Africa
Larez, Ivan	Ing. Agr. Nat. Agrarian University, Lima	Texas Tech	6/80 - 12/82	Peru
Legdali, Nadia	2eme cycle Animal Production National School of Ag, Meknes	North Carolina	10/83 - 7/84	Morocco
Lemharzi, L[2]	2eme Animal Science National School of Ag., Meknes	North Carolina	10/82 - 7/84	Morocco
Llerena, Gorki	Licenciatura Econ. and Marketing Nat. Agrarian University, Lima	Winrock/Economics	11/80 - 1/82	Peru
Lopez, Manuel	M.S. Animal Production Nat. Agrarian University	Montana	10/86 - 10/88	Peru

STUDENT	PROGRAM/INSTITUTION	SUPPORT	DATES	NATIVE COUNTRY
Lopez, Manuel	Ing. Zootechista Univ. Nacional Agraria, La Molina	Montana	3/83 - 9/86	Peru
Lopez, Victor	Ing. Zootechista Nat. Agrarian University, Lima	Montana	Completed 1981	Peru
Machuca, Juan	Ing. Agr. - Ag. Economics Nat. Agrarian University, Lima	Winrock/Economics	9/80 - 9/81	Peru
Maharzi, Latifa El	2eme Animal Production National School of Ag, Meknes	North Carolina	10/83 - 7/84	Mali
Mamani, Loio[2]	BS Anthropology Univ. of San Agustin (Arequipa)	Missouri	8/83 - 7/84	Peru
Mara, Sandra	MS Animal Science Fed. Univ. of Ceara	Utah/Range	1/84 - 3/86	Brazil
Mathuva, Moses	MS Grassland Science Reading University	Winrock/Management	8/82 - 12/83	Kenya
Mawi, Syahrir	MS Sociology Institut Pertanian, Bogor	Missouri	8/82 - 8/84	Indonesia
Maurique, Juan	Ing. Zootechista Centro Nat. Univ. Huancayo	Montana	3/82 - 3/84	Peru
Meneses, Norma[2]	BA Linquisitics San Marcos Univ.	Missouri	5/85 - 5/86	Peru
Millones, Luiz[2]	Licenciatura National Agrarian Univ., Lima	Winrock/Economics	12/81 - 1/83	Peru
Montesinos, Maria E.	Medico Veterinario y Zootechista UNTA-Puno	Montana	11/81 - 12/83	Peru

STUDENT	PROGRAM/INSTITUTION	SUPPORT	DATES	NATIVE COUNTRY
Moura Fe, Fatima	MS Animal Science Federal University of Ceara	Winrock/Economics	8/81 - 8/83	Brazil
Mountassir, N.[2]	2eme Animal Science National School of Ag., Meknes	North Carolina	10/81 - 7/83	Morocco
Nascimento, Edna[1]	MS Range Management Federal University of Ceara	Texas A&M/Breeding	9/81 - 9/85	Brazil
Ochieng, E.[2]	Certificate Course Social Development/Maseno Gov. Training Institute	Missouri	2/86/ 9/86	Kenya
Ogada, Henry[1]	MS Agricultural Economics Nairobi University	Winrock/Economics	11/84 - 9/85	Kenya
Oscanoa, Luis	MS Range Science UNA, La Molina, Lima	Texas Tech	6/84 - 12/85	Peru
Otieno, E[2]	Certificate Course Social Development/Maseno Gov. Training Institute	Missouri	2/ 86 - 9/86	Kenya
Ouchkif, M.[3]	3eme Animal Production Hassan II	North Carolina	10/86 - 9/87	Morocco
Oumzai, Fatima	2eme cycle An. Production National School of Ag., Meknes	North Carolina	10/83 - 7/84	Morocco
Peralta, A.P. Silva	MS Range Science U.N. Pedro Ruiz Gallo, Lambayeque	Texas Tech	1/84 - 5/86	Peru
Pinares, Cesar	BS UNA, Lima	Utah/Reproduction	85 - 86	Peru
Pinares, Cesar	MS UNA - La Molina, Lima	Utah Reproduction	86 - 87	Peru

STUDENT	PROGRAM/INSTITUTION	SUPPORT	DATES	NATIVE COUNTRY
Pinontoan, R. [3]	S1 , Animal Nutrition BPT	North Carolina	86 - 87	Indonesia
Priyanto, Dwi	BS Animal Science Bogor Agricultural Institute	North Carolina	9/84 - 9/87	Indonesia
Ponce, Gonzalez A.	MS Range Science UNTA, Puno	Texas Tech	1/84 - 5/86	Peru
Puchuri, J. [3]	DVM San Marcos Uiv.	Colorado	6/84 - 6/85	Peru
Pulungan, Hamzah	PhD Animal Nutrition Bogor Agricultural Institute	North Carolina	1/85 - 1/88	Indonesia
Quevedo, Pilar	MS Animal Production Nat. Agrarian University	Montana	4/86 - 4/88	Peru
Quevedo, Pilar	Ing. Zootechista Nat. Agrarian Univ. Lima	Montana	3/84 - 3/86	Peru
Rahal, Boudour Ben	2eme Agricultural Economics National School of Ag., Meknes	North Carolina	10/84 - 7/85	Morocco
Rios, Maria	DVM San Marcos University, Lima	Texas Tech/ Colorado	6/80 - 6/81 2/82 - 7/82	Peru
Rodriguez, Humberto	MS Animal Breeding Nat. Agrarian University, Lima	Montana	3/80 - 4/81	Peru
Rodriguez, Nellie	MS Range Science UNA, La Molina, Lima	Texas Tech	6/82 - 5/84	Peru
Rojas, Corina[2]	BS Anthropology Univ. of San Agustin (Arequipa)	Missouri	8/83 - 7/84	Peru

STUDENT	PROGRAM/INSTITUTION	SUPPORT	DATES	NATIVE COUNTRY
Rogue, Juan	MS Animal Breeding Nat. Agrarian University, Lima	Montana	7/81 - indefinite	Peru
Ruiton, Jesus	Ing. Agr. - Ag. Economics Nat. Agrarian University, Lima	Winrock/Economics	1/80 - 9/82	Peru
Sabrani, M.[2]	PhD Agricultural Economics Gadja Mada Univ., Jakarta	Winrock/Economics	6/82 - 12/84	Indonesia
Saonoun, Abdelatif	3eme cycle Animal Nutrition Hassan II	North Carolina	10/81 - 7/82	Morocco
Salazar, Eler	BS Reproduction UNC, Huancayo	Utah/Reproduction	85 - 86	Peru
Sali, Laaziza[3]	2eme Animal Production Nat. School of Ag., Meknes	North Carolina	10/86 - 9/87	Morocco
Santos, Maximiano	Ing. Zootechista Centro Nat. Univ. Huancayo	Montana	3/82 - 3/85	Peru
Semega, Djibril	2eme cycle Animal Production National School of Ag., Meknes	North Carolina	10/83 - 7/84	Mali
Setiadi, M.	MS Animal Science IPB University, Bogor	UCD Breeding	4/81 - 3/83	Indonesia
Sitorus, Marudin	PhD Animal Nutrition Bogor Ag. Institute	North Carolina	9/83 - 9/86	Indonesia
Solano, J.[2]	DMV San Marcos Univ.	Colorado	6/84 - 6/85	Peru
Soto, Alberto	MS Animal Health San Marcos University, Lima	Colorado	4/82 - 8/82	Peru

STUDENT	PROGRAM/INSTITUTION	SUPPORT	DATES	NATIVE COUNTRY
Soto, L. Bueno	MS Range Science UNA, La Molina	Texas Tech	1/82 - 5/84	Peru
Soto, V.	MS Range Science U.N. Pedro Ruiz Gallo, Lambayeque	Texas Tech	1/82 - 12/82	Peru
Souza, Jose de	MS Marketing Federal University of Ceara	Winrock/Economics	9/80 - 2/82	Brazil
Sudaryanto[3]	M.S. Animal Nutrition IPB	North Carolina	86 - 87	Indonesia
Sugiyanto, Agus	MS Production Economics Institut Pertanian Bogor	Winrock/Economics	8/80 - 12/82	Indonesia
Tibary, Ahmed[3]	PhD Phyiscalogy IAV, Hassan II, Rabat	UCD Genetics	83 - 88	Morocco
Torres, Raul G.	Ing. Zootecnista Centro Nat. Univ. Huancayo	Montana	1982-84	Peru
Urbano, J. Rueda	MS Range Science UNA, La Molina	Texas Tech	1/84 - 12/85	Peru
Urchupaico, Ide	Ing. Zootechista Centro Nat. Univ. Huancayo	Montana	1982-84	Peru
de Vasconcelos, Maria Auxiliadora	MS Animal Science Fed. Univ. of Pernambuco,Recife	North Carolina & Utah Range	4/86 - 4/88	Brazil
Vasquez, Nelly	Ing. Agr. Nat. Agrarian University, Lima	Texas Tech	6/80 - 8/83	Peru
Valderi, Vieira da Silva	MS Production Systems Federal University of Ceara	Winrock/Economics	8/81 - 8/83	Brazil
Valer, Charo	MS Depart. of Econ. & Planning Nat. Agrarian University, Lima	Winrock/Econ	1/84 - 1/85	Peru

STUDENT	PROGRAM/INSTITUTION	SUPPORT	DATES	NATIVE COUNTRY
Vega, Pilar[2]	BS Anthropology Univ. of San Agustin (Arequipa)	Missouri	8/83 - 7/84	Peru
Velarde, Ruben	Licenciatura Ag. Economics Nat. Agrarian University, Lima	Winrock/Economics	1/80 - 12/83	Peru
Vilia, R. Velarde	MS Range Science UNTA, Puno	Texas Tech	1/84 - 5/86	Peru
Wahyuni,Sri	MS Rural Sociology. Institut Pertanian Bogor (IPB)	Missouri	9/85 - 8/87	
Wanderley, A. Costa[2]	MS Rural Economics Univ. F. Paraiba	Texas A & M	12/84 - 5/85	Brazil
Zrirak, Naima[3]	2eme Animal Production Nat. School of Ag., Meknes	North Carolina	10/86 - 9/87	Morocco

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1 Support for thesis research only

[2] Partial support

[3]Student's supported mainly by Minnesota project. SR-CRSP support is minimal.

SR-CRSP SPONSORED SHORTCOURSES

COURSE	SPONSORED BY	WHERE HELD	DATES
Sheep Production 23 participants	All Projects	Bogor, Indonesia	6-7/80 (2 weeks)
Reproduction 18 participants	Utah/Cal Poly	Sobral, Brazil	9/80 (2 weeks)
Management of Reproduction 26 participants	Utah/Cal Poly Reproduction	Lima, Peru	3/81 (5 days)
Forage-Vegetation Sampling 16 participants	Utah/Range	Sobral, Brazil	5/81 (2 days)
Veterinary Lab Techniques	Washington	Kabete, Kenya	6-7/81 (6 weeks)
Animal Breeding 65 participants	Montana	Lima, Peru	11/81 (5 days)
Training on Pathology & Immunology Lab 5 participants	Colorado	Lima, Peru	2/82 (2 weeks)
Diet Analysis Techniques 9 participants	Utah/Range	Sobral, Brazil	3/82 (2 days)
Animal Breeding & Systems 21 participants	TAMU/Breeding & Systems	Sobral, Brazil	5/82 (2 days)
Nutrition Part I: Nutrition Update for Sheep and Goats 20 participants	North Carolina	Sobral, Brazil	7/82 (5 days)
Nutrition Part II: Practical Training in Feed Analysis Procedures 10 participants	North Carolina	Sobral, Brazil	8/82 (5 days)
Management & Improvement of Natural Pastures 117 participants	Texas Tech	Lima, Peru	8/82 (4 days)
Range Shortcourse for Professional Agriculturalists in the Southern Sierra	Texas Tech	Puno, Peru	4/83

COURSE	SPONSORED BY	WHERE HELD	DATES
Socio-Economic Research Techniques for Livestock in Asia (T. Soedjana from Indonesia attended and DeBoer and Knipscheer served as lecturers.)	IDRC, ADC, Winrock	Bangkok, Thailand	4/13/83 - 5/18/83
Methods of Measuring Caatinga Vegetation 25 participants	Utah Range	Brazil	(3 days)
Techniques of Animal Diet Analysis 12 participants	Utah Range	Brazil	(2 days)
Systems Analysis for Small Ruminants 6 participants	TAMU Systems	TAMU	7/85-8/85
Systems Analysis of Peruvian Sheep Production 4 participants	TAMU Systems	Peru	(4 days)
Systems Analysis Short Course 4 participants	TAMU Systems	TAMU	July 85 (6 weeks)
Fourth Annual Kenya Workshop 60 participants	Kenya Site	Kenya	March 85
Fifth Annual Kenya Workshop 60 participants	Kenya Site	Kenya	Oct. 86
State of the Art Workshop 25 participants	Brazil Site	Brazil	April 86
The Texas A&M Sheep and Goat Models for Simulation 7 participants	Texas A&M	Texas	August 86
Role of Small Ruminants in the Humid Tropics	IIDRC & ACIAR with SR-CRSP contribution	Indonesia	Oct. 86
IV International Goat Conference	SR-CRSP financial support	Brazil	March 87

SR-CRSP SPONSORED INFORMAL TRAINING

Subject Matter	No. Participants	Trainer	Project	Location	Dates
Data Analysis with hand-held calculator	12 participants	Neil Thomas	Indonesian Projects	Bogor, Indonesia	March 82
Microbiological Laboratory Procedures	4 participants	Mary Sawyer	UCD Animal Health	Sobral, Brazil	1983
Animal Experimentation Procedures for Trainees	2 to 6 per year	Carlos Zometa	TAMU Management	Pendencia, Brazil	1983-85
Field Survey Techniques for Kenyan Enumerators	4 plus replacements	Mike Sands and others	Kenya Projects	Maseno, Kenya	1980-1985
Goat Milk Processing and Cheesemcking	Peace Corps volunteers & Vet. farm staff	Kathy Boor	Winrock Production Systems	Maseno, Kenya	Oct. 1982
Goat Management and Feed Production	10 farmers - (goat recipients)	Dan Brown & Sandra Russo	Winrock Prod. Systems	Maseno, Kenya	March 1983
Nutrition Laboratory Techniques	4 technicians	Tom Robb	NCSU Nutrition	Sobral, Brazil	5/81-12/83
Livestock Feed Production and Preservation	Small farmers	Moses Onim & co-workers	Winrock Prod. Systems	Maseno, Kenya	4/85
Sheep Management	Indonesian Staff	D.T. Torell	UCD Animal Genetics	Bogor, Indonesia	6-7/80
Sheep and Goat Mgt. and Record Keeping	3 professionals and other staff	Fremont Bell	UCD Animal Genetics	Western Java	7/82 - 7/83

Subject Matter	No. Participants	Trainer	Project	Location	Dates
Economic data design, collection, analysis and write up	4 professionals and other staff	H. Knipscheer & co-workers	Winrock Econ.	Bogor, Indonesia	1981 - 1984
Village Data Gathering	5 professionals from BPT	M. Sabrani & H. Knipscheer	Winrock Econ.	Bogor, Indonesia	Feb-Mar. 1983
Semen Processing and Artificial Insemination	Several Kenyans	E.A. Nelson	Cal Poly Repro.	Kabete, Kenya	
Animal Health Lab. Equipping and Teaching Techniques	Kenyan Staff	S. Schmidt & K. Farnsworth	WSU Animal Health	Kabete, Kenya	June-July 81
Animal Management and Data Collection	12-15 students per year	M. Carpio & B. Quijandria	Montana Animal Breeding	Peru	1981-1985
Training In Veterinary Laboratory Techniques	5-25 Peruvian veterinarians and animal health technicians	J. DeMartini & Colorado colleagues	Colorado Animal Health	Lima La Raya Sais Tupac Amaru	1981 1982 1982 1983
Use of SR-CRSP Sheep and Goat Models on IBM Personal Computers	3 professionals	H. Blackburn	TAMU-Systems	Kabete, Kenya	Nov. 1985
Range Sampling Procedures	3 students fulfilling filed experience requirement from Colegio Aricola Gailherme Gouveia	W. Schacht	Utah Range	Sobral, Brazil	July-Aug. 85
Hay Making, Feed Production and Foat Nutrition Mangement	District extension officers & staff of Western and Nyanja Provinces	Kenya Project personnel	Winrock Production System	Kenya	

Subject Matter	No. Participants	Trainer	Project	Location	Dates
Lecture on Goat Management	Action-AID organizational staff	Kenya Project personnel	Winrock Production Systems	Kenya Farmers Training Center	???
Computer analysis training	Gladys Huapaya	R. Blackwell P. Burfening	Montana	Montana	4/28/85- 7/3/85
Training in establishing RIA laboratory and conducting RIA for selected Hormones	Angela Maria Eloy	Utah Repro	Utah/Reproduction	Utah	3/15/86 8/15/86
Training in statistical data using micro computer	Mahdi Mohammed	Missouri	Missouri	Missouri	6/1/86 - 9/1/86

INDIVIDUAL TRAINING INCLUDING PARTIAL SUPPORT TO ATTEND PROFESSIONAL MEETINGS [*a]

Name	Training	Project	Dates
Subandriyo	Sheep and Goat Management and Record Keeping at UC Davis and UC Hopland Field Station	UCD Animal Genetics	Jan-Feb. 1981
E. Figueirido	Third International Conference on Goat Production and Disease, Tucson, AR	TAMU Breeding-Mgt.	Jan. 1982
M. Sabrani A. Muljadi	Third International Conference on Goat Production and Disease[*b], Tucson, AR	Winrock Economics	Jan. 1982
M. Sabrani	First Asian-Australian Animal Production Congress, Kuala Lampur	Winrock Economics	Sept. 1980
M. Sabrani	Second Asian-Australian Animal Production Congress, Manilla, Philippines	Winrock Economics	Nov. 1982
M. Sabrani	IDRC Conference on "Livestock in Asia: Issues and Policies," Singapore	Winrock Economics	Feb. 1982
Uka Kusnadi	English Training Course [*c]	Winrock Economics	- - - - -
T. Soedjana	Technical writing in English[*c]	Winrock Economics	Jan. 1983
A. Djajanegara	Nutrition Laboratory Procedures (1 week at Cornell, 2 weeks at NCSU)	NCSU Nutrition	- - - - -
A. Carneiro	Trainee in Reproduction, Brazil	USU Reproduction	- - - - -

[*a] See also publication section for papers presented by SR-CRSP participants at meetings.

[*b] other attendees were supported by SR-CRSP projects

[*c] Many other participants have been supported by SR-CRSP for improving their English but not reported as training.

Name	Training	Project	Dates
V. Alarcon Victor Lacssa Cesar Pinares H. Cardenas V. Alarcon Ada Ribas Plata Adelaid Prado	Trainees in Reproduction in Peru	USU Reproduction	- - - - -
W. Guimaraes	Research Techniques in Nutrition at CNPC, Sobral	NCSU Nutrition	- - - - -
K. Otieno	Regional Training Workshop in Farming Systems Research CIMMYT in Zimbabwe	Winrock Production Systems	February 1984
D. Huaman	New approaches to isolation and characterization of bacterial toxins at CSU	CSU Animal Health	July 1980 (4 weeks)
E. Caletti	New research planning at CSU and Nat'l. Dis. Center, Ames Iowa in field of cell-associated virus isolation and cell culture	CSU Animal Health	1980
E. Ameghino	Ford Animal Veterinary Medicine Meetings and new methodology at UCD, WSU and CSU	CSU Animal Health	March/April 1983
W. Vivanco	Radioimmunoassay Techniques, International Atomic Energy Agency supported training in Peru and Vienna	Utah Reproduction	1983-1984
F. Villena R. Higaona	Tropical Forages Course at CATIE, Costa Rica (Kellogg Foundation sponsored)	Peru Goat Project	4 weeks

Name	Training	Project	Dates
T. Cordero M. Callacna	Goat Production in the Tropics (Kellogg Foundation and AID/ROCAP sponsored)	Peru Goat Project	- - - - -
A. Florez	Intn'l. Society for Range Mgt. Meetings at Calgary, Canada and Albuquerque, N. Mex.	Texas Tech Range Mgt.	1982-1983
R. Farfan	IV Intn'l Meeting on South American Camelids, Punta Arendas, Chile	Texas Tech Range Mgt.	Nov. 1981
T. Cordero B. Quijandria	Methodology of Livestock Systems Research (Sponsored by IDRC) Pucallpa, Peru	Peru Goat Project	Jan. 1982
T. Cordero B. Quijandria	Methodology of Livestock Systems Research (Sponsored by IDRC) CATIE, Costa Rica	Peru Goat Project	Feb. 1983
Danilon, Jose	Short Term Traineeship at CNPC	North Carolina	
M. Mathuva	Forage Analysis and Animal Nutrition 3 week short course conducted by ILCA Addis Ababa	Winrock Production Systems	
J. Camacho	II International short course on Sheep production. APPA, Huancayo, Peru	Utah Reproduction	Nov. 12-16, 1985
V. Alarcon H. Cardenas V. Llaossa C. Novoa C. Pinares J. Sumar W. Vivanco	V International Convention on South American Camelids, Cusco, Peru,	Utah Reproduction	1985

Name	Training	Project	Dates
V. Alarcon J. Camacho H. Cardenas V. Llaossa C. Novoa C. Pinares J. Sumar W. Vivanco	VIII Anual meeting of the Peruvian Association of Animal Production, Huancayo, Peru.	Utah Reproduction	1985
W. Bravo P. Villalta	ASAS Annual Meeting, University of Georgia, Athens, GA	Utah Reproduction	1985
C. Novoa	VIII National Congress on Veterinary Sciences Lima, Peru	Utah Reproduction	1985
Luke Oyugi	Farming Systems Research Workshop, University of Zimbabwe	Winrock Economics	9/1-12/86
A. Lahlou-Kassi	Third International Congress on Genetics Applied to Livestock, Lincoln, Nebraska	UCD Breeding	7/16-22/86
F. Guessous	American Society of Animal Science, Manhattan, Kansas	UCD Breeding	7/21/86- 8/10/86
Ahmed El Aich	American Society of Animal Science Manhattan, Kansas	Texas Tech	7/26/86- 8/9/86
Maximo Gamarra Manuel Carpio	Third International Congress on Genetics Applied to Livestock, Lincoln, Nebraska	Montana	7/5-24/86
Djoko Sri Wening Subandriyo Ruth Gatenby	Conference on Livestock Production and Diseases in the Tropics	UCD Breeding	8/17-23/86

Name	Training	Project	Dates
Sri Wening	Conference on Advances in Animal Feeds and Feeding in the Tropics	UCD Breeding	8/2-8/86
R. Farfan J. Astorga N. Gutierrez	ALPA Meetings	Winrock/Economics	4/27/86-
Puis Ketaren	Conference on Grazing Small Ruminants under Rubber Trees, Kuala Lumpur, Malaysia	Indonesia Host Country Funds	11/26/85 - 12/2/85
M. Bourfia	Second World Merion Conference, Madrid Spain	UCD Breeding	4/20-24/86
R. Mesquito	Society for Range Management, Orland, FL	Utah/Range	2/8-15/86
Julio Sumar	Symposium on use of Nuclear Techniques in Studies of Animal Production and Health in Different Environments, Vienna, Austria	Management Entity	3/5-23/86
Omar Berkat Arturo Florez Hamid Narjisse	International Society for Range Managment	Texas Tech	2/8-16/86
Adrian Mukhebi	ILCA Workshop on Liverstock Farming Systems Addis Ababa, Ethiopia	Winrock Economics	6/24-28/85
Ahmed Kabbali	American Society of Animal Science, Athens, GA	North Carolina	8/6-17-85
A. Lahlou-Kassi	Symposium on Sheep Production, European Association of Animal Production	UCD Breeding	9/22-29/85
Adrian Mukhebi	Attend FSSP Worshop Attend AHEA Meeting	Winrock Economics	7/10-8/2/85
Carlos A. Zometa	80th Annual Meeting of the American Dairy Science Association	TAMU/Systems	6/2/86

Name	Training	Project	Dates
A. Lahlou-Kassi Hamid Narjisse Eric Bradford	Planning Workshop on Agricultural Networks, ICARDA & AID, Jordon	UCD Breeding	3/16-21/85
P. Sitorus	Asian Association of Animal Science	UCD Breeding	5/11/85
Mohamed Mahdi	8 weeks of short-term training in Social Science Research Methods and Theory	Missouri	June-July, 1986
Simon Ginting,	International Conference on Advances in Animal Feeds and Feeding	North Carolina	April 1-5, 1987

Small Ruminant CRSP
USAID Grant No. DAN-1328-G-SS-4093-00

TABLE 1

PROGRAM BUDGETS

Institution/ Category	Discipline	Approved Year Six 1984/85	Approved Year Seven 1985/86	Approved Year Eight 1986/87	Approved Year Nine 1987/88	TOTAL
California	Breeding	$242,034.00	$226,100.00	$165,900.00	$160,000.00	$794,034.00
California	Health	$170,000.00	$150,750.00	$73,100.00	$.00	$393,850.00
Colorado	Health	$170,000.00	$153,450.00	$126,400.00	$160,000.00	$609,850.00
Missouri	Sociology	$307,800.00	$295,700.00	$173,400.00	$210,000.00	$986,900.00
Montana	Breeding	$145,000.00	$144,000.00	$126,400.00	$100,000.00	$515,400.00
North Carolina	Nutrition	$235,178.00	$240,488.00	$165,900.00	$160,000.00	$801,566.00
Texas A & M	Breeding	$185,000.00	$121,500.00	$67,200.00	$114,000.00	$487,700.00
Texas A & M	Systems	$185,000.00	$187,026.00	$142,200.00	$11,000.00	$525,226.00
Texas Tech.	Range	$297,000.00	$239,850.00	$126,400.00	$160,000.00	$823,250.00
Utah State	Range	$190,000.00	$168,750.00	$126,400.00	$120,000.00	$605,150.00
Utah State	Physiology	$195,000.00	$161,030.00	$21,900.00	$.00	$377,930.00
Washington	Health	$170,000.00	$165,150.00	$126,400.00	$160,000.00	$621,550.00
Winrock Intl.	Economics	$235,000.00	$258,829.00	$165,900.00	$210,000.00	$869,729.00
Winrock Intl.	Management	$232,000.00	$234,900.00	$169,900.00	$180,000.00	$816,800.00
Subtotals		$2,959,012.00	$2,747,523.00	$1,777,400.00	$1,745,000.00	$9,228,935.00
Management Entity*		$450,000.00	$432,000.00	$300,200.00	$450,000.00	$1,632,200.00
Contingency Funds		$89,200.00	$27,412.00	$55,600.00	$220,000.00	$392,212.00
Overseas Sites		$501,788.00	$393,065.00	$316,000.00	$300,000.00	$1,510,853.00
Linkages		$.00	$.00	$.00	$93,000.00	$93,000.00
GRAND TOTAL		$4,000,000.00	$3,600,000.00	$2,449,200.00	$2,808,000.00	$12,857,200.00

* Allocations include funding for External Evaluation Panel, Board of Directors & Technical Committee

TABLE 2

SMALL RUMINANT CRSP
USAID GRANT NO. DAN-1328-G-SS-4093-00
MATCHING CONTRIBUTIONS FROM U.S. INSTITUTIONS

Institution	Discipline	Year Six 1984/85	Year Seven 1985/86	Year Eight(*) 1986/87	TOTAL
California	Breeding	$106,748.75	$117,007.00	$105,825.00	$329,580.75
California	Health	$60,184.00	$40,921.00	$45,289.00	$146,394.00
Colorado	Health	$56,667.00	$53,833.00	$53,334.00	$163,834.00
Missouri	Sociology	$95,388.54	$94,190.49	$84,170.80	$273,749.83
Montana	Breeding	$331,265.00	$262,557.00	$184,001.30	$777,823.30
North Carolina	Nutrition	$87,462.00	$80,549.04	$64,731.00	$232,742.04
Texas A&M	Breeding/Mgmt.	$66,474.41	$67,573.65	$46,311.50	$180,359.56
Texas A&M	Breeding/Systems	$59,755.04	$64,026.43	$77,033.02	$200,814.49
Texas Tech	Range	$114,381.91	$110,950.00	$59,125.79	$284,457.70
Utah State	Range	$103,929.97	$115,510.02	$52,109.38	$271,549.37
Utah State	Reproduction	$90,408.40	$128,057.46	$6,998.17	$225,464.03
Washington	Health	$89,817.59	$85,610.80	$77,079.08	$252,507.47
Winrock Intl.	Economics	$78,111.67	$73,975.07	$68,262.09	$220,348.83
Winrock Intl.	Management	$58,364.49	$73,428.47	$79,461.02	$211,253.98
TOTALS		$1,398,958.77	$1,368,189.43	$1,003,731.15	$3,770,879.35

(*) Some amounts are based upon estimates from subgrantees as of 1/28/88

TABLE 3

SMALL RUMINANT CRSP
USAID GRANT NO. DAN-1328-G-SS-4093-00
EXPENDITURES BY PROGRAM

Institution	Discipline	Year Six 1984/85	Year Seven 1985/86	Year Eight 1986/87	TOTAL
California	Breeding	$192,562.10	$258,979.52	$216,229.92	$667,771.54
California	Health	$119,308.75	$142,139.33	$132,401.92	$393,850.00
Colorado	Health	$159,902.05	$157,787.88	$131,447.80	$449,137.73
Missouri	Sociology	$270,247.05	$307,072.42	$204,442.54	$781,762.01
Montana	Breeding	$145,000.00	$144,000.00	$126,400.00	$415,400.00
North Carolina	Nutrition	$235,178.00	$244,088.00	$165,900.00	$645,166.00
Texas A&M	Breeding/Mgmt.	$158,827.67	$144,451.44	$65,380.21	$368,659.32
Texas A&M	Breeding/Systems	$143,489.80	$155,836.79	$175,909.65	$475,236.24
Texas Tech	Range	$282,151.09	$246,138.86	$113,615.10	$641,905.05
Utah State	Range	$180,566.51	$178,183.00	$126,400.00	$485,149.51
Utah State	Physiology	$195,000.00	$156,755.09	$21,900.00	$373,655.09
Washington	Health	$158,632.69	$176,310.01	$123,022.15	$457,964.85
Winrock Intl.	Economics	$235,000.00	$258,584.43	$198,365.81	$691,950.24
Winrock Intl.	Management	$200,019.76	$228,936.79	$207,610.00	$636,566.55
Subtotals		$2,675,885.47	$2,799,263.56	$2,009,025.10	$7,484,174.13
Host Countries					
Brazil		$125,202.15	$108,969.41	$59,874.67	$294,046.23
Indonesia		$95,001.04	$70,454.82	$25,735.50	$191,191.36
Kenya		$73,777.56	$55,922.68	$40,597.29	$170,297.53
Morocco		$39,681.21	$47,894.74	$69,230.01	$156,805.96
Peru		$129,422.10	$121,942.83	$59,778.00	$311,142.93
Subtotal		$463,084.06	$405,184.48	$255,215.47	$1,123,484.01
Management Entity *		$376,306.95	$415,263.66	$438,094.62	$1,229,665.23
Miscellaneous Expenses		$0.00	$11,541.71	$0.00	$11,541.71
TOTALS		$3,515,276.48	$3,631,253.41	$2,702,335.19	$9,848,865.08

* Expenditures include those for the External Evaluation Panel, Board and Directors & Technical Committee

SMALL RUMINANT CRSP
FREQUENTLY USED ACRONYMS

AC	Advisory Council
ACIAR	Australian Centre for International Agricultural Research
AID/W	Agency for International Development/Washington, D.C.
AUSUDIAP	Association of U.S. University Directors of International Agricultural Programs
BD	Board of Directors
BIFAD	Board for International Food and Agricultural Development
CATIE	Center for Research and Training in Tropical Agriculture (Costa Rica)
CGIAR	Consultative Group in International Agricultural Research
CIAT	International Center for Tropical Agriculture
CID	Consortium on International Development
CIDA	Canadian International Development Agency
CRSP	Collaborative Research Support Program
CSIRO	Commonwealth Scientific and Industrial Research Organization
DA/AID	Deputy Administrator of the Agency for International Development
EEP	External Evaluation Panel
FAA	Foreign Assistance Act
FAO	Food and Agriculture Organization of the United Nations
FY	Fiscal Year
GAO	General Accounting Office
GC	Office of General Counsel (AID)
HC	Host Country
HCR	Host Country Representative
IARC	International Agricultural Research Center

ICARDA	International Center for Agricultural Research in Dry Areas
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IDRC	International Development Research Centre
IG	Inspector General (AID)
IICA	Inter-American Institute of Agricultural Cooperation (Costa Rica)
IITA	International Institute for Tropical Agriculture
ILCA	International Livestock Centre for Africa
ILRAD	International Laboratory for Research on Animal Diseases
ITR	International Travel Request
LDC	Less Developed Country
LLDCs	Least Developed Countries
ME	Management Entity
MOU	Memorandum of Understanding
MSP	Morocco Scientific Panel
MUCIA	Midwest Universities Consortium for International Activities
NASULGC	National Association of State Universities and Land Grant Colleges
NTIS	National Technical Information Services (Dept. of Commerce)
OMB	Office of Management and Budget
Origin	The country in which a commodity has been mined, grown, produced, manufactured or assembled
PAC	Program Advisory Council
PDF	Participant Data Form
PI	Principal Investigator
PIO	Project Implementation Order
PIO/C	Project Implementation Order/Commodity

PIO/P	Project Implementation Order/Participant
PIO/T	Project Implementation Order/Technical Services
PIP	Project Implementation Plan
PO	Purchase Order
PPC	Bureau for Program and Policy Coordination (AID)
PTIS	Participant Training Information System
PVO	Private Voluntary Organization
R&D	Research and Development
SA	State Annex; Special Assistant
SC	Site Coordinator
S&T	Bureau for Science and Technology (AID)
TC	Technical Committee
USAID	United States Agency for International Development (Overseas Mission)
USDA	United States Department of Agriculture

COLLABORATING ORGANIZATIONS

Federal (U.S.):

United States Agency for International Development
Science and Technology Bureau

Board of International Food and Agriculture

Joint Committee on Agricultural Development

Overseas Collaborators:

BRAZIL--Empresa Brasileira de Pesquisa Agropecuaria (EMBRAPA)

INDONESIA--Agency for Agricultural Research and Development (AARD)

KENYA--Ministry of Agriculture and Livestock Development (MALD)

MOROCCO--Institut Agronomique et Veterinaire--Hassan II University (IAV)

PERU--Instituto Nacional de Investigacio y Promocion Agropecuaria (INIPA)

State Subgranted Institutions:

University of California, Davis

Colorado State University, Fort Collins

Montana State University, Bozeman

University of Missouri, Columbia

North Carolina State University, Raleigh

Texas A&M University, College Station

Texas Tech University, Lubbock

Utah State University, Logan

Washington State University, Pullman

Winrock International Institute for Agricultural Development,
Morrilton, Arkansas

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* Member of Board of Directors
\# Host Country Representative

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Saul Fernandez-Baca	Santo Domingo
William Flinn	Ohio State University
Gerald Thomas, Chair	New Mexico State University

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William C. Weir	Program Director after 9/30/87
James Scott	Assistant Program Director
Lindy Watts	Administrative Assistant
Marcella Pieratt	Accounting Assistant until 10/1/87

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