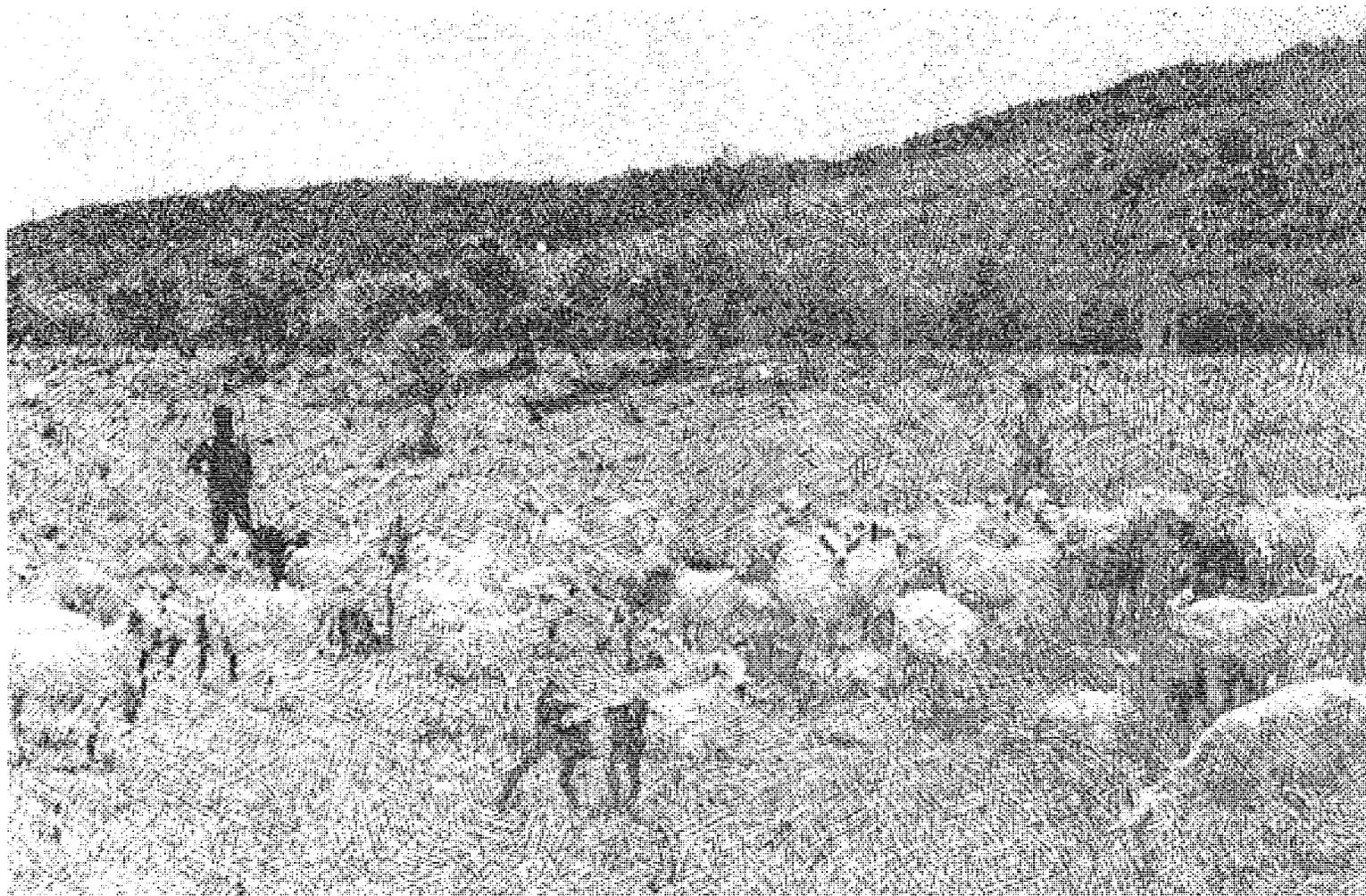


Small Ruminant Collaborative Research Support Program



External Evaluation Panel Report

1988

**United States Agency for International Development
Grant No. DAN 1328-G-SS-4093-00**

COLLABORATING ORGANIZATIONS

Federal (U.S.):

United States Agency for International Development
Science and Technology Bureau

Board for International Food and Agricultural Development
Joint Committee on Agricultural Development

Overseas Collaborators:

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

KENYA--Kenya Agricultural Research Institute

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

PERU--Instituto Nacional de Investigacion Agraria y
Agroindustrial (INIPA)

Participating 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,
Morrlilton, Arkansas

TENTH REPORT OF THE EXTERNAL EVALUATION PANEL

Small Ruminant Collaborative Research Support Program

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	ACTIVITIES OF THE EXTERNAL EVALUATION PANEL	2
III.	SUMMARY AND RECOMMENDATIONS	3
	A. Major Accomplishments	3
	B. Compliance with the Collaborative Mode	5
	C. Adherence to the Log Frame and Program Objectives	6
	D. Measuring Progress Toward the Goals	6
	E. Budget Considerations	7
	F. Response to Previous EEP Evaluations	9
	G. Status of Tech Packages	9
	H. The Training Component	10
	I. Publications and Reports	10
	J. Linkages, Networking and Regionalization	11
	K. Cooperation with Field Missions	13
	L. Response to Strategic Plan	13
IV.	PROGRAM EVALUATION: HOST COUNTRIES	14
	A. Kenya	14
	B. Morocco	22
	C. Indonesia	28
	D. Peru	30
	E. Brazil	38
V.	PROGRAM EVALUATION: U.S. INSTITUTIONS	38
	A. University of California at Davis	38
	B. Colorado State University	40
	C. North Carolina State University	41
	D. University of Missouri-Columbia	42
	E. Montana State University	45
	F. Texas A&M University	47
	G. Texas Tech University	49
	H. Utah State University	50
	I. Winrock International Institute for Agricultural Development	51
	J. Comments on the Management Entity	52
VI.	ACKNOWLEDGEMENTS	54
VII.	APPENDICES:	
	A: Project Design Summary Logical Framework	55
	B: Response to EEP Recommendations	59

I. INTRODUCTION

The Small Ruminant Collaborative Research Support Program (SR-CRSP) is a joint effort of the U.S. Agency for International Development (USAID), U.S. universities, and governmental agencies in five developing countries. Initiated in 1968, it was supported for the first five-year period by a \$15 million Title XII grant and by additional contributions of over 30% of this amount from participating institutions.¹ The present level of funding is approximately \$2.8 million per year.

The purpose of the SR-CRSP is to determine the constraints to small ruminant production (primarily sheep, goats, and alpacas); to research the alternative solutions; and to develop recommendations for the small holders in the developing countries. 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 U.S. 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 contribute 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 the recommendations to their local conditions.

Small ruminant animals are an important source of food and reserve income for millions of families in the developing world. In 1985 there were approximately 1.1 billion sheep and 460 million goats in the world, a slight increase over the previous five-year period; 50% of the sheep and 95% of the goats are in the developing countries of Africa, Asia, the Near East, and Latin America.² During the past ten years the output of meat from sheep and goats has increased more in the developing countries than in the developed countries, but still lags behind population growth. The demand for sheep and goat meat and milk remains strong. The Food and Agriculture Organization (FAO) of the UN estimates that in 1990 world economic demand will exceed production by approximately 600,000 metric tons or the equivalent of production from 30 to 40 million sheep and goats.

¹ From "Partners in Progress," a five-year report on the SR-CRSP, undated.

² "A Strategic Plan for the Small Ruminant CRSP," prepared by the Management Entity (UC-Davis), Jan., 1989.

The Management Entity (ME) for the SR-CRSP is the University of California at Davis. The ME works with two key committees of the SR-CRSP: 1) The Technical Committee made up largely of Principal Investigators (PIs); and 2) the Board of Directors which establishes overall policy. Most of the initial recommendations for project direction and budget allocations originate with the Technical Committee.

Fourteen institutions were originally involved in the small ruminant program. There are ten remaining as listed below:

University of California-Davis Breeding, Animal Health	Montana State University Breeding
Texas A&M University Systems Analysis, Breeding	University of Missouri Rural Sociology
Texas Tech University Range Management	Washington State University Animal Health
Utah State University Range Management	Winrock International Economics, Production & Feed Systems
Colorado State University Animal Health	North Carolina State University Forages & Nutrition

These nine American universities and Winrock remain active in some phase of the research. Field locations for the program were originally in five countries: Brazil, Indonesia, Kenya, Morocco, and Peru. The field work in Brazil was phased out in 1986 and a report and technology manual on Brazil is scheduled for release in 1989.

II. ACTIVITIES OF THE EXTERNAL EVALUATION PANEL

The External Evaluation Panel (EEP) in 1988 consisted of:

Dr. S. Gordon Campbell, Associate Dean, New York State College of Veterinary Medicine, Cornell University;

Dr. Saul Fernandez-Baca, formerly with UNDP and FAO, Consultant for Animal Science and International Development, Lima, Peru;

Dr. William A. Flinn, President, Midwest Universities Consortium for International Activities, Columbus, Ohio;

Dr. Gerald W. Thomas, President Emeritus, New Mexico State University.

Dr. Thomas has served as chairman for the EEP for the past three years. With the completion of this report, Dr. Thomas has requested that a new chairman be appointed and that he rotate off the EEP after the evaluation

in 1989. Also, Dr. William Flinn has asked to be replaced with the completion of this report.

As a result of these changes and the continuing recommendation of the EEP to maintain a panel of five members, the ME has initiated the process of naming two new members. Final approval of the panel members will rest with USAID and BIFAD.

This past year the EEP visited more host countries and more U.S. institutions than in any previous period. These visits were necessary because of the upcoming triennial review of the SR-CRSP by USAID.

The EEP report for 1988 is more detailed and more critical than in previous years. Some duplication in the recommendations will be apparent since the panel examined the research from both the viewpoint of the host country (with field observations) as well as from the viewpoint of the sub-grant U.S. institutions.

The section entitled "Summary and Recommendations" is not designed as an "Executive Summary," but will provide an overview of our observations. It will be necessary to examine the sections on program evaluations to obtain a more complete appraisal of the SR-CRSP.

III. SUMMARY AND RECOMMENDATIONS

A. MAJOR ACCOMPLISHMENTS

Accomplishments of the 10 years of research and training under the auspices of the SR-CRSP are contained throughout this report. However, it seems appropriate to cite a few specific examples of research results that have immediate implications for small ruminant production in the developing countries (see Ten Year Strategic Plan).

- Substantial progress has been made in genetic control of prolificacy. For example, the discovery that the Moroccan D'Man breed of sheep transmits its high prolificacy "additively" to first cross and backcross progeny. This means that it is possible to use local genetic resources to increase prolificacy in Moroccan sheep to different degrees in accordance with the requirements of different management and feeding systems. It is estimated that if 10% of Morocco's 10 million ewes were replaced with D'Man crosses, an additional US\$5 million in gross annual income would be generated for producers.

- The identification of the comparative and interactive grazing behavior of sheep, alpacas, and llamas on Peruvian highland ranges is a major step toward sustainable production systems. Results show that alpacas have the most opportunistic feeding strategy and that they compete directly with llamas and sheep under most range conditions. This means that llamas and sheep can be grazed together to optimize biomass conversion while alpacas should be managed as a single species.

- The identification and control of caprine arthritis encephalitis viral infection in Kenya, Peru, and other parts of the world could represent a world-wide savings of US\$20 million. It was determined that viral transmission occurs through colostrum and milk, and methods were developed to prevent its spread. These control methods are very important for the U.S. where about 80% of dairy goats are affected.
- The upgrading of Criolla sheep in Peru is expected to increase the production of carcass meat by 8,000 metric tons and grease wool by about 20 million kilograms per year.
- The development and placement of dual-purpose goats in Kenya with the corresponding increase in forage production should increase the income of small farmers by an estimated US\$52 per hectare. In addition, the pride generated by these new dual-purpose goats has caused the small holders to pay more attention to all aspects of management and nutrition.
- The identification of nutritional myopathy among sheep in Morocco, a condition previously unrecognized in this region, was determined to be caused by a dietary deficiency of selenium. Methods for correcting the deficiency previously developed in the U.S. were tested and found completely effective in Morocco.
- Research in Indonesia revealed that unsupplemented tropical grasses impose severe restrictions on the growth and reproduction of Javanese Thin Tail sheep and the growth of Kacang goats is similarly affected. It was found that these constraints could be solved by a supplementation of a complete mineral mixture plus a low fiber feed, and that such a supplement could be provided at low cost by village farmers. The adoption of improved practices for the utilization of green legume foliage has led to increases in weight gain of 120% and to increases in feed efficiency of 80%.
- In Brazil, researchers found that thinning the tree canopy resulted in significantly more forage biomass produced beneath the trees. It was furthermore determined that a partial clearing of the canopy was just as effective as complete clearing. Increases of up to 800% in herbaceous vegetation were obtained by tree canopy manipulation.
- Research in Peru revealed that a large proportion of the livestock produced by highland peasant communities is raised in agropastoral communities and not exclusively by pastoral communities as had been previously thought. Furthermore, the research established that livestock in highland Peruvian agropastoral communities are valued more for the dung that they provide for fertilizers than for their meat, fiber, or cash value.
- Increased alpaca fiber yields in Peru from a low of six pounds up to 17 pounds per animal should add incomes of approximately US\$40-\$50 per animal.

- The development and validation of computer simulation models for sheep and goats should have wide application and use for future researchers. The models have great utility for extending data to practical production terms, thus replacing some expensive field experiments and large numbers of experimental animals.

B. COMPLIANCE WITH THE COLLABORATIVE MODE

The EEP found good overall compliance with the concepts of the collaborative mode. However, the panel is concerned that funding restrictions will reduce the opportunity for multi-disciplinary interaction and may tend to narrow the future focus. As compared with most host country development projects, the SR-CRSP has shown excellent results per dollar invested. We strongly recommend continued and adequate support for the SR-CRSP based on the following observations:

- The collaborate mode has provided an opportunity for the best scientific talent to conduct research on small ruminant problems. This is true for both the universities and host countries. The scientists involved have opportunities for publishing results, maintaining their professional ties, and interaction in the international arena.
- The SR-CRSP approach is designed to evaluate all contributing factors to improved production in complex agricultural systems including economics, social, and environmental constraints.
- The multi-disciplinary approach of the SR-CRSP can incorporate consideration of "sustained use" of the natural resource base as well as other critical environmental concerns. More emphasis should be placed on this objective.
- Renewed interest in "biological diversity" must take into consideration the role and proper management of livestock (particularly sheep and goats). The SR-CRSP is designed to yield information on both the positive and negative impacts of grazing animals on the vegetation and soil base with recommendations for ameliorating any adverse impacts.
- The training component of the SR-CRSP has been highly successful and has resulted in a long-term contribution to both host countries and U.S. institutions.
- The collaborative mode has been effective in multiplying the impact of USAID funds through matching contributions from U.S. and host country institutions.
- Scientists involved in the SR-CRSP have made and continue to make contributions to the world literature on small ruminants. Many of the publications are in languages other than English.

- The establishment of scientific and administrative networks presents a strong argument for the collaborative mode adopted by the SR-CRSP.
- The collaborative mode has enabled U.S. scientists and students to observe conditions and systems not present in the U.S., thus extending their knowledge base. This is particularly important in the area of foreign animal diseases.
- It appears that the weakest link in the SR-CRSP objective of collaboration relates to the training of U.S. graduate students at overseas locations. Project leaders indicate a reluctance on the part of host countries to accept U.S. students. Part of this problem concerns the relative high cost of maintaining U.S. graduate students in the host country compared with the country's own students or with the host country's other priorities for the expenditure of limited resources. Nevertheless, the EEP joins with the Board of Directors in the opinion that U.S. students must be involved in the program and that this factor is important for the selection of host country locations for future SR-CRSP activities.

C. ADHERENCE TO THE LOG FRAME AND PROGRAM OBJECTIVES

The log frame, appended to this report, has been revised to cover the period from fiscal 1987 through 1990, the termination date of the present grant. This is the fourth version of the log frame. The EEP feels that the objectives are realistic and that most of the objections raised by the Inspector General's 1986 report have been considered. It is important, however, to re-emphasize that many of the objectives of the SR-CRSP can only be accomplished over the long-term.

With the preparation and evaluation of the "Strategic Plan For the Small Ruminant CRSP for 1990-2000," further revision in the log frame will be necessary.

D. MEASURING PROGRESS TOWARD THE GOALS

One of the lingering problems in small ruminant research is that of measuring progress toward the goals. The most traditional economic indicators have been increased sales and income generation. Yet, many small holders keep sheep or goats for meat or milk products to balance family nutrition. The role of these animals in the family and community social structure is difficult to quantify. More attention should be given to the development of indicators of success which include indirect economic benefit, improved family health, social values, political implications of change, and natural resource degradation or improvement. Livestock production must be viewed as part of the very complex ecological, social, and economic systems rather than as a single commodity.

E. BUDGET CONSIDERATIONS

Uncertainty of budgets and forward funding continues to be a problem for both future planning and present conduct of the SR-CRSP. Last year the EEP called attention to the two reports which had a bearing on the long-term outlook for the SR-CRSP. These two reports: 1) Hogan, Richie & Robins, 1987; and 2) Gray, 1987, are still of value for their careful analysis and specific recommendations. (See 1987 EEP Report.)

Table I
Collaborative Research Support Program
FY 1977 - FY 1988

CRSP Name & Year	USAID Contribution	University Matching	Host Country Contribution	Total
Small Ruminants				
1978	\$ 356,000.00	\$ 250,000.00	\$ 0.00	\$ 606,000.00
1979	2,026,000.00	938,000.00	400,000.00	3,364,000.00
1980	4,491,000.00	1,740,000.00	600,000.00	6,831,000.00
1981	4,054,000.00	1,498,000.00	825,000.00	6,377,000.00
1982	4,040,000.00	1,393,000.00	825,000.00	6,258,000.00
1983	4,140,000.00	1,576,000.00	1,445,000.00	7,161,000.00
1984	4,085,000.00	1,408,000.00	1,500,000.00	6,993,000.00
1985	3,515,276.00	1,399,000.00	3,821,878.00	8,736,154.00
1986	3,631,253.00	1,369,000.00	4,052,238.00	9,052,491.00
1987	2,702,335.00	1,043,000.00	4,321,507.00	8,066,842.00
1988 *	2,473,030.00	982,430.55	2,066,417.00	5,521,877.55
Total	\$35,513,894.00	\$13,596,430.55	\$19,857,040.00	\$68,967,364.55

* Final figures were not available at the time this report was prepared.

FN: AIDFIN.rpt
Prepared: 12/29/88 jws

The approved budget for year ten (1988-89) for the SR-CRSP is \$2.8 million or 70% of the originally planned \$4.0 million per year. Allocations to the program for the 11-year period with a listing of host country contributions and university matching funds are shown in Table 1. Note that the university match is approximately 38% of the USAID allocation and the host country match is approximately 55% of the USAID allocation. In other words, the multiplier factor for the USAID finds was 1.94.

An analysis of the proposed allocations of funds for the sub-grants, host countries, and Management Entity is shown in Table II. This table also shows a suggested use of regionalization and contingency funds as proposed by the ME. The sub-grants are minimal considering the responsibilities assigned to each unit.

TABLE II
Small Ruminant CRSP Proposed Budgets
Year 10, 1988/89

Categories	Disciplines	PI	Amount
SUB-GRANTS			
UC-D	Genetics	B. Bradford	\$ 210,000
Colorado State	Animal Health	J. MeMartini	160,000
Montana State	Breeding	P. Burfening	125,000
N. Carolina State	Nutrition	K. Pond	179,500
Texas A&M	Breeding/Systems	T. Cartwright	140,000
Utah State	Range	J. Malechek	118,505
Texas Tech	Range	F. Bryant	150,000
Missouri	Sociology	M. Nolan	210,000
Washington	Health	T. McGuire	160,000
Winrock Int'l	Dairy Mgt.	H. Fitzhugh	180,000
Winrock Int'l	Economics	H. Knipscheer	210,000
Total of Sub-grants			<u>\$1,843,005</u>
HOST COUNTRIES			
Indonesia			\$ 105,000
Kenya			105,000
Peru			105,000
Subtotal			<u>\$ 315,000</u>
Morocco Site Admin			18,700
Total Host Countries			<u>\$ 333,700</u>
REGIONALIZATION & CONTINGENCY *			\$ 183,295
MANAGEMENT ENTITY			
ME			\$ 380,000
EEP			15,000
Technical Committee			20,000
Board Meetings			10,000
Meetings: Various (Strategic Planning, etc.)			15,000
Subtotal			<u>\$ 440,000</u>
TOTAL BUDGET 1988/89			\$2,800,000 =====
<hr/>			
* Suggested use of these funds:			
A. Technology Packages			\$ 50,000
B. Workshops/Conferences			0
C. Contingency			<u>133,295</u>
Total Regionalization & Contingency			\$ 183,295

F. RESPONSE TO PREVIOUS EEP EVALUATIONS

Dr. Jim Oxley, Program Director of the SR-CRSP, has submitted to the EEP a detailed response to our previous recommendations. Because of its importance to the EEP review, this response is located in Appendix B. Dr. Oxley made comprehensive statements about the major items contained in earlier EEP evaluations. This response of the ME has been very useful in the preparation of the 1988 EEP report. The ME commented on the following items:

1. Status of Technological Packages.
2. Revision of Log Frame.
3. Measuring Progress Toward the Goals.
4. Response to Previous Recommendations for Strengthening the SR-CRSP.
5. Implications of Recent Changes in By-Laws.
6. Cooperation with Field Missions.
7. Publications, Workshops, and Reports.
8. The Training Component.
9. Phase-Down of SR-CRSP Projects.
10. New Directions for Development Assistance.
11. Host Country Recommendations.

G. STATUS OF TECH PACKAGES

The primary purpose of the Technological Package is to summarize the progress of the small ruminant research in each country with appropriate recommendations for follow-up by extension agencies, educational institutions, and in-country research organizations. The concept of the Tech Pack has varied among project investigators and host country participants.

Good progress has been made toward the preparation of these Tech Packs since the last EEP report. The ME has encouraged this development by providing earmarked funds and advice.

The Tech Pack for goats in Brazil is funded and in press; the Brazil Tech Pack for sheep should be completed in March of 1989. The Morocco Tech Pack is in final review and the Tech Pack for Indonesia is made up of a series of modules which will be produced locally with about 30 scheduled for completion in 1989. Social components for the Peru Tech Pack are finished.

Planning and development work on the Kenya Tech Pack is underway but the completion date has not been set. The EEP would like to encourage the Kenya team to move more aggressively toward completing this project since it appears that ample data have been collected and analyzed to make a substantial contribution to the production of dual-purpose goats under certain African conditions.

H. THE TRAINING COMPONENT

Past EEP reports have emphasized that the training component is one of the strongest and most lasting positive implications of the SR-CRSP. Each of the country reports contains a section on training with lists of students graduated or in various stages of the educational process.

The ME response to the EEP, dated 9 January 1989, by Dr. Oxley, contains an excellent summary of the SR-CRSP training component (see Appendix B). It is unfortunate that funding uncertainties forced the decision not to initiate new programs but to complete the training of students in the pipeline. Consequently, only two new students were placed in master's degree programs in 1988. Eighteen Ph.D. and 17 master's candidates were in training in the U.S. or overseas during 1988.

The effectiveness of the training component of the SR-CRSP is illustrated by the following summary statements:

- A total of 166 students have been trained or are in training in 21 different U.S. institutions. These students are from 28 countries.
- Approximately 134 students were trained at 20 different overseas universities, primarily at the bachelor's or master's level. These students received support from U.S. scientists and the interaction among U.S. and host country scientists has been effective in increasing the standards and effectiveness of the training.
- Informal (non-degree) training has been reported for many subject-matter topics. In 1988, workshops or short courses were held in 14 locations involving over 400 participants. The SR-CRSP personnel have tried to involve other logical cooperating agencies or organizations in these non-degree training programs.

I. PUBLICATIONS AND REPORTS

The SR-CRSP activities over the past 9-10 years have resulted in an impressive array of publications, numbering in excess of 2,000. This list ranges from complete books to journal articles, monographs, and miscellaneous reports. For good reasons many of the publications are in English, but particularly commendable are the publications in native languages which make them more available to extension agents and others for use in the field.

The EEP noted that the publication of working papers provided an excellent medium for committing early results to paper and providing trainees with experience in the production of a scientific paper. This system has been used very effectively in Indonesia where "Guidelines for Publication" of data from work supported entirely, or in part, by SR-CRSP have been prepared.

The ME, with the collaboration of all cooperating personnel, issued a report on "Communications" concerning the publication record of the SR-CRSP over the period 1978-1987. This document lists all publications under the classifications of: 1) books and chapters in books; 2) theses; 3) journal articles; 4) abstracts; 5) technical communications; and 6) oral presentations. Unfortunately, the document does not contain a summary or an analysis of the effectiveness of these publications.

The University of Missouri has made a major contribution to the field of communications by the design of a model (Fig. 1) for communicating SR-CRSP project results. This model shows the recommended flow patterns for some 2,229 scientific communications from the SR-CRSP. A quote from the Missouri study is called to the attention of those reading this EEP report:

Farming systems research and extension projects devote enormous energy and sums to research and development, but typically provide little planning, personnel, or budget for systematically and effectively reporting and disseminating the results of those efforts. . . Agricultural R&D projects that are sincere about being effective must therefore make a formal (but flexible) plan and commitment to this task. Otherwise, they are unlikely to fulfill their primary mandates: to improve agricultural productivity and farmer well-being, inform policy making, and guide future research.³

J. LINKAGES, NETWORKING AND REGIONALIZATION

One of the important goals of the SR-CRSP was to help establish ties among the world scientists who have a special interest in small ruminant research. Funding limitations at the outset restricted this worthy goal. However, the involvement of four host countries and 10 U.S. institutions has demonstrated that a limited network can be established and can produce significant results. The question now arises, with the prospect of further resource restrictions: Can the network be held intact to maintain the broad-based scientific ties essential to a timely collaborative mode? Even at the outset, there was no way to involve the so-called middle-income country scientists, many of whom have good scientific background in small ruminants.

The challenge for the future is obviously not to expand the scientific network, but rather to develop ways to maintain the current technological base. The strategic plan for the next 10 years projects a more limited geographic focus with fewer field locations and fewer U.S. universities. This limited vision of the future of the SR-CRSP is a concern of the External Evaluation Panel.

³ McCorkle, C. M., D. L. Esslinger, & J. L. DeWeese. "Communicating Project Results: A Model from the SR-CRSP. Paper presented at the Global Information/Communication Session of the 1988 Farming Systems & Extension Symposium, University of Arkansas, Oct. 9-12, 1988.

SR-CRSP SCIENTIFIC COMMUNICATIONS*

SR-CRSP Projects

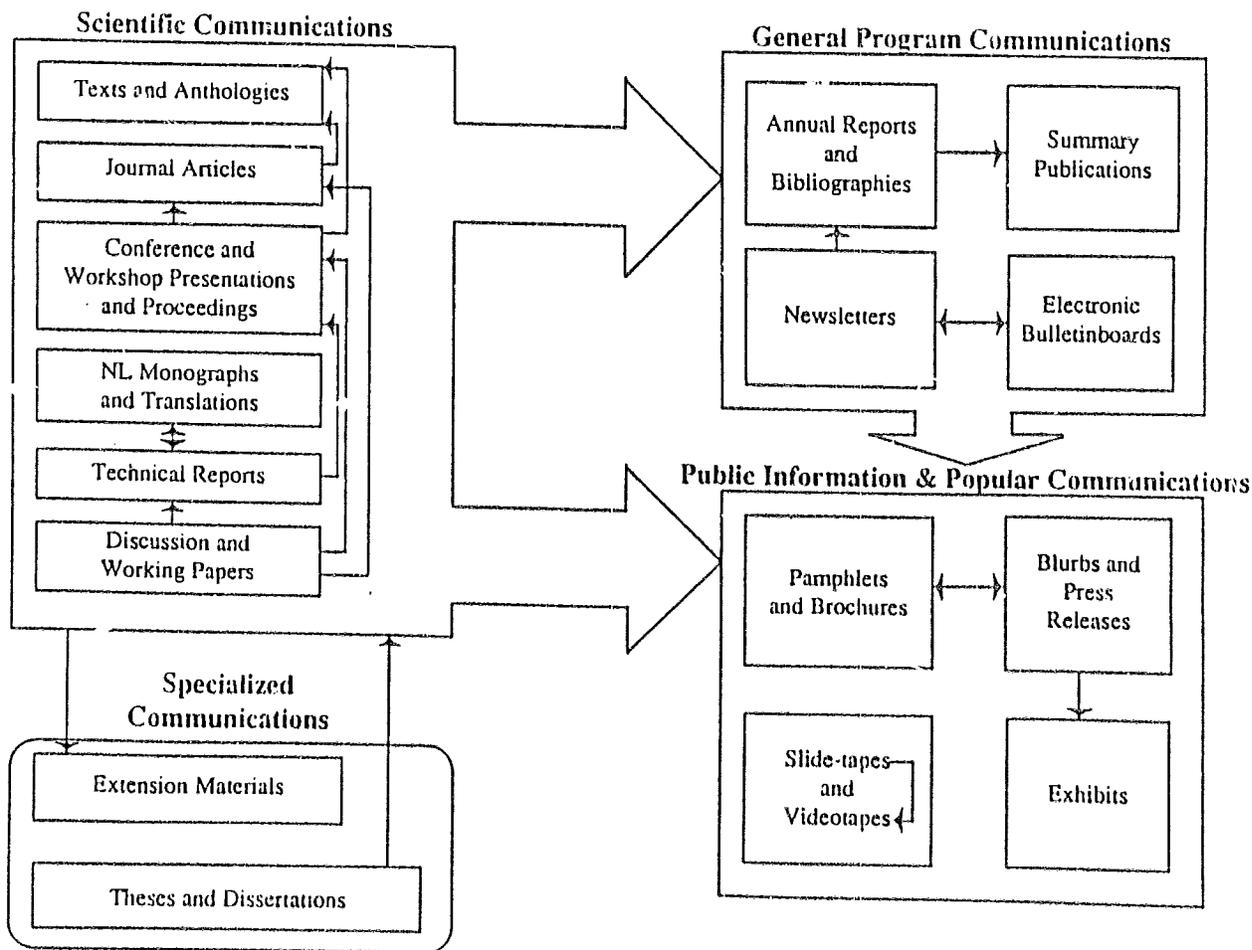
Mode of Communication	Sociology	Economics	Range/ Forage	Nutrition	Breeding/ Genetics	Repro- duction	Animal Health	Production Systems	Systems Analysis	Total
Books ^a	7	3	1	1	0	0	1	0	0	13
Chapters in books	10	5	4	7	33	8	2	10	0	79
Refereed articles	25	16	38	30	45	4	50	6	6	220
Journal articles submitted or in press	11	19	25	18	51	4	37	6	2	173
Technical communications ^c	134	111	107	61	221	37	29	65	0	765
PhD dissertations	2	2	15	3	11	3	5	1	0	42
BS and MS degrees/theses	8	10	20	33	28	17	11	5	0	132
Abstracts	9	20	125	93	221	43	76	15	14	616
Oral presentations	37	8	48	25	17	7	40	7	0	189
Total	243	190	383	271	627	123	251	115	22	2229

a - As of August 1988 based on MB n.d. plus SP annual reports

b - Published, in press, under contract, or in progress.

c - Includes technical reports, proceedings papers, and presentations at scientific meetings, conferences, and workshops.

with figures compiled by R. Primov and C. McCorkle, respectively.



A MODEL FROM THE SMALL RUMINANT CRSP

FIGURE 1: Data and Communications Model for SR-CRSP as developed by McCorkle, et.al, Sociology Component, University of Missouri-Columbia, October 1988.

Comments on networking and linkages are contained in other parts of this report. The EEP encourages the Board of Directors and the ME to commit adequate resources to this activity in the near future. It is particularly important to maintain ties with the five host countries involved to date.

There appears to be a unique opportunity to regionalize a research network on alpaca, building on the expertise developed in Peru and the U.S. Workshops on alpaca production could be a start toward the objective. This could serve as an example of regionalization which might later be expanded to small ruminant networks in Africa or Asia.

K. COOPERATION WITH FIELD MISSIONS

The EEP found substantial improvement this past year in the relationships of the SR-CRSP key personnel to the USAID Missions in each of the host countries visited. Comments on this item are detailed in the ME report to the EEP and in the EEP country discussions. These relationships are very important, not only in terms of improved communications, but for the continued exploration of additional funding sources as SR-CRSP traditional support continues to decline.

All SR-CRSP principals who travel to and from each of the host countries now pay regular visits to the USAID Mission offices. The mission in Bolivia provided resources to assist with the cost of a three-day workshop held in La Paz on May 3-5, 1988. Other missions may help as the SR-CRSP networking progresses.

L. RESPONSE TO STRATEGIC PLAN

A strategic plan for the SR-CRSP was completed in late 1988 at the request of management and the Board. A committee of seven made the initial draft and responded to critiques from other collaborators in the program. The EEP was provided an opportunity for input and was pleased to note adjustments as a result. The plan was approved by the TC and Board as an internal working document.

This 10-year strategic plan served as the basis for the preparation of budgets and program direction for a five-year extension as proposed by USAID representative, Joyce Turk. The plan and resultant discussions relating to the request for extension of the SR-CRSP have forced the Technical Committee (TC) to make some very difficult decisions about potential participants and program direction. Final decisions on these matters had not been made at the time of this report.

The Technical Committee has developed a set of criteria for the evaluation and selection of future sites for the SR-CRSP. This selection process will include an analysis of all existing host country sites. The EEP expresses some concern that the criteria, while focusing on the ability of the host country to perform under the collaborative mode, may tend to eliminate from consideration

some countries and some regions which have major populations of small ruminants. For example, sub-Saharan Africa should be a high priority research area, but human resources and institutions in the countries south of the Sahara may be too weak to host the program in a truly collaborative mode. Nevertheless, research activity on sheep and goats is critical to the solution of problems of desert encroachment and food production in sub-Saharan Africa.

The strategic plan and the TC discussions emphasize the importance of research in two ecosystems: 1) semi-arid lands; and 2) the humid tropics. About two-thirds of the total resources would be committed to these two studies and the collaborative mode would be emphasized.

The third thrust for future research as proposed by the strategic plan is labeled, "Focused Single-Discipline Research" with emphasis on animal health. The justification as stated is logical. Nevertheless, this focused research represents a break from the collaborative mode--a precedent that needs further study.

The fourth element of future SR-CRSP activities as outlined in the strategic plan is essential to the future continuity of the program. This element includes some resources for continued ties with former host countries, networking, and regionalization.

Members of the EEP still feel that future SR-CRSP activities should place more emphasis on the issue of agricultural sustainability and resource conservation. In a recent policy paper prepared by the Science and Technology Bureau of USAID, the statement is made that, "The major topic that will dominate discussion, resource allocation, and evaluation of agricultural development programs during the decades ahead will be that of 'sustainable' agricultural development."⁴ One key to the development of sustainable agricultural systems rests heavily on the design of proper management strategies for the production of small ruminant animals.

IV. PROGRAM EVALUATION: HOST COUNTRIES

A. KENYA

1. Introduction

Two members of the External Evaluation Panel, Drs. Saul Fernandez-Baca and S. Gordon Campbell, spent the first week of November, 1988, on a review visit to Kenya. At the start of the visit they had discussions in Nairobi with members of the USAID mission (Drs. McFarland and McCullough) and with Dr. S. Chema, Ministry of Agriculture and Livestock Department. They visited briefly with scientists at Kabete and proceeded to western Kenya. Enroute they visited the major goat breeding station at Ol Magogo. They also visited

⁴ Furtick, William. (Nov. 22, 1988). "U.S. International Agricultural Development: Directions for the 1990s and Beyond," S&T Bureau Working Paper. USAID, Washington, D.C.

they visited the major goat breeding station at Ol Magogo. They also visited the research station at Maseno and spent time with a dozen farmers who had been supplied with dual-purpose goats. Throughout the visit the members of the EEP were provided opportunities to visit and question all parties concerned. Resident scientists and farmers went out of their way to ensure that the visit was a successful one. All requests were met within the tight time constraints of the visit.

In general, the EEP members were most impressed by the amount and caliber of work being carried out in Kenya and the frank and open exchange which took place. The following report is an attempt to summarize the EEP findings within the guidelines supplied by the Management Entity.

2. Progress to Date: General

The projects in Kenya have carefully adhered to the log frame and project objectives. Some minor adjustments have been made as projects progressed to strengthen the research. The research achievements during the last two years are impressive. They are summarized in a document entitled, "Small Ruminant Collaborative Research Support Program Research Highlights, 1986-1988" which is available for review. This document was published in October 1988, and summarizes the research which has been accomplished during the last two years. By any measure, the tabulated results for all the projects in Kenya have been impressive. It is very clear from the lists of publications appended that the scientists involved have been getting the information out in a wide variety of documents, some of which are very high-quality, independently-reviewed publications (see list of publications of the Animal Health Project, for example).

For the next two years, it is clear that the scientists will have to carefully assess their priorities and selectively pursue those areas which: a) will be most profitable, and b) will be continued in the next phase of the SR-CRSP. This process will be difficult because many of the areas, for example feed resources, breeding and animal health, have promising long-term payouts. Very careful discussion and priority-setting will be needed so that promising projects are not aborted.

3. Evaluation of Sub-projects

a. Genetic Improvement of Dual-Purpose Goats Under Smallholder Farming Systems. This project is under the leadership of the Texas Agricultural Experiment Station, a part of the Texas A&M University system.

The progress made on this project has been excellent and on schedule. The EEP visited the dual-purpose goat foundation flock at Ol Magogo and will vouch for the presence of a large flock, well managed, and in good order.

b. EEP Recommendations.

• The members of the EEP, while complimentary about the excellent bodily condition of the animals, were concerned that the

feeding of concentrates and alfalfa to this flock may be somewhat unrealistic and produce results not easily possible elsewhere in Kenya.

- Major efforts had been made at Ol Magogo to reduce the neonatal mortality rates. These efforts and a careful definition of the causes of death in young goats (< 2 months) should be continued as they will provide excellent information for other goat breeders in Kenya.

- The EEP recommends in the strongest possible terms that the participants maintain the focus on the continued development of the dual-purpose goat, carefully monitoring its characteristics and framing plans for large-scale multiplication and distribution. This is the very *raison d'être* of the SR-CRSP in Kenya and must be given top priority at this time of limited funding horizons. The selection of Haemonchus resistant animals is an excellent project. It is long-range and interacts well with the sheep-model system and the health projects. However, it should not be pushed to the disadvantage of the successful completion of the basic breeding project.

- Similarly, the new initiative to evaluate goat cheese must take second place to the basic breeding and production elements. At this point in the CRSP, it would be well to focus resources sharply on the main project and perhaps seek supplementary funding for fresh initiatives and new projects.

c. Dual-Purpose Goat Production Systems for Smallholder Agriculturalists. This project is under the leadership of Dr. H. A. Fitzhugh at the Winrock International Institute for Agricultural Development in cooperation with the Kenya Agricultural Research Institute, Ministry of Science and Technology.

Considerable progress has been made towards accomplishing the goal of integrating dual-purpose goats successfully into the farming economy of western Kenya. The EEP members were impressed with the success stories they heard and the results observed on a dozen small farms. This SR-CRSP project has reached a critical stage and every effort must be made to bring it to a successful conclusion.

d. EEP Recommendations.

- Strengthen efforts to produce and distribute the full dual-purpose goat to western Kenya. Many of the present goats are not the dual-purpose goat. To achieve this, emphasis must be placed on breeding and production for the future.

- A summary should be made of all the feedstuffs used with their relative merits for goat nutrition. There are many potential feedstuffs in western Kenya and all of these cannot be investigated, so careful selections must be made from among those

presently available (with perhaps one or two promising imports). Focus should be on production and suitability (economics, nutritive value, etc.) for western Kenya.

- The addition of a qualified veterinarian is commendable. It will not be possible to investigate every disease of goats, but rather determine as accurately as possible the primary causes of morbidity and mortality of goats (especially kids in western Kenya). Simple control systems should be developed for inclusion in the Tech Packs.

e. Kenya Animal Health Research Component. This project is under the Ministry of Livestock Development in Kenya with Washington State University as the U.S. lead institution.

The animal health research component of the SR-CRSP in Kenya and at Pullman, Washington involves work with four diseases of goats: contagious caprine pleuropneumonia (CCPP), anaplasmosis, heartwater, and haemonchosis. All are important conditions in Kenya and one at least (haemonchosis) is a major disease of small ruminants in many parts of the world including the U.S.

In all cases the research approach has been sound with modern research techniques, providing an excellent exchange of information on the biotechnological approach to disease detection and prevention. The CCPP vaccine has been successfully developed and tested in goats under controlled conditions. It would appear to be efficacious. The only major remaining hurdle is to produce the vaccine on a large scale and submit it to widespread testing in the field (see later suggestions).

The two projects on anaplasmosis and heartwater have made excellent progress but are still at an early stage of development. The evaluation of possible genetic resistance to Haemonchus contortus is a major undertaking requiring a different approach than the other three. It will involve long-term and extensive study involving the collaboration of personnel in animal health, genetics, and systems analysis (the goat model).

f. EEP Recommendations.

- Top priority should be placed on the production of the CCPP vaccine.
- The principal investigator should reevaluate the four major areas under study and decide whether it would be more profitable to concentrate on two or three for the SR-CRSP work. There are two natural clusters viz CCPP, anaplasmosis and heartwater which go together while haemonchosis can be separated as a very large problem.
- The PIs should incorporate these priorities in the "Ten Year Plan."

g. Economic Analysis of Small Ruminant Production and Marketing Systems. Winrock International holds the U.S. institution role in the economic component of the Kenya SR-CRSP in cooperation with the Kenya Agricultural Research Institute. Dr. Hendrick C. Knipscheer is the project leader.

h. Sociological Analysis of Small Ruminant Production Systems. This project is also centered in the Kenya Agricultural Research Institute of the Ministry of Livestock Development. Dr. Mike Nolan, of the University of Missouri at Columbia, is the U.S. project leader.

i. EEP Recommendations. Both the economic and sociological analysis of the SR-CRSP in Kenya are well integrated into the projects described above. The economics component suffered from the loss of Mr. Luke Oyugi and we understand that competition is fierce for home country economists (and sociologists). Despite this the members of the EEP commend the sociologists for their publication of ten years of work and strongly recommend that both components, sociological and economic, be fully staffed and continued in the next phase of SR-CRSP.

4. Technological Package

Kenya scientists have made excellent progress in preparing their technological package. They have produced a document entitled, "Dual-Purpose Goat Technology Package for Small Holders in Kenya." This document contains some 70 pages in five sections:

1. Management and Nutrition
2. Development and Utilization of Forages
3. Herd Health Recommendations
4. Breeding Strategies
5. Various Appendices.

This Tech Pack is designed for use by extension agents and farmers. It contains a wealth of information, including the results of the research which has been carried out in Kenya. Members of the EEP saw the content of this Tech Pack being applied on the small farms in Kenya. This document will be useful for extension agents and farmers working with dual-purpose goats in Kenya.

The research and training which has been conducted under the SR-CRSP is most pertinent to the needs of the small farmers in Kenya. This is apparent from the contents of the Technological Package, the obvious good relationships which the scientists have with the farmers in the field (viewed first-hand by the EEP) and by the clear-cut relevance of the research to the problems of dual-purpose goats in Kenya. While the project is less than a decade old, it is clear that it has been directed towards the needs of the small farmers in Kenya, supplying them with dual-purpose dairy goats and providing information the farmers need to breed, feed, and keep the dual-purpose goat healthy.

While the project in Kenya has been kept very well focused, there will also be some fallout and ancillary research findings. There are examples of this in the studies which have been carried out in various feedstuffs which have been examined for goats, and also in the studies which have been done on the diseases of goats in east Africa. Many of the results of these projects will have application in other parts of the world.

5. Other Comments and Recommendations on Program

a. Personnel and Collaboration. While the SR-CRSP in Kenya has been very successful in many ways in conducting collaborative research and training projects, there were some concerns expressed to members of the EEP regarding the following:

- lack of **early** input by home country personnel.
- lack of substantial **representation** of home country personnel on key committees.
- lack of **cross-fertilization** between the members of various home countries, e.g. Morocco, Kenya, and Indonesia.

The members of the External Evaluation Panel felt that these concerns were valid. The Panel recommends that for the next phase, home-country personnel be taken into a completely collaborative role **early** in the piece, have good representation in the decision-making arenas, and have every opportunity to interact with other non-U.S. participating countries wherever this is possible. Much could be gained by this early input of host country personnel who have a very deep and long-range vested interest in the success of the projects.

b. Training. The training accomplishments of the SR-CRSP over the decade have been impressive, but with the 1990 horizon fast approaching, the training of personnel is now restricted. Attempts are clearly being made to allow students to finish up their degrees but no long-range plans can be made at the moment. There is no doubt that the training of personnel has been very useful and it is hoped that this can be continued. Many of the resident scientists have had out-of-country training and they have clearly profited from it.

c. Equipment and Facilities. The equipment and facilities which were viewed by the External Evaluation Panel were adequate, but certainly not excessive. It is clear that the host country has used the funds strategically to procure enough equipment and laboratory supplies to do the job. It is equally clear that the funds have been used to a great extent to provide facilities, equipment and supplies which would otherwise be very hard to get in Kenya. From this point of view, the funds have been well used. It is also clear that in the absence of SR-CRSP funds for items such as transportation, laboratory supplies, animal feed, and other expendables would be very hard to obtain locally.

d. Funding. It is virtually impossible without doing a complete audit to make any detailed statements concerning the adequacy of funding. Upon our request, the home country produced a 1987-88 SR-CRSP budget which is summarized in another section of this report. This gives an overall view of the expenditures for the year. In a general way, the EEP felt that a substantial number of results had been achieved on a relatively modest budget. The major items of expenditure in animal health were for laboratory supplies and experimental animals. This is to be expected in the production of a vaccine. In the breeding and production systems substantial amounts of money were expended on supplies for the animals. In major breeding programs such as this one, this is to be expected as is the purchase of experimental animals. The largest item in the budget was for research outreach activities and the EEP was certainly impressed that a large number of people had been involved in these activities and their effectiveness as evidenced by the response of the farmers to our visitations.

The development of the dual-purpose goat raises the possibility of a number of additional collaborators including the private sector, USAID, and other foreign agencies This is to be encouraged. The prominence of the program and its early success has guaranteed a large amount of interest from other agencies. The EEP felt that it would be most unfortunate if additional funding were not found for these Kenya programs which are at a critical point and for which the SR-CRSP has provided very strategic funds. The likelihood that USAID will select component parts for help with funds should be pursued.

The EEP recommendations with respect to funding are as follows:

- Over the next two years establish an order of priority for the most promising components of the present projects.
- Over the next two years complete, wherever possible, projects which are presently underway. There is, for example, a pressing need to complete the work on the vaccine, get it into commercial production, and press for extensive field trials on its efficacy.
- Continue to pursue the developing of the "synthetic breed" of goat; increase the numbers, and find methods of distributing the breed to the farmers. The EEP felt that, with respect to distribution, farmers might receive three goats of the synthetic breed and be expected within a reasonable period of time, for example three years, to return three offspring. There is also a need to establish multiplication centers for the future and this might be done in the private sector. In fact, the EEP members visited one multiplication unit which had been purchased by a private individual for the breeding and distribution of dual-purpose goats in western Kenya.
- Search for continuity of funding for the highest priority items in these projects. Possible sources of funding might include: USAID, other international agencies (perhaps European), and the private sector.

The work done under the SR-CRSP has been very promising in many areas: vaccine development, utilization of forages, and the development of the "synthetic breed" of dual-purpose goat. With careful planning continuity can be maintained. The Kenya scientists themselves are fully cognizant of these facts and have done much to further the projects on their own behalf.

EEP members were assured that the budget reductions of the last two years had a major adverse impact on the work. This was not evident from the quality of the work was observed. However, the budget reduction certainly had a major negative impact on **morale**.

e. USAID Mission Involvement. The EEP met with members of USAID both on entering and leaving Kenya. It was very clear that the USAID mission had a great deal of knowledge about, and interest in, the projects and their success. The USAID mission has clearly given their support to the programs. It was the feeling of the EEP, as stated by Mission officers, that the Mission would give serious consideration to continuing the best parts of the SR-CRSP projects so that they would not "fall flat on their face" after 1990. The EEP felt that this contact with the Mission and the potential for future collaboration and financial support should be vigorously pursued.

f. Linkages and Networking. The linkages and networking among the agencies within Kenya appear to be good. The Kenyans themselves were very knowledgeable about networking and linkages and discriminating in their usage. Regional networking is limited. The EEP felt that much could be gained by the SR-CRSP if scientists from the host countries were provided more opportunity to interact and network among themselves and with surrounding countries.

EEP members visiting Kenya in 1988 made two recommendations:

- That host country scientists who know the conditions in their own country should be included in all the deliberations at the beginning; and
- That host country scientists be given more opportunity to interact throughout the course of these projects. It was felt that much mutual support and exchange of information could be gained by the **personal** interaction of these people, rather than relying very heavily on the written word as is now the case.

5. Summary

The two members of the EEP were impressed with the progress which had been made by the SR-CRSP projects in Kenya. While this report might seem laudatory, it should be borne in mind that a review of this type is, of necessity, based on a short survey of the strategic elements of the program. During the process, the EEP members made suggestions as to the scientists' new research directions or provided on-the spot critiques. It should be noted that these projects, despite recent cutbacks, have

come a long way towards the successful fruition of the original objectives. The research is now at a critical point with the very real likelihood of success in the near future. It is, therefore, incumbent upon everyone involved to set some hard priorities so that the best of the projects might be continued. The writeups should be completed in the next two years, and careful plans made to continue the most promising elements of the SR-CRSP. Included in this list should be the development, testing, and distribution of the vaccine; the investigation and propagation of the most promising feedstuffs; and the distribution and follow-up on the dual-purpose four-way cross goats.

B. PROGRAM EVALUATION: MOROCCO

1. Introduction

Two member of the EEP, Drs. S. Gordon Campbell and Saul Fernandez-Baca, visited Morocco from 15th to 17th November 1988. Even though the time available for reviewing the SR-CRSP program in Morocco was extremely short, the diligent planning of the activities by the host-country representatives made it possible to visit the principal field work-sites and view the entire program. Visits were made to Tadla Experimental Station, where the projects on genetic improvement and nutrition are being carried out, and to the rangelands of the Middle Atlas where the range management projects are located.

These field visits, complemented by discussions with the national scientists, form the basis of this report. This report is limited due to the time constraints of the visit to Morocco.

2. Small Ruminant Production in Morocco

There are about 14 million sheep and 5.7 million goats in Morocco. Forty-six percent (46%) of the sheep population belongs to small farmers with less than 5 hectares of land. Morocco has the highest density of sheep population (20/km²) among all African countries. Sheep production plays a very important role in Morocco as a source of income for a large rural population and also for its special significance from the social, cultural, and religious viewpoints. The preference for mutton in the local market is reflected by its higher prices as compared to meat of other species (Dh.34 for mutton as compared to Dh. 30 for beef, 27-28 for goat, and 11 for poultry).

There are three main sheep production systems in Morocco: the agropastoral system, the oases system, and the more extensive range pastoral system.

The agropastoral system is located mostly in the cereal producing areas where sheep raising constitutes an important complement to cereal production. Cereal stubble and straw are the main sources of feed; these are eventually complemented with other agricultural by-products.

The oases system is characterized by a combination of intensive agricultural production under irrigation and the raising of highly prolific sheep breeds (i.e. D'Man), usually under confinement.

The pastoral system is based on the extensive rangelands located in the region of the Atlas mountains. Grazing takes place in the lower areas during the winter and in the highlands during spring and summer. Forests are also utilized for grazing. The fact that most of the rangelands are communal property, whereas sheep are privately owned, creates a rather difficult situation for the proper management of the natural resources in order to ensure sustainable agricultural production. This fact also limits the application of research results on range management, requiring the full cooperation of all the communities involved.

The seasonal fluctuations in feed availability for the animals in both the agropastoral and pastoral systems often leads to the practice of transhumance in order to ensure the survival of the animals.

It is estimated that more than 66% of the total sheep population of the country is raised in agropastoral systems; 22% of this corresponds to irrigated areas.

The productivity of sheep (measured as the number of lambs reaching slaughter age per ewe per year) is relatively low. The estimated national average is 0.6-0.7 and varies from region to region (0.57 of the Middle Atlas and 0.65 in the cereal production region of Meknes). The main contributing factors to this low productivity are the relatively low fertility rates (78-83%) and high lamb mortality (18-31%). The seasonal variations in quality and quantity of feed supply result in poor growth rates; a consequence of this is the low carcass weight at sacrifice (12-14 kg). Sheep production also faces the impact of parasitic diseases which causes sizeable losses. Other limiting factors include specific mineral deficiencies and/or toxicities.

3. Counterpart Institution

The host-country counterpart institution is Hassan II Institute of Agriculture and Veterinary Medicine (IAV). This Institute was formally inaugurated in April 1968 and since then it has had a remarkable development with the collaboration of different foreign institutions, among which the collaborative program with USAID and the University of Minnesota has played an important role. This program started in 1969 and is due to terminate in 1990.

At present the IAV is Morocco's largest and only graduate-level school of agriculture and veterinary medicine. It has about 2,300 students and 346 faculty members of which 85 are Moroccans. The Institute offers the Moroccan equivalents of the American BS, MS, and Ph.D. degrees in agriculture and a doctorate in veterinary medicine. In addition, it trains approximately 250 non-Moroccan African students (Erikson et al., 1986. The Hassan II IAV, an impact assessment study).

Apart from their teaching duties, the livestock group at the IAV is active in a large number of research activities aimed at finding solutions to basic constraints in the livestock sector. In order to ensure the proper extension of research results and other technical information to livestock producers, the IAV signed in 1984, a convention with the Livestock Service at the Ministry of Agriculture and Agrarian Reform (MARA). The Institute is also implementing contracts with sheep producers in order to increase productivity through the application of improved production and range management techniques. These activities also allow the gathering of valuable field data for research and teaching purposes.

4. Research Accomplishments

The research projects being executed with SR-CRSP support include nutrition, genetic improvement, and range management. It is understood that the sociology project has been discontinued.

The animal nutrition project is being carried out at Tadla Experimental Farm. Its main focus is the development of appropriate feeding strategies for sheep in the agropastoral system, with particular emphasis in the optimal utilization of local resources. The ultimate goal is to increase sheep productivity (reproduction and growth rates) through improved feeding and management. Several experiments on stubble grazing and the effect of different supplements on growth rate of lambs and reproductive efficiency of ewes are being evaluated.

The main focus of the genetic improvement project, which started in 1982, is the evaluation of productive and reproductive performance of the prolific D'Man and non-prolific Sardi breeds of sheep and the crosses between them. The evaluations are being conducted at the Tadla Experimental Farm where a sizeable amount of useful information has already been obtained. Future plans include the evaluation of F1 crosses in private farms and a selection program leading to the formation of a synthetic breed with a higher genetic potential for production in the cereal growing areas of Morocco and the Mediterranean region. This is a long-term program which will demand continuous financial support.

The second phase of the range project with SR-CRSP support was started in 1987 after a period of discontinuity. Studies are aimed at gaining a better understanding of the population structure, dynamics, and regeneration of native species such as Artemisia and herba-alba, and the improvement of the rangelands through different interventions such as the introduction of new plant species and grazing management. Part of the range project is being executed in communal grazing lands within the framework of a rural development project financed by the World Bank.

Even though SR-CRSP in Morocco does not include an animal health component, the staff of the IAV is actively engaged in the study of the epidemiology and prevention of parasitic diseases in the region of the Middle Atlas.

An important step of the Morocco program has been the preparation of a sheep production manual or technological package with emphasis in the agropastoral systems of Morocco and other Mediterranean regions. A copy of the French version of this manual was made available to the EEP team; it was understood that the English version is in the process of preparation.

5. Training

The training of national staff at different levels, both abroad and in Morocco, has been one of the most outstanding contributions of SR-CRSP to the process of institutional strengthening. This trained manpower constitutes a real asset for the country in general, and for the IAV in particular. Table 3 contains a list of Moroccan trainees that have received some degree of financial support from SR-CRSP for their graduate studies in US institutions. Most of the financial support for these students has come from a combination of CRSP funds with that of other institutions, mostly the USAID/University of Minnesota/IAV project.

SR-CRSP has also supported the training of 31 Moroccan degree candidates at Hassan II IAV and the National School of Agriculture at Meknes from 1981 to 1988 (Table 4).

6. Publications

An impressive list of publications is included in other sections of this report.

7. General Comments

One of the interesting features of the program in Morocco is that the counterpart institution is a teaching and research institute (IAV). Therefore, the research program is likely to provide the necessary reinforcement of the teaching activities. A better knowledge and understanding of the small ruminant production problems in the country as well as the means to solve them will be valuable for professional formation more in line with the characteristics and needs of their country. The support of SR-CRSP has been a key factor for the initiation of research activities at Tadla Experimental Farm located in the cereal-sheep producing area.

The SR-CRSP has also played a catalytic role for the establishment of inter-institutional working relations within the country. The EEP was favorably impressed with the close working relationship between IAV scientists and the staff of the Regional Agricultural Offices in charge of extension activities. Furthermore, the conduct of field trials on the recovery and management of rangelands in collaboration with native communities is a commendable step.

The EEP would like to express its concern about the future of the program after the termination of SR-CRSP support. Even though the IAV has a cadre of well-trained scientists, it will be necessary to have continuous financial support to attain its full scientific production capabilities. Unfortunately, the termination date of CRSP coincides with the termination of the USAID/Minnesota project. It is hoped that adequate provisions will be taken by the host country to ensure the continuity of the program.

Finally, regarding the studies on range management, it would be highly desirable to include an economic component in order to analyze properly the cost/benefit relationships of different interventions.

TABLE 3

**Training of SR-CRSP-Sponsored Moroccan Students
in Degree Programs in the U.S.**

<u>Name</u>	<u>Degree</u>	<u>Program</u>	<u>Dates</u>
El Aich, A. ¹	PhD/Range Mgt.	Utah State	06/81-09/86
Aitboulahcon, A. ²	PhD/Animal Nut.	North Carolina	01/86-12/89
Berkat, O. ³	PhD/Range Science	Utah State	10/81-07/84
Boujenane, E. ⁴	PhD/Genetics	UC-D/Breeding	09/83-06/88
Bourfia, M. ⁵	PhD/Breeding	UC-Davis	09/85-01/86
Chafik, A. ⁴	MS/Breeding	UC-Davis	09/84-09/85
Derquaoui, L. ²	PhD/Endocrinology	UC-D/Breeding	09/86-03/87
Ilham ²	PhD/An. Nutrition	North Carolina	07/84-06/87
Mounsif, M. ⁴	MS/Range Science	Texas Tech	05/85-12/86
Narjisse, H. ²	PhD/Range Mgt.	Utah State	08/79-05/81
Rihani, N. ⁶	PhD/An. Nutrition	North Carolina	08/85-08/88

1. Attending Colorado State, partial support
2. Partial support
3. At Texas A&M, overseas research supported by Utah & Texas Tech
4. Supported by Univ. Minnesota/IAV Training programs
5. Support 11 weeks at UC-D for doctoral dissertation
6. Attended University of California

Source: SR-CRSP Summary Report, Program Year Eight, 1986-87 (Prepared by ME, UC-D).

TABLE 4

Numbers of Moroccan Degree Candidates Trained
in Morocco with SR-CRSP Support
(1981-1988)

<u>Program</u>	<u>Hassan II IAV</u>	<u>Nat'l School of Ag,</u>	<u>Totals</u>
Utah State/Range	5	--	5
N. Carolina/Nutrition	8	15	23
UC-D/Genetics	3	--	3
Totals	16	15	31

Source: SR-CRSP Summary Report, Program Year Eight, 1986-87 (Prepared by ME, UC-D).

C. PROGRAM EVALUATION: INDONESIA

1. Introduction

Members of the EEP have not visited Indonesia since the fall of 1987. The report of that visit is included in the 1987 EEP report. However, the EEP did read the various work plans for 1987-88. They also received and read the annual reports from the various projects. In addition, Panel members were provided with the observations on the SR-CRSP made by Dr. Ned S. Raun upon his return from Indonesia as well as the remarks of Dr. J. W. Oxley, Director, Management Entity, who also visited Indonesia in 1988. The following brief report is a summary from all of these sources.

2. Concerns Expressed by the EEP, 1987 Report

- Members of the EEP were gratified to learn that the temporary drought had been broken in Indonesia and that the general bodily condition of the sheep and goats under experimentation was much improved.

- The EEP expressed concern about the large number of projects on nutrition. They were pleased to learn that these had been reduced in number and become more focused.

- Concern had been expressed about the lack of a health project in Indonesia. This was especially true of the sheep being kept under relatively unique conditions in rubber and other plantations. The Panel was pleased to see that plans had been made to provide some assistance from veterinarians associated with Balivet of AARD, the Australian advisors from Cook College, and the disease investigations center near Medan. These efforts are very constructive and are to be commended. Since transportation was a difficulty foreseen by all of the visitors to Indonesia, the EEP would recommend that some reasonable funds be made available for this purpose.

- The EEP expressed some concern about the public relations aspects of the SR-CRSP in Indonesia and felt that the success of these programs should be publicized, particularly locally where cooperation is so desirable. The EEP notes that the following commendable additions were made in the field of communications:

- a meeting in October of 1988 involving persons from 25 institutions;
- the completion of five video tapes for technology transfer;
- the implementation of a national network issuing the first newsletter on small ruminants in Indonesia;
- starting a data bank of literature references.

The panel was also very pleased to see that plans had been made to prepare a booklet entitled, "The Small Farmer in Focus: Small Ruminant Research and Applied Technology Testing in West Java." We feel that the

preparation of this booklet and its associated publicity will do much to raise the profile of the SR-CRSP projects in Indonesia.

With respect to the specific projects, the EEP has the following observations:

a. Genetic Improvement of Sheep and Goats. Dr. G. E. Bradford's work plan and budget for 1988-89 detailed the need for another senior scientist on this project and made the suggestion that Dr. Quirk might be a suitable candidate. In view of the very important nature of the genetics projects in Indonesia--characterization and utilization of the prolificacy hair traits of various types of sheep, and the evaluation of the sheep and their crosses--the EEP would hope this matter has been resolved or that Dr. Bradford has in place plans to provide him some relief. The genetic component of the small ruminant program in Indonesia is an important one and considerable investment of time and materials has been made. It is hoped that problems of personnel can be solved so that these long-range plans can be successfully brought to fruition.

This component introduced St. Croix hair sheep to Indonesia. Crosses of this breed can substantially increase the growth rate of lambs. Other accomplishments of breeding and management include shortening the lambing interval, reducing lamb mortality, and developing prolific ewes which can produce twin lambs.

b. Nutrition and Feeding Systems for Small Ruminants. The work on nutrition and feeding systems, under the direction of Drs. W.L. Johnson and K.R. Pond, was of great interest to the EEP when they visited Indonesia. The members noted that the effort was wide-ranging and of great importance to the sheep industry there. It included utilization of tree legumes and several local by-products as well as making salt and mineral supplementation more common practice. They are gratified to note that another excellent nutritionist has been added to the team (Professor K.R. Pond) and that the overall number of projects has been reduced to a more manageable level. It should be stressed that the work in nutrition in Indonesia is extremely important. The EEP's concern was that as the 1990 horizon approached efforts be consolidated and stress placed on those aspects of nutrition which were most promising and most likely to be of value, given the limited time available. Progress has clearly been made towards this end and a variety of very interesting projects on feeds and feeding and grazing under plantation conditions are proceeding in a constructive fashion. These latter experiments of grazing under rubber trees with adequate control of parasites are likely to have application in many parts of the world.

c. Economic Analysis of Small Ruminant Production and Marketing Systems Sociological Analysis of Small Ruminant Production Systems. The EEP last year noted that the economics and extension aspects of the work in Indonesia were extensive and impressive. These components are vital to the collaborative research mode. It is very clear from the 1987-88 annual report that these initiatives have been carried forward and extended to include additional transfer of technology, farmers' meetings, improved communications between various groups

of small farmers, and to enhance the practical training of extension agents. The additional plans to prepare and present a manual on the economic analysis of small farm animal research are highly commendable. This manual would not only have a great deal of use in the farming systems in Indonesia, but some of its contents would be applicable in other parts of the world, for example, the economic, statistical, and animal production concepts that apply to conducting on-farm animal research. It is hoped that the economists working in Indonesia will give this manual a very high priority in the next two years.

The EEP was pleased that Dr. Ned S. Raun supported their recommendations for the small ruminant CRSP in Indonesia. Dr. Raun made two additional observations in which he stressed the need for agrostology input and the need for more integration of the research projects. The EEP commends both of these suggestions and suggests that they be included as agenda items for the appropriate committees of the SR-CRSP.

D. PROGRAM EVALUATION: PERU

1. Introduction

The SR-CRSP program in Peru was reviewed by two members of the EEP, Drs. Gerald W. Thomas and Saul Fernandez-Baca, on 19-20 December 1988. Current security problems in Peru prevented any visits to field work sites; therefore, the team concentrated its evaluation work in Lima, according to a schedule prepared by the site coordinator.

Meetings were held with representatives of the institutions closely related to CRSP activities such as the Instituto Nacional de Investigacion Agraria y Agroindustrial (INIAA), which is the national counterpart institution; the Instituto Veterinario de Investigaciones Tropicales y de Altura (IVITA) of San Marcos University; the Universidad Nacional Agraria, La Molina (UNA), and the Universidad Nacional del Altiplano, Puno (UNA-P). Even though the national counterpart institution is INIAA, most of the research work under SR-CRSP sponsorship is carried out by the latter three institutions, through specific agreements with INIAA. Visits were also made to USAID mission in Lima both at the beginning and at the end of the review process.

During the second day of the program review, oral presentations of research results and other related activities were made by the Peruvian scientists which gave a panoramic view of the overall program in Peru.

Several events that occurred in Peru during the 1987/88 period affected the CRSP program in different ways. The national counterpart institution, INIPA, underwent a reorganization process which resulted in the formation of INIAA in June 1987. The main feature of this change was the separation of the extension component (formerly under INIPA) to be integrated into the structure of the Ministry of Agriculture. This separation may not be advantageous from the point of view of quick dissemination of research results to the producers, unless an effective

linkage and communication between research and extension is established. The second event was the killing of two members of the community project in the Mantaro Valley, near Huancayo. This tragic event led to the suspension of the field work in that project and has seriously hampered the Technology Validation Project at the peasant community level. A further aggravation of the social unrest in the area of Huancayo has led to the decision to close the project office in Huancayo. This decision was taken by the ME office at the time the EEP team was reviewing the program. Finally, starting in October 1988 a new site coordinator was appointed; Dr. Arturo Florez took the post held until that date by Dr. Enrique Nolte.

In spite of the above limitations, it was the impression of the EEP that the SR-CRSP program in Peru has achieved outstanding progress in terms of both quality and quantity of research results with commendable efforts to disseminate these results both in the country and in the region.

The present report summarizes the major accomplishments and indicates the shortcomings of the program in Peru. With no direct access to the field, the report is based on the information gathered during the meetings and that contained in the annual reports.

2. Progress

The SR-CRSP research in Peru is focussed on the improvement of the overall productivity of sheep and camelids which are by far the most important small ruminant species in Peru from both economic and social standpoints. The research disciplines included in the Peruvian SR-CRSP are animal breeding, health, nutrition (range and pasture), economics, and sociology. In addition to specific research carried out in each one of these disciplines, a multi- and inter-disciplinary project was initiated in 1987 for technology validation in peasant agropastoral communities (Community Project) near the Mantaro Valley. What follows is a summary of the research accomplishments in each project with special reference to the period 1987/88.

3. Research Accomplishments

a. Animal Breeding - Montana State University/UNA-La Molina, UNA-Puno. After breeding work at the SAIS was discontinued because of security reasons, the studies are focused on the evaluation of the productive performance of native Criollo sheep as a basis for their genetic improvement. It is estimated that about 72% of the sheep population in Peru is of the Criollo type.

A project to evaluate the response to mass selection and improved environment in Criollo sheep was established at three communities in the Mantaro Valley as part of the Technology Validation Project (TVP). As a first step, studies were carried out in family flocks to gain information about flock structure, selection criteria for rams and different

management practices such as shearing, mating systems, etc. Unfortunately, this project had to be discontinued after the sad incident referred to above. At the Chuquibambilla station, the comparison of the production performance of Criollo sheep from two different sources (Puno and Cusco) revealed no differences in fertility, birth weight, weaning weight, and fleece weight and the quality between the two groups. The progeny will go into a selection program as one group regardless of origin.

Given the enormous economic importance of alpacas in Peru and other countries in the region, and the fact that very little is known about the breeding and genetics of these species, it is rather unfortunate that little attention has been paid to this area of research in the current CRSP program.

b. Reproduction. Even though this discipline no longer forms part of CRSP, a special fund was assigned by the ME to a Peruvian scientist for the specific purpose of initiating a project on the development of techniques for embryo transfer in vicunas and alpacas. Some progress has been made in the induction of super-ovulation and techniques of recovery of embryos and their transfer to recipients. There is no doubt that such techniques could be useful tools for: a) enhancing the increase in the population of vicunas (transfer of vicuna embryos to alpaca recipients) which is an endangered species; and b) a better understanding of the reproductive biology of camelids as a means of improving the rate of reproduction.

c. Range and Forages - Texas Tech University/IVITA, UNA-La Molina and UNA-Puno. Much of the work in this area has been concentrated on the analysis of research results and the preparation of the manuscripts for publication. A rather impressive number of articles covering a variety of subject matter such as animal production, animal nutrition and forage intake, grazing systems and management, diet selectivity, etc. have been published, or will be published, in scientific journals and in the form of separate volumes of a series of research papers published in Spanish.

This discipline was also a component of the TVP in the communities of the Mantaro Valley.

Prospective research plans for the future include the evaluation of complementary grazing of Andean rangeland with sheep, llamas and alpacas; and the use of crop residues as feed for alpacas.

d. Animal Health - Colorado State University/IVITA. Having determined that the high neonatal mortality in alpaca is related to Clostridium perfringens type A (CPA) and enteropathogenic E. coli, in association with the failure of passive transfer of maternal antibody, studies are now in progress in the development of a field diagnostic test and the pathogenic mechanisms for CPA enterotoxemia.

On the other hand, studies to evaluate the feasibility of controlling chronic respiratory diseases in sheep (ovine pulmonary carcinoma and

ovine progressive pneumonia) are in progress. The success achieved at CSU in the development of a model for rapid, consistent induction of ovine pulmonary carcinoma in neonatal lambs should facilitate the development of more effective means to control the disease.

As part of the community project, the usefulness of some indigenous plants for the control of certain parasitic diseases has been evaluated (Nicotiana sp. leaves and artichoke leaves for the control of Melophagus ovinus and liver flukes, respectively). Even though preliminary results seem to be promising, the availability of these plants and their economic advantages should be evaluated properly, preferably at experimental stations.

e. Economics - Winrock International/UNA-La Molina; INIAA; Grupo Yanapai. This component has allocated most of its resources to support the Technology Validation Project in the Mantaro Valley. In spite of the difficulties, an important body of information has been gathered on the characteristics of production systems in the peasant agropastoral communities in the Central Sierra of Peru. One of the interesting results is the use of labor. It was found that time invested in tending livestock is almost twice as much as that allocated to crops in spite of the general perception that livestock is the subsidiary occupation.

f. Sociology - University of Missouri-Columbia/INIAA, Grupo Yanapai. This component assumed the responsibility for coordinating the Technology Validation Project in peasant communities, with the participation of all disciplines involved in the SR-CRSP in Peru. An office was organized in Huancayo and several field assistants were hired. After the tragic event in 1988, field work at the communities was discontinued at it was rather concentrated at the experimental stations of IVITA, INIAA, and UNA in the Mantaro Valley. Consequently, the sociology project changed the research emphasis from technology validation in the field to analysis of data already accumulated from the field work.

Nine publications based on several years of work in the Mantaro Valley communities are to be coordinated and completed by the sociology project. This is in line with the larger sociology project, already under way, to synthesize and publish its research results to date across all SR-CRSP sites.

The UM-C Sociology Project also assumed the responsibility for coordinating the preparation of the "Technology Package for Peru" in close collaboration with the other CRSP disciplines. The EEP expects that the preparation and publication of this important document will be completed shortly.

4. Future Research Plans

In view of the limitations posed by the social problems for field work, one consequence being the closing of the project office in Huancayo, future work will concentrate on the analysis and publication of the research results so far obtained.

Publications will be prepared both for scientific journals and for technical papers or bulletins which may have wider utilization among extensionists and farmers. The completion of the technology package for sheep and alpacas, in which all research information suitable to the highland conditions will be integrated in a readable form, is considered by the EEP a matter of high priority.

The EEP also recommends that in addition to the above tasks, and in order to maintain a collaborative spirit among disciplines and among institutions, some workshops be organized and carried out both within the country and in other countries in the region that may benefit from the research results generated in Peru. These countries could be Ecuador, Chile, or Bolivia. The three workshops held during 1988, one in Lima (26-27 September), one in Arequipa (29-30 September), and one in La Paz, Bolivia (3-4 May 1988), in which research results obtained under SR-CRSP were presented, are a commendable effort which should be continued and expanded.

There is no doubt that the research program in Peru responded well to the needs of the sheep and alpaca farmers. However, in spite of its achievements, the application of research results in the field, especially at the level of small farmers, appears to be very limited. The extension services frequently face serious financial constraints. Linkage between research and extension needs strengthening. With the present separation of extension from research in INIAA, the problems of coordination may increase. It is necessary therefore, to explore and develop alternative channels to deliver the information to farmers, in addition to the official extension channels.

5. Personnel

As mentioned earlier, even though INIAA is the counterpart national institution, research work is carried out mostly by staff from three national universities. The direct participation to date of INIAA's scientific staff has been limited. It is envisaged that this participation will increase in the future, as expressed by the Technical Director of INIAA. In addition, there are some Peruvian scientists paid from SR-CRSP funds under fixed-term contracts. There are no expatriates working in Peru on a long-term basis at the present time.

The participation of host country scientific personnel appears to have been adequate both in quantity and quality. The only criticism has been that in many cases the commitment of the scientists has been on an individual basis rather than through institutional channels. This situation seems to be improving. The hiring of Peruvian residents with

SR-CRSP funds is a good way to strengthen the scientific manpower. However, the fact that these personnel are not formally attached to any national institution, does not contribute to the institution-building objective of SR-CRSP. The EEP holds the view that all research activities, including national personnel in charge of them, should be incorporated within existing institutional structures. This, without doubt, will increase the possibility of continuation of the program after the termination of SR-CRSP. It would also seem desirable to avoid large differences in salaries between SR-CRSP-supported national personnel and those of the national institutions. In general, there seems to be good collaboration between host country personnel and U.S. scientists.

6. Training

A summary of the number of Peruvian students trained in the U.S. and in Peru under the sponsorship of SR-CRSP is presented in Tables 5 and 6. There is no doubt that training has been one of the major contributions of the SR-CRSP in Peru. Most of these students, after completion of their training, are working in Peru. Those working at the universities are contributing to the quality of teaching which should result in the improvement of the professional level in the future. It is expected that the national institutions will provide the proper working environment, including adequate financial incentives, to take full advantage of this trained manpower.

TABLE 5

Training of SR-CRSP-Sponsored Peruvian Students In Degree Programs in the USA

Field of Study & Institution	MS	PhD	Total
Animal Health (CSU)	---	3	3
Breeding (MSU)	---	1	1
Range Management (TTU/USU)	6	3	9
Reproduction (Cal. Poly)	1	---	1
Reproduction (USU)	3	3	6
Economics (Winrock)	3	2	5
Sociology (UM-C)	4	1	5
Systems (Texas A&M)	1	---	1
Totals	18	13	31

Source: Workshop on research results of SR-CRSP in Peru (1980-88) Lima, Sept. 1988 (in Spanish).

TABLE 6

Training of SR-CRSP-Sponsored Peruvian Students in Peru

Field of Study and Institution	BS	MS	Total
Animal Health (CSU)	3	1	4
Breeding (MSU)	11	7	18
Reproduction (USU)	3	2	5
Range Management (TTU)	10	11	21
Economics (Winrock)	8	1	9
Sociology (UM-C)	10	--	10
Totals	45	22	67

Source: Workshop on research results of SR-CRSP in Peru (1980-88) Lima, Sept. 1988 (in Spanish).

7. Equipment and Facilities

All national institutions participating in the program have adequate field and laboratory facilities for the research work. SR-CRSP support has been valuable for the purchase of some equipment and supplies not available in the country as well as for the provision of some operational funds to facilitate the work.

The EEP was concerned by some comments made by local authorities about the lack of information to the national institutions about the purchase of equipment with CRSP funds. This is an administrative matter that should be addressed by the site coordinator.

8. USAID Mission Involvement

The USAID mission in Lima is very well acquainted with SR-CRSP activities and progress. They seem to fully support the program. Their concern about the future of the program in view of the limitations for field work because of security problems, is shared by the EEP. The EEP recommends that a careful evaluation of all aspects of the program in Peru, as well as the further development of social and political issues, be made before making a final decision.

9. Linkage and Networking

One of the weak points of SR-CRSP in Peru has been the lack of proper coordination among the participating national institutions. This fact has been pointed out repeatedly in the reports of the EEP. In many cases there was no coordination even among disciplines within the same institution. On the other hand, INIAA personnel have not participated directly in the research work and there was hardly any institutional contact between the participating universities and INIAA. The EEP was reassured by the efforts that are now being made to overcome these limitations and seek greater institutional communication through meetings, seminars, workshops, etc. It was also understood that more people from INIAA will be directly involved in the research activities. The workshop presented in La Paz, Bolivia, was a good way to convey the results to the other countries in the region. Besides, the establishment of personal and institutional relations with other countries should be useful for future collaborative research.

The EEP strongly feels that these outreach activities should be strengthened and expanded to other countries in the region. In order to carry them out in an orderly fashion it would be desirable that the ME prepare a specific program of outreach activities during the period 1988/89.

10. Concluding Remarks

It is the impression of the EEP that the SR-CRSP in Peru has been very fruitful in research results and in the training of national professional staff.

Even though livestock research has a long tradition in the country, the SR-CRSP has played an important role in the establishment and support of long-term research programs. The young professionals returning to the country after completion of their training programs have been provided with facilities and the scientific backup of more experienced scientists, such as the PI's of the SR-CRSP, to use their knowledge and abilities for research which will benefit their own country.

The EEP concurs with the decision made by the ME and the project leaders that further field work in Peru must be very limited due to security of personnel. The recommendations discussed with the Peruvian counterparts during the EEP visit to Peru were further refined by the technical committee during their meeting in Dallas on January 22-25, 1989. These are: 1) to continue with data analysis and publication; 2) to schedule at least two regional workshops (Ecuador and Cajamarca, Peru); and 3) to evaluate ways to work more effectively with INIAA for field data collection and evaluation

Finally, the important role of livestock in the sustainability of agricultural systems needs to be emphasized. There is no government policy in Peru to encourage conservation. Many farmers who have other sources of income besides agriculture, do not care about sustainability,

whereas the contrary is true for real farmers who entirely depend on agriculture for their living. The EEP would like to stress the importance of considering the concept of sustainability in all areas of research in small ruminant production systems in the Andean region.

E. PROGRAM EVALUATION: BRAZIL

There is currently minimal funding for SR-CRSP activities in Brazil; however, a cadre of Brazilian scientists with good facilities is in place as a result of the CRSP. Efforts have been made to ensure continued linkages with Brazilian counterparts. The minimal monetary support and the lack of specific research objectives has endangered this linkage.

Two volumes which summarize the country research have been prepared with joint authorship between former U.S. Principal Investigators and Brazilian scientists with Ph.D. degrees obtained under SR-CRSP sponsorship. They are: "Tropical Hair Sheep Production" by Dr. Maurice Shelton and Dr. Elsie A.P. Figueiredo; and "Improving Meat Goat Production in the Semi-Arid Tropics" by Dr. William Johnson and Dr. Elderlon R. de Oliveira. The latter is currently in press.

The effectiveness of continuing linkages with Brazil will depend upon specific funding with carefully defined objectives.

V. PROGRAM EVALUATION: U.S. INSTITUTIONS

A. UNIVERSITY OF CALIFORNIA AT DAVIS

1. Introduction

In addition to the responsibility of UC-Davis as the Management Entity (ME), the University holds leadership for the project entitled "Genetic Improvement of Sheep and Goats." This project, with Dr. G.E. Bradford as Principal Investigator, is in cooperation with two host country institutions: the Institute Agronomique et Veterinaire (IAV), Hassan II, Rabat, Morocco; and Balai Penelitian Ternak (BPT), Bogor, Indonesia.

Most of the sheep research at UC-Davis is funded by the University. CRSP funds are used primarily for graduate students. Stipends for these students now range from \$12,000-17,000.

The focus of the UC-Davis breeding program is on growth rate and breeding season. Work is continuing on the evaluation of the lines of sheep selected for many generations for growth and multiple births, on their line crosses, on out-of-season breeding, and on cryopreservation of embryos. This work complements the field research in Morocco and Indonesia.

2. UC-Davis Morocco Component

Data from the first two lamb crops produced by 365 ewes of nine genetic groups have been analyzed. The results show that the D'Man breed transmutes its superior prolificacy in an essential additive manner. This provides the possibility of creating groups of sheep with mean litter sizes at any desired level.

Studies are continuing of the physiology of D'Man and Sardi breeds to capitalize on their differences. A small flock of D'Man goats has also been established at Tadla Farm.

A manual (Teck Pack) on sheep production in Mediterranean regions has been drafted and should be available in 1989.

3. UC-Davis Indonesia Component

Studies of the experimental flock of Javanese sheep maintained at the Cicades Station near Bogar provide confirmation for the hypothesis of a major gene for prolificacy in these sheep. This means that genetic potential and nutrition management can be appropriately matched, leading to more efficient use of resources for sheep production.

The evaluation of hair sheep and their crosses in a system of grouping under rubber trees is progressing well. Crosses designed to reduce or eliminate the remaining wool on the backs of the sheep should increase performance in Indonesia.

The annual report lists 11 papers in journals or symposium proceedings, and several technical papers and abstracts.

4. Observations by the EEP

The SR-CRSP is a small but important component of the research at UC-Davis. It has provided for good graduate training for foreign students. The publication record is good. The balance between the expenditure of funds in the U.S. as compared with the field locations is satisfactory.

The project at UC-Davis does not now include activities at all locations. Questions were raised by UC-Davis personnel about the potential value of the system's project and the expenditures in the U.S. (Note: See Texas A&M report on this topic.)

Since members of the EEP did not meet with all levels of administration at the University of California, we were unable to measure the support beyond the PI level. However, at the PI level we found strong support for the collaborative approach, opportunities for the SR-CRSP to take advantage of other university projects, with a high return on the SR-CRSP funds.

The new emphasis on "sustainable" agricultural systems should be easily adapted to UC-Davis since the administrative unit where the SR-CRSP resides

carries the name "College of Agriculture and Environmental Sciences." The SR-CRSP program should take advantage of this diversity of scientific knowledge.

B. PROGRAM EVALUATION: COLORADO STATE UNIVERSITY

1. Introduction

Members of the EEP did **not** visit Colorado State University at Fort Collins this year. This brief report is based on limited field observations and on a study of the Annual Report 1987/88, the Tenth Year Work Plan, 1988-89, prepared by PI, Dr. J.C. DeMartini, and an evaluation of some of the research results and publications cited.

The Colorado State University project is entitled "An Investigation of Small Ruminant Health Problems." The project is in cooperation with IVITA/San Marcos University and the other SR-CRSP scientists.

The investigations of small ruminant health problems in Peru have encompassed studies on:

- neonatal mortality in alpaca and lambs.
- health problems in community flocks.
- respiratory diseases of sheep.
- disease survey work, "small projects" at IVITA.

At the outset, it should be stated that the work on alpaca is virtually unique with very few comparable studies on alpaca being carried out elsewhere. Further, all the work has been carried out under the most difficult political conditions in Peru. This has made travel and collaboration between Peru and the U.S. most difficult. The prospects for improvement in the situation do not seem good at the moment.

2. Results in the Past Twelve Months

a. Prenatal mortality in alpaca. These studies parallel classic studies in calves and lambs done some time ago and are essential if the mortality rates in newborn alpacas are to be kept to a minimum. The results found to date would indicate that, while similarities exist with other ruminants (colostrum deprivation, etc.), certain aspects of the alpaca work are different, the significance of Clostridium perfringens type A, for example. These results confirm that fact that further research on young alpaca is essential and highly desirable.

b. Community flock health. This study has involved projects to evaluate the efficacy of management and local drugs to control ecto and endoparasites of sheep. This type of work must be repeated wherever sheep and other ruminants are kept under different climates and management conditions. It is basic and important work, essential for the maintenance of their health. The work in Peru has the interesting new dimension of using local "native" drugs for the control of these parasites.

c. Respiratory diseases of sheep in Peru. This project will provide information, basic and practical, which will be useful for the diagnosis and control of respiratory diseases in adult sheep in Peru. There is currently a world-wide interest in retroviruses and other labs in the U.S. and elsewhere are conducting similar projects. The Colorado State project will augment this work (Dr. DeMartini is a recognized authority in this field) and will provide useful information of these respiratory diseases under Peruvian conditions of management and husbandry.

d. Other projects at IVITA. The SR-CRSP has provided seed money to fund small projects at IVITA on small ruminant diseases. While the EEP could not review these projects in situ, the topics chosen vis Mycoplasmosis, Sarcocystis, Toxoplasmosis, and Plant Poisoning are very appropriate and the EEP is very well aware from its experiences in other countries how desirable and useful this type of small project funding can be.

3. EEP Recommendations

In view of the very difficult conditions in Peru which make truly collaborative work impossible but in recognition of the unique and valuable nature of the work which has been done at Colorado State and in Peru, the EEP recommends that **priorities be set** for all projects in Peru. The EEP order of priority would be: 1) research on alpaca because it is unique; 2) work with Community Flock Health Programs; 3) respiratory diseases in sheep are being studied elsewhere; 4) some small research projects in Peru might be continued, but it is hard to see how they can be truly collaborative in the spirit of SR-CRSP.

It is obvious that interdisciplinary work cannot reasonably continue in Peru. EEP recommendations, as shown in other parts of this report focus on: 1) providing funding to wind down SR-CRSP projects in Peru in a way to minimize personal hardship caused by termination and to complete projects and publish results where possible; 2) seek an alternate site for small ruminant collaborative research in like surroundings. It is particularly important to pursue work on the alpaca and to regionalize a network to continue this effort. If it should not prove possible to follow up on the alpaca, consideration should be given in the next phase to the selection of another ruminant at a location in the Alto Plano of South America.

C. PROGRAM EVALUATION: NORTH CAROLINA STATE UNIVERSITY

1. Introduction

North Carolina State University holds the responsibility for two major research projects under the SR-CRSP. While no visits were made to NCSU by the EEP in 1988, observations were made of the collaborative research in Indonesia in 1987 and Morocco in 1988.

Project leadership at NCSU was assigned to Dr. Kevin R. Pond after Dr. W.L. Johnson moved to another project in Peru. The two projects under Dr. Pond's leadership are:

a. Nutrition and Feeding Systems for Small Ruminants in Indonesia. The host institutions cooperating on this project are: 1) the Animal Husbandry Research Institute (BPT), Bogor, West Java, and Sungai Putih, North Sumatra; and 2) the National Rubber Research Institute (BPP), Sungai Putih, North Sumatra.

b. Nutrition and Confinement Feeding for Sheep in Semi-Extensive Production systems in Morocco. The host institutions for this project are: 1) Hassan II Institute for Agronomy and Veterinary Medicine (IAV), Rabat; and 2) the National School of Agriculture (ENA), Meknes.

The research work being carried out by NCSU in Indonesia and Morocco is focused on: a) the nutritional value of locally available feedstuffs for small ruminants; b) the development of guidelines for the formulation of nutritionally and economically optimum diets; and c) the development of strategies for more efficient use of the local feed resources, especially in small farming systems.

NCSU is one of the institutions that has been participating in the SR-CRSP since its initial stages, first in Brazil and later in Indonesia and Morocco. Work in Indonesia was initiated in 1980, and in Morocco in 1981.

There is, without doubt, a strong institutional commitment and effective support for the international activities of NCSU; therefore the activities under SR-CRSP have strong technical and administrative support at the university.

The staff on NCSU has established a high degree of collaboration with the host country scientists both in Indonesia and Morocco. Research in progress responds to the needs of each country and in particular to the need of the small farmers.

It is evident also that there is good collaboration with other U.S. institutions in the host country; such is the case in Morocco where there is a close collaboration with the breeding project in the development of better feeding strategies for selected genetically productive sheep.

Research and training accomplishments during the past twelve months have been important and are described in the review of each host country.

D. PROGRAM EVALUATION: UNIVERSITY OF MISSOURI-COLUMBIA

1. General Observations

Drs. Gerald Thomas and William Flinn, of the EEP, visited the university in October 1988 for an on-site review of the SR-CRSP program. Both EEP members were impressed with the institutional commitment to the sociology program and the leadership which the sociology program provides to the entire SR-CRSP.

It should be noted that the SR-CRSP is the only CRSP that continues to have a significant social science component and the integration of the social sciences is one of the program's most significant achievements. The economic component at Winrock and the Missouri Sociology Project have worked hand-in-hand to provide the biological sciences with valuable information on what types of interventions will be culturally and economically accepted.

The functions of the social science projects are unlike the biological components in that they do not produce technology *per se* but ensure that the technological packages benefit the small farmer. In this respect, the social science research has not been academic or disciplinary, but applied, service, or extension oriented. The social sciences have provided the multi-disciplinary or inter-disciplinary aspects of the SR-CRSP.

The Sociology Project (Sociology Analysis of Small Ruminant Production Systems) is the only SR-CRSP project which has attempted to work in five host countries. This has produced a special challenge for the Sociology Project because of budget constraints. Funding has always been insufficient to allow comprehensive projects in all host countries at all times throughout the life of the SR-CRSP. Hence, the categories outlined in the EEP Scope of Work do not always fit the mandate of the social sciences on the SR-CRSP.

2. Research Progress

The following research themes are being carried out across several sites and in the U.S.:

- The interactions between plant and animal production--sometimes conflicting, and other times complementary.
- Bio-social roles (women, men, children, elderly) in agricultural production, transformation, consumption, and distribution.
- Indigenous knowledge systems of animal management (e.g. in range management and animal health).
- Methodologies targeting beneficiary groups for doing participatory on-farm research and extension.
- Several general cross-site accomplishments should be cited:
 - Generation of cross-site, synthesizing publications by topical areas of research on the CRSP Sociology Project.
 - Anthology on agropastoral systems research conducted in all five host countries by the Sociology Project.
 - Anthology on the sociology of range management based on studies by sociology project and other scientists worldwide.
 - Anthology on the role of sociology and anthropology in international agricultural development.
 - Anthology on the pioneering new field of ethno-veterinary research and development.

- Scholarly texts on crop/livestock and range management systems in Peru published or in progress in both English and Spanish.

a. Training.

- Students have been well integrated into graduate program/student life and into courses and areas related to their immediate home-country needs.
- The Sociology Project has created innovative internships for undergraduate students in the department--to give them hands-on experience in the realm of international agricultural development.
- The Project has utilized non-traditional methods of supporting the professional development and/or in-country training of host-country students and scientists, which has made possible more field research for a wide range of nationals linked to the SR-CRSP.

b. Personnel. There have not been sufficient funds to staff full-blown research programs simultaneously in all countries. As a result, the level of effort has varied from site to site over time.

c. Institutional Support. The SR-CRSP Sociology Project is directly integrated into the department's research and teaching programs via the Graduation Specialization in the Sociology of Agriculture. UMC commitment to the Sociology Project is demonstrated by the University's willingness to forego collection of indirect costs. The Office of International Agriculture Programs has provided technical, logistical, and financial support to the project.

3. **The Sociology Component in Indonesia**

a. Research Progress.

- Facilitating development of the Outreach Pilot Project (OPP) in West Java and its derivative in North Sumatra.
- Enhancing the capabilities of the socio-economic research unit within the Research Institute for Animal Production (RIAP) via graduate degree training and private support for research by counterpart scientists.

b. Personnel. A lack of personnel, both trained social scientists and potential sociology project trainees. This has meant that the project has had to place expatriate scientists rather than national staff in basic project management positions. A heavy demand has been placed on sociology project personnel to engage in technology transfer activities, sometimes to the detriment of disciplinary research.

c. Institutional Support. A decline in funding for the SR-CRSP and from host country sources has had a negative impact on all projects,

including sociology. Indonesian salary and per diem policies make utilization of scientists' expertise difficult.

4. The Sociology Component in Kenya

a. Research Progress. The project entitled "Evaluation of Dual-Purpose Goats' Impacts on Household Nutrition and Economy" has confirmed trends identified during the first year of research:

- Milk remained an essential source of protein, especially in areas where other sources of protein (i.e. fish, meat, beans) were not regularly consumed.
- Most households continued to spend considerable portions of their income on expensive commercial cow's milk.

b. Survey Coordination. Sociology has coordinated the multi-disciplinary rapid survey designed to identify household characteristics and resource constraints to 90 farm households that will participate in the 1988-89 farmer-managed dual-purpose goat on-farm trials.

c. Personnel. The project has relied on expatriate personnel because the counterpart has been in the U.S. for the past four years pursuing graduate studies.

d. Funding. Funding shortages for the SR-CRSP make keeping expatriate personnel permanently on staff impossible.

e. Institutional Support. Lack of a social science unit in the Ministry of Livestock Development and the Kenya Agricultural Research Institute handicaps developing a comprehensive social science research program on the Kenya SR-CRSP. It is difficult to find opportunities and support for training U.S. students in sociology at the Kenya site.

5. The Sociology Component in Peru

a. Research Progress.

1) Integrated Research in Peasant Communities. This project has focused on the design of technology validation experiments appropriate to conditions found in peasant communities. All field work in the region was discontinued after the killing of two CRSP field workers in June 1988. This means a shift in research emphasis--from technology validation in the field to analysis of intermediate results. Sociology will assist by coordinating the editing and production of nine proposed publications based on prior years of work in Mataro communities.

2) Technological Domains of Women in Mixed Peasant Farming Systems. This Sociology Project is concerned with production, consumption, processing, and distribution of

agropastoral products; management of natural resources; and women's roles in community, inter-household, and other bio-social groups (girls/boys, elder women/men) in crop and livestock systems.

6. Status of Peru Technology Package

- Responsibility for coordinating, editing, and producing this document has been delegated to sociology, working closely with the Range Management, Animal Health, Reproduction, and Economics Projects.

7. The Sociology Component in Morocco

a. Research Progress. Sociologists have participated in inter-disciplinary research on range conditions for small ruminant production in the high Atlas mountains. This work was completed in 1987. In the last report EEP suggested that further sociological research be concentrated in the Tadla area where an institutional base exists and other SR-CRSP projects were concentrated.

b. Personnel. No Moroccan counterparts available to collaborate on work in Tadla area. This caused the Sociology Project to phase out the Morocco project.

c. Institutional Support. The difficulty in getting national scientists to engage in inter-disciplinary research has slowed progress. However, a working arrangement for providing opportunities for training U.S. students in Morocco has been developed.

E. PROGRAM EVALUATION: MONTANA STATE UNIVERSITY

No official visit to Montana State University was made by the EEP in 1988, although members did attend scheduled meetings of the Principal Investigators. The Montana project is entitled "Evaluation and Improvement of Small Ruminants in Extensive Management Systems." Dr. P.J. Burfening is the Principal Investigator. Project focus is on genetic improvement of sheep and alpaca.

Collaborating institutions for the MSU project in Peru are INIAA, IVITA, Universidad Nationale de Altiplano, Puno (UNA-P).

As stated in the Peru country report, the severe limitation in field work will mean that the major emphasis for 1989 will be on analysis and publications of results of past research.

Genetic improvement of sheep by Montana State and Peruvian annual scientists has focused on two approaches. The first includes further improvement and expansion of the better stock as a source of genetic material for upgrading the Criollo. The second is to improve the Criollo by direct selection within the population. The scientists recommend importation of

additional genetic material on a very conservative basis, at least until the matter of adaptation to Peruvian conditions and markets is determined.

The same general approach to genetic improvement of the alpaca is suggested by the collaborative research team. The potential for genetic improvement to increase the productivity of both alpaca and sheep is very good. It is unfortunate that the program must be curtailed at this time due to unforeseen in-country circumstances.

Montana State University is supplying about one-third of the U.S. cost of this SR-CRSP project. The out-reach phase, through the community project, was designed as an inter-disciplinary effort.

F. PROGRAM EVALUATION: TEXAS A&M UNIVERSITY

1. Introduction

Texas A&M has been a cooperating institution in the SR-CRSP program since its initiation. This participation is important since Texas produces 20% of the sheep and 90% of the goats in the United States. Texas A&M has a strong research and extension program and the small financial contribution of the SR-CRSP provides access to this important R&D effort. Ten scientific man-years are committed to sheep and goat research at Texas A&M. Most of the SR-CRSP funds go toward the support of graduate students.

Two SR-CRSP projects are headquartered at Texas A&M. These projects were reviewed in depth in September, 1988 by two members of the EEP, Drs. S. Gordon Campbell, and Gerald W. Thomas. The review team found a strong and enthusiastic commitment at all levels of administration for the small ruminant programs.

2. Breeding Dual-Purpose Goats for Tropical Areas

The responsibility for this project was shifted to Texas A&M in 1982. The primary objective of the project is to develop a new breed of dual purpose goat (DPG) utilizing exotic dairy and indigenous breeds focusing on adaptation to Kenya smallholder production conditions. Secondary experiments were superimposed on the breeding flock to answer specific questions needed for the smallholders. These include: 1) milking strategies; 2) growth and development characterization; 3) lactation patterns; 4) carcass characterization; 5) dairy milk vs. weaned kid potential; 6) postpartum estrone cycling; 7) artificial insemination procedures; 8) development of age, sex, and weight correction factors; 9) determination of age by dentition; and 10) grazing habits.

The new DPG was "computer designed" for specifications that were optimal for western Kenya and systematic distribution of DPG's is underway. It is anticipated that the demand for the new breed will be very strong.

Future plans for this project include: 1) to produce increased numbers of four-breed composites to establish a viable base for developing the new

breed; 2) to establish programs for private breeder involvement; 3) to distribute foundation stock for major multiplication; and 4) to follow up on numerous secondary objectives. Dr. Maurice Shelton is working on the final draft of a publication summarizing the results of the breeding program under the leadership of Texas A&M.

The EEP found good collaboration with the host country on the DPG project. In addition, Egerton University and the Kiboko Station have expressed interest in the "intensive" and "extensive" developments. It is planned for the International Livestock Center for Africa (ILCA) to become an active collaborator in the exploitation of the dual-purpose goats.

A major strength of the program is the visibility and widespread interest in an exciting new breed of goat which incorporates many of the characteristics needed for the smallholder in Kenya. The focus on a new breed has led to increased interest on the part of the smallholder in several aspects of management, forage production, and economics. If the plans materialize as projected, Kenya could then become a source for distribution of dual-purpose goats to other countries.

The EEP has raised some questions as to whether or not the logistics and total cost of the dual-purpose goat distribution program has been considered. The involvement of private industry in the multiplication and distribution of the dual purpose goats is a good idea, but plans have not yet been formulated as to how to implement this approach.

3. Systems Analysis Project

Texas A&M has the lead role in the Systems Analysis Project for SR-CRSP. The major objective is to formulate and test practices developed or nominated by other SR-CRSP projects and to develop a simulation model for small ruminant animals. Sub-projects included in this program are:

- Formulation of Production Packages for Smallholder DPG Production.
- Performance of DPG Flocks on Improved Forage Packages on Smallholder Farms: Simulated Response to Projected Forage Interventions.
- Semi-intensive Dual-Purpose and Intensive Dairy Goat Production Systems: Simulated Production Potential for the Smallholder and Larger Operations.
- Using the Goat Model to Evaluate Various Hypotheses Concerning the Biology of the Goat: Extending Model Use and Operation.
- Optimizing Management and Breeding Packages for SAIS, Cooperative, and Community Smallholder Flocks.
- Strategies for Reducing the Impact of Internal Parasites on Sheep and Goat Production.

- Utilization of Forage and Sheep and Goat Data Collected by ILCA to Examine Production Systems.

The key element in system analysis is the "simulation model." The development of these models required a great deal of data collection, program experimentation, and implementation. This has meant that a major portion of the funding has been spent on the campus of Texas A&M. A sheep model and a goat model have now been developed, verified, and validated.

In past years the EEP, as well as some of the other project investigators, have raised questions about the cost and the value of these new small ruminant simulation models. The EEP members who reviewed this work at Texas A&M and interacted with other project leaders in 1988 now feel that the value of the simulation model has been underestimated even though some of the PI's have not as yet used the model. The SR-CRSP model should be useful to small ruminant research in the U.S. as well as in many other countries of the world for many years in the future.

The concept of a sheep and goat simulation model grew out of the experience with a beef cattle model developed by Texas A&M in 1976. Since that time the beef model has been widely used by many institutions in the simulation of beef production systems. The new models for sheep and goats are more sophisticated than the beef cattle model and should have a greater potential for future use. Within the U.S. there have been serious requests to use the model by scientists in several states and at the U.S. Sheep Station in Idaho. In addition, these models have been distributed to Brazil, Morocco, Egypt, and Indonesia as well as ILCA. The models are comprehensive with great utility for extending data to practical production terms which can substitute for expensive experiments.

It is anticipated that the SR-CRSP models will be copyrighted and made widely available. Future work will focus on model enhancement, graphics capability, refinement of the parasitic component, linkages to forages, and increased interaction with other institutions and scientists. The Texas Agricultural Experiment Station has provided 3-5 times more funding for the simulation models than the SR-CRSP. However, the models would not have been developed without the collaboration of the SR-CRSP and the stimulus provided by CRSP funds.

G. PROGRAM EVALUATION: TEXAS TECH UNIVERSITY

Texas Tech holds the responsibility in the SR-CRSP for the project entitled, "Improving Small Ruminant Nutrition, Management, and Production through Range and Forages Management." This project is an integral part of the collaborative research in Peru. Cooperating institutions include:

- Instituto Veterinario Investigaciones Tropical y Altura (IVITA, Lima and La Raya).
- Universidad Nacional Agricultura-Puno (formerly UNTA).
- National University of Piura (UNPG-Lambayaque)
- National Agrarian University (UNA, La Molina).

Two members of the EEP, Drs. Gerald Thomas and S. Gordon Campbell, reviewed the program at Texas Tech in September, 1988. The EEP was impressed with the research under the leadership of Dr. Fred C. Bryant and with the cooperation of administrative personnel in the College of Agricultural Services. No opportunity was provided to observe the extent of support at the president's level, although it was pointed out that a study was currently underway concerning the structure of all international programs at Texas Tech, including the International Center for Arid and Semi-Arid Land Studies (ICASALS). The former president of Texas Tech, Dr. Larry Cabazos, has been appointed by the White House to the position of Secretary of Education.

The Texas Tech range and forages project has made effective use of the Texas A&M sheep and goat simulation models.

Due to the problems in Peru as outlined earlier, most of the future plans for field research by Texas Tech will not develop. Tech personnel feel very strongly that field testing and community validation are critical to their research. Discussions were held concerning a possible move to Ecuador for field studies.

During 1989, Dr. Bryant and cooperating personnel will concentrate on data analysis and publications. This may require more funds for the U.S. portion. Currently, there is a backlog of data from experiments which have had research agendas lasting 3-5 years. To proceed with an orderly phase-down, to insure that these data are not lost in files at various worksites and to insure the data will be published should the SR-CRSP terminate in 1990, data sets are being transferred from Peru worksites at La Raya and Chuquibambilla to Texas Tech. These data will be organized and analyzed, and preparations will begin to develop publication outlines and formats.

The range/forages component at Texas Tech has integrated with all other components of the SR-CRSP. Due to the limitations of resources assigned to the project from SR-CRSP, Texas Tech will continue to provide a major source of funds and personnel to insure the success of this important project for the rural communities of Peru.

H. PROGRAM EVALUATION: UTAH STATE UNIVERSITY

Members of the EEP did not visit Utah State University in 1988 although interaction with the Principal Investigator was possible at several meetings. Two projects are under the direction of USU with Dr. John C. Malachek, Range Scientist, as the Principal Investigator.

1. Range Research for Increasing Small Ruminant Production in Developing Countries (Brazil)

The decision was reached in February 1987, that the range project work in Brazil would be converted to a "linkages" approach. This meant that a small sum of SR-CRSP funds (\$13,000) would be expended to facilitate ongoing work

at the National Goat Research Center (CNPC) and to maintain collaborative relationships with Brazilian scientists through EMBRAPA.

The past project emphasis has been on (a) caatinga vegetation manipulation and forage production, (b) ecological biochemistry of caatinga browse plants, (c) assessment of forage and major nutrient intakes by free-ranging goats and sheep utilizing caatinga ranges, and (d) evaluation of energy and protein supplementation for free-grazing does during the dry season.

2. Range Research for Increasing Small Ruminant Production in Developing Countries (Morocco)

The collaborating institution in Morocco is the Institute Agronomique et Veterinaire. The institute has a well-qualified group of scientists with a strong interest in range and livestock research. The major project objectives are:

- to understand the resource base use in the Artemisia-Stipa ecosystem;
- to assess the ecological potential of the resource base;
- to design an optimal grazing system for the two dominant plant communities in the Artemisia-Stipa ecosystem; and
- to identify alternatives for improving primary and secondary productivity.

Dr. Malachek is proposing that some new sites be added to the range research component of the SR-CRSP. Funding limitations may prevent this expansion. Utah State is presently complying with the matching fund requirements of the SR-CRSP. The university is providing valuable input into the collaborative research objectives of the program.

I. PROGRAM EVALUATION: WINROCK INTERNATIONAL INSTITUTE FOR AGRICULTURAL DEVELOPMENT

All members of the EEP made a site visit to Winrock International (WI) on 4-5 December 1988. The purpose of the visit was to get acquainted with Winrock's small ruminant activities both within and outside SR-CRSP, and its commitment to agricultural research and development in general.

Comprehensive information about the activities of the Institute was presented by the staff. A visit was also made to the facilities of the Institute at its headquarters.

The present WI came into being in July 1985 by the merger of three organizations with a copious experience in international agricultural development. These organizations were: the Agricultural Development Council (ADC), the International Agricultural Development Service (IADS), and the Winrock International Livestock Research and Training Center (WI). Winrock research

and development activities are now widespread. The institute is now carrying out a total of 43 projects in three continents: America, Asia, and Africa. The projects cover a wide area of agricultural development such as training, research, experiment station management, etc.

Two projects are being executed by WI under the SR-CRSP program:

- Economic Analysis of Small Ruminant Production and Marketing Systems. Host countries: Indonesia, Kenya, Peru.
- Dual-Purpose Goat Production Systems for Smallholder Agriculturalists. Host country: Kenya.

The main objective of the first project is to develop and adapt sheep and goat production systems to the needs of smallholder farmers in the humid and semi-humid tropics, with emphasis on economic aspects. The aim of the second project is to develop and adapt goat production systems to the needs of smallholder agriculturalists in the humid and semi-humid tropics with emphasis on dual-purpose goats to produce milk and meat. These two projects are executed in cooperation with other U.S. institutions representing different disciplines. They are, therefore, truly collaborative projects.

It was obvious to the EEP that WI is strongly committed to its international programs. SR-CRSP-sponsored projects have strong institutional support. Winrock has been participating in SR-CRSP since 1979 when the program initiated its activities. The institute has had the opportunity to share the initial difficulties and to enjoy better times.

WI has developed a high degree of collaboration with the host country institutions in Indonesia, Kenya, and Peru as well as with other U.S. institutions in the host countries.

Research and training accomplishments of WI in the three countries have been outstanding. The numerous publications in the form of books and chapters in books, journal articles, and technical communications indicate the high scientific productivity of the Institute. As far as training is concerned, WI has supported a large number of trainees in U.S. universities as well as in host country educational institutions. The review of each country program contains more information about research and training accomplishments in the host countries.

Winrock International is to be complimented by its interest and dedication to international agricultural development, especially in favor of small farmers in developing countries, and its achievements within SR-CRSP.

J. PROGRAM EVALUATION: COMMENTS ON THE MANAGEMENT ENTITY

The University of California at Davis has served as the Management Entity for the SR-CRSP since its inception. During the past 10 years, three different program directors have been appointed. In addition, Dr. William C.

Weir has served as Interim Director on several occasions. This turnover in leadership has created some problems for the program.

The present Director, Dr. James W. Oxley, took office on January 26, 1988. Dr. Oxley has demonstrated good leadership and has moved rapidly to orient himself by visits to all of the field locations except Morocco and Kenya. He has also visited six of the cooperating universities and held regular meetings with key personnel involved in the program including USAID and BIFAD staff.

The EEP feels that, in spite of budget limitations there is a need for additional support staff in the Management Entity. As the SR-CRSP projects have progressed an increased burden, including various types of reports, workshops, and publications, inevitably has fallen to the ME without benefit of increased personnel. Some structural changes in the organization may partially offset this deficiency, but new emphasis on accountability and publishing research results places heavy demands on the office.

Lack of attention by some of the PI's to internal reporting systems and some built-in delays in funding tend to complicate the ME task. The ME needs more timely advice from USAID on available or anticipated resources. Also the level of contingency funds is minimal.

The EEP found no mismanagement of funds either by the universities or by the ME. Host country management appeared to be variable, but satisfactory.

The sequence and timing of reports for the SR-CRSP should be carefully examined by the ME and the Board of Directors. Annual reports should be received in time for the ME to conduct an analysis ~~before~~ the EEP report is prepared. The EEP should receive these reports and ME responses at least two months before the EEP report is finalized. It would also be desirable to have annual reports in hand before the EEP makes site visits to host countries.

The EEP compliments Dr. Jim Oxley, Program Director, for submitting a detailed response to our previous recommendations. (See Section III,F.)

VI. ACKNOWLEDGEMENTS

The External Evaluation Panel expresses sincere appreciation for the hospitality extended to members who visited the host countries of Peru, Morocco, and Kenya in 1988. Pleasant memories also carry over from the 1987 meetings in Indonesia, as well as the inspirational challenge made by Dr. Jan Nari, director of CRIAS in Indonesia. His statement captures the essence of the collaborate mode of SR-CRSP:

"--Technically Sound
--Economically Feasible
--Socially Acceptable
--Environmentally Appropriate"

Appreciation is expressed to the SR-CRSP Principal Investigators; members of the Board of Directors and the Technical Committee; and all collaborators who provided annual reports, copies of proceedings, minutes of meetings, and other useful documents for the tenth report of the External Evaluation Panel.

Our thanks to Dr. Jim Oxley of the Management Entity, who responded to each request for information and who has provided conscientious guidance to the program.

The EEP was again impressed with the enthusiasm, dedication, and commitment of all personnel to the worthy objectives of the Small Ruminant Collaborative Research Support Program.

The chairman of the EEP expresses thanks to the Center for International Programs at New Mexico State University for office support and especially to Claudia Smith-Porter for her help in typing, editing, and report compilation. While NMSU is not a participant in the SR-CRSP, the matching contribution of the institution is significant.

Gerald W. Thomas, Chairman
External Evaluation Panel

APPENDIX A:
PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Indefinite with
Life of Project: 3-year Minimum
From: FY 10/87 to FY 10/90
Total U.S. Funding: \$2,400,000. est.
Date Prepared: 10.1.82

Project Title & Number Small Ruminant Collaborative Research Support Program/DAM-132B-G-SS-4093-00

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program Goals: Improve the efficiency of meat, milk and fiber production of sheep, goats and camelids in developing countries by:</p> <ul style="list-style-type: none"> - expanding the body of knowledge on small ruminants and smallholder production systems. - developing and testing appropriate technologies and practices to improve productivity of target production systems. - expanding the level of competence of 	<p>Measures of Goal Achievement:</p> <ul style="list-style-type: none"> a) Availability of published information on the new knowledge developed. b) Evidence of improved competence of U.S. and developing country manpower by the quantity and quality of new trained manpower. c) Evidence of availability of suitable technology packages to improve small ruminant productivity. d) Baseline survey data available for 	<ul style="list-style-type: none"> a) Test Technology Packages under actual farm conditions and develop materials for user application. b) Publish a compilation of project communications including theses, books, abstracts, professional journal articles and oral presentations. c) Publish an analysis of training and other institutional building accomplishments. 	<p>Assumptions for achieving goal targets:</p> <ul style="list-style-type: none"> a) That constraints identified to date can be relieved by newer knowledge. b) That host country personnel trained by SR-CRSP will remain in research and extension related to small ruminants. c) That research undertaken will succeed in providing practical solutions. d) That the research and training effort envisioned will in fact improve the competency of developing countries and US
<p>Project Purposes: To conduct collaborative research to develop and/or test technologies that improve small ruminant production by:</p> <ul style="list-style-type: none"> - bringing together the resources of U.S. institutions having expertise in the disciplines of ruminant nutrition, genetics and breeding, range science, economics, sociology, health sciences and systems analysis with institutions in the developing countries in order to facilitate 	<p>Conditions that will indicate purpose has been achieved: End of project status:</p> <ul style="list-style-type: none"> a) Viable and functioning collaborative research projects in the U.S. and Host countries with identifiable personnel. b) Identifiable personnel under training in the developing countries, U.S., and through in-country programs. c) Research results that demonstrate significant improvement in sheep and goat 	<ul style="list-style-type: none"> a) Reports from Mission personnel and host country representatives that chronicle adoption of methods based on SR-CRSP research and testing. b) Reports from host country personnel that indicate numbers of improved small ruminants requested by farmers exceed numbers available c. Inquiries from Mission personnel that express interest in accessing SR-CRSP expertise through a basic ordering 	<p>Assumptions for achieving purpose:</p> <ul style="list-style-type: none"> a) That political and economic stability within host countries will enable research institutions and scientists to function effectively. b) That host country extension systems will adopt and promote the methods developed through SR-CRSP research to relieve the constraints identified.
<p>Outputs:</p> <ul style="list-style-type: none"> a) Technological packages of validated practices developed in specific locations but readily adaptable to other similar ecological zones (evidence to regionalization). b) An understanding of the interacting forces constraining improved efficiency and development of management practices incorporating the new knowledge and techniques. 	<p>Magnitude of Outputs:</p> <ul style="list-style-type: none"> a) Manuals, other publications, and presentations at meetings and workshops. b) Examples of improved management techniques of production practices resulting from SR-CRSP research. c) Examples of tests/demonstrations in technological package development. d) Evidence of improved small ruminant research capability in U.S. and host country institutions through numbers of projects. 	<ul style="list-style-type: none"> a) through reviews by EEP and others enumerate annual publication lists and lists of workshops, seminars, special training courses, all of which achieve various objectives and/or degrees. Trainee lists by country of origin and site of training including thesis and degree. Host country workshops and proceedings therefrom. b) Reports from Mission and host country personnel that demonstrate use of innovations arising from SR-CRSP research. 	<p>Assumptions for achieving outputs:</p> <ul style="list-style-type: none"> a) That those identified as collaborators and trainees will assimilate the technical information and have the will to apply it to the host country situation. b) That collaborators and staff in developing countries will be willing to work with SR-CRSP subgrantees in the appropriate field.
<p>Inputs:</p> <ul style="list-style-type: none"> a) Grant No. U.S. DAM-132B-G-SS-4093-000 with University of California. b) 25% minimum cost sharing by each participating U.S. institution. c) Experience and expertise of U.S. and developing country staff to undertake the planned research as specified in the integrated Program Plan. d) Students and other collaborators from U.S. and developing country institution 	<p>Implementation Target (Type and Quantity) Extension of grant from 10/1/90 through 9/30/99 as requested by Board of Directors and Management Entity.</p>	<p>Annual reports and periodic evaluation by External Evaluation Panel, USAID, JACARD and BIFAD to summarize progress made and to plan for the future. Audit of each subgrantee, the Management Entity and the SR-CRSP as a whole. Each subgrantee, the Management Entity, and the SR-CRSP as a whole are subject to audit by AID/W or their designee.</p>	<p>Assumptions for providing inputs:</p> <ul style="list-style-type: none"> -That SR-CRSP will be funded by AID to carry out the proposed work plans. -That overseas collaborating institutions will continue to receive domestic funding and adhere to the terms and conditions of the Memoranda of Understanding with Management Entity. -That U.S. institutions and their faculty will continue to retain an active interest

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Indefinite with
 Life of Project: 9-year minimum.
 From FY 10/90 to FY 10/99
 Total U.S. Funding \$31,101,000
 Date Prepared 10/1/88

est.

Project Title & Number Small Ruminant Collaborative Research Support Program/DAN-1328-G-SS-4093-00

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program Goals: (continued) U.S. and developing country scientists to conduct research. - improving food and fiber production capability.</p>	<p>Measures of Goal Achievement: (continued) comparing improved packages with current practices. e) Socio-economic evaluation of improved packages for smallholder families.</p>	<p>d) Review by involved agencies and institutions including USAID (3-year reviews); External Evaluation Panel (yearly reviews); Administrative Council and Board; JACARD; and developing country institutional means of verification.</p>	<p>Assumptions for achieving goal targets: scientists. e) That the capacity and capability of increasing productivity will be grasped by the developing countries.</p>
<p>Project Purposes: (continued) the development of a base of knowledge and manpower from which improved management systems and increased efficiency of small ruminant can be achieved.</p>	<p>Conditions that will indicate purpose has been achieved: End of project: (continued) productivity in developing countries and U.S. d) On-farm tests and demonstrations showing that technological packages can be used effectively by smallholders. e) When demand for improved breeds or lines of sheep and goats exceeds supply an indication that smallholders desire</p>	<p>agreement or buy-ins. d) Design and implementation by USAID missions of bilateral projects which follow on or build on to SR-CRSP activities in host countries.</p>	
<p>Outputs: (continued) c) The practical application of knowledge gained and its methods of implementation through publication, consultation, active workshops and trained manpower.</p>	<p>Magnitude of Outputs: (continued) numbers of scientists involved and fiscal resources committed. e) Generation and extension of knowledge through trained personnel including women, several trained at B.S., M.S. and Ph.D levels as well as at non-degree/services course level at U.S. and developing country universities and through in-country SR-CRSP-sponsored workshops and shortcourses.</p>		<p>Assumptions for achieving outputs: (Continued) c) That facilities and resources will be made available to the degree specified in each country Memorandum of Understanding. d) That suitable staff and students will be available for training in the appropriate disciplines at U.S. and, in specified fields, at overseas institutions.</p>
<p>Inputs: (continued) for specific and advanced training.</p>			<p>Assumptions for providing inputs: (continued) in the SR-CRSP and contribute 25% cost-sharing.</p>

3

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Indefinite with
life of Project: 9-year minimum.
From FY 10/90 to FY 10/99
Total U.S. Funding \$31,101,000
Date Prepared 10/1/88

est.

Project Title & Number Small Ruminant Collaborative Research Support Program/DAN-1328-G-85-4093-00

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
	<p>to benefit their families. f) When host country and/or other developing countries through USAID Missions request consultations, workshops and cooperative endeavors from scientists and management personnel associated with the project.</p>		

**APPENDIX B:
RESPONSE TO EEP RECOMMENDATIONS**

UNIVERSITY OF CALIFORNIA, DAVIS

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO



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SMALL RUMINANT
COLLABORATIVE RESEARCH SUPPORT PROGRAM
TEL. (916) 752-1721
FAX 493 0495

DAVIS, CALIFORNIA 95616

TO: Members of the External Evaluation Panel
FROM: Dr. J.W. Oxley, Director *JWO*
DATE: January 9, 1989
ATTENTION: Dr. Gerald Thomas, Chair

Dear Members of the Panel:

Following your recent meeting at Winrock International, I am prompted to respond to the point you raised about the ME's response to your 1987 report. I apologize for not giving you a written, direct response, though I have indicated from time to time some accomplishments and did, in fact, respond to some of your recommendations. Let me review these and make further comments.

A. Status of the "Technological Packages"

The ME concurs with the EEP suggestions in development of technological packages and wishes to indicate the following progress:

<u>Country package</u>	<u>Person Responsible</u>	<u>Expected Completion</u>	<u>Comments</u>
a. Brazil-Goats	William Johnson	Jan. 1, 1989	In Press. Funded
b. Brazil-Sheep	Maurice Shelton	March, 1989	All chapters are written, photos need including, preface pending, final editing remains. Will be published at Davis/Berkeley. Funded.
Morocco	Eric Bradford	February, 1989	Dr. Bradford is giving it his final review; final editing and formatting by ME. Will be published at Davis/Berkeley. Funded.
Indonesia	Henk Knipscheer	Several modules will be completed during 1989.	Tech. Packs constitute a series of modules which will be produced locally as technology is developed and tested. At least 30 modules are anticipated for 1989. Budgeted at \$21,000.
Peru	Mike Nolan and colleagues at Missouri.	Mid-1989 for first draft.	Several components are finished - each will require a socio-economic summary. No budget developed but funds are being held in a Tech. Pack account.
Kenya	Tom Conelly	Not known.	Some planning and development effort is underway pending further testing of results on farms. 20 Technical guides were introduced at 4 workshops.

The Board approved \$50,000 for technology packages for the current fiscal year. Hopefully, the effort will be completed with the exception of Kenya by September, 1989. Indonesia may continue to add modules after 1989 and it remains to be seen what form the package will take in Kenya.

B. Revision of the Log Frame

Attached is an updated version which Joyce and I worked on last summer. It covers the period FY 10/87 to FY 10/90, the termination date of the present grant. The funding for the three year period is estimated to be \$8,400,000. or \$2.8 M per year. Our fund authorization for this year is through April 30, 1989. We hope AID/W will authorize our next allocation soon, so we can operate through April 30, 1990 or better yet, September 30, 1990. As we prepare our next three year extension, an updated log frame will be forthcoming.

C. Measuring Progress toward the Goals.

The ME specifically asked each principal investigator to submit project accomplishments in their 1987-88 reports. You may wish to evaluate whether this year's reports include more measures of success. I don't think the PI's have given this aspect of their research efforts sufficient thought and treatment recognizing the difficulty of such an exercise. You may wish to note that during the preparation of the 10-year Strategic Plan, a section was devoted to research results. (See attached). Several of the PI's gave their best estimates of important research outcomes, some of which were expressed in economic terms. We can all keep trying harder to come up with better measures of sustainability, social costs, effects on human nutrition and environmental impact. It seems to me that some of these measures need researching as well before one can apply appropriate techniques to produce meaningful results.

D. Response to Previous Recommendations for Strengthening the SR-CRSP.

This report, though late, is in response to last year's EEP recommendations. While there has been much to consider as the new Director, I have used the 1987 EEP report as a guide and certainly for background information during my ten months of administering the program. I found the report very helpful and well done as an evaluation instrument.

Prior to my appointment, I was invited to attend the North Carolina Planning Conference, a fortuitous opportunity, not only to meet most of the SR-CRSP principles, but to be fully immersed in the planning for the next decade at the earliest stage. After becoming Director I felt I had a running start on the planning dimension of the job which has culminated in a nearly completed Strategic Plan for the Next Decade.

As you will note in the Minutes of the 1988 Board Meeting, I have tried to streamline the office operations by redefining positions, recruiting against those descriptions and upgrading the electronic equipment to increase our efficiency. The work load remains heavy and the office cannot take on added responsibilities like transferring records to new discs, editing incoming documents, giving critical attention to Tech. Pack production and producing a newsletter without hiring additional part-time help. After a few more months we will be in a better position to evaluate these changes.

F. Implications of Recent Changes in By-Laws

Minor adjustments in the wording of Article IV, Section 4.02 and Article V, Sections 5.03 and 5.05 were made by the ME and approved by the Board last July. A workable procedure needs to be developed to provide for host country representation on the Board whereby each country is represented on the Board every four years.

Thus far, the new structure seems to be functioning and everyone is adjusting to the streamlining of operations as established by the changes in the by-laws.

G. Cooperation with Field Missions

On two occasions I have visited the Peruvian Mission and found it most supportive and understanding of the SR-CRSP. The Mission Director met with a SR-CRSP delegation on one occasion. Because of a change in our site coordinator, the phasing down and realignment of our program in Peru after the assassination of two employees last June and new project personnel in the Mission, I made a special trip to Peru in September to clarify our program and position with USAID/Lima. As a result, our communications have improved, we know the key people and everyone has a clearer understanding of each others roles and programs. With the recent security concerns and problems in Huancayo, it has been particularly important that we have good communication between the Mission, ME and our Site Coordinator.

Also, I found the Mission in Indonesia highly interested in our program and supportive of our efforts. The AID project officer has visited our project sites with our Project Liaison Officer on more than one occasion. For the first time, an AID representative attended the Project Administrative Committee meeting held in Bogor in October. The Mission Director met with SR-CRSP PI's, the Director and AID/W project officer at the time of the PAC meeting. He expressed an interest in what the Small Ruminant Program was accomplishing and was encouraged by the fact that we had increased the proportion of expenditure in 1986-88 on research in Indonesia as compared to the period before 1986.

The Mission in Bolivia provided resources to assist with the cost of a three day workshop held in La Paz on May 3-5, 1988.

Though the Mission would like possibly to consider a buy-in with the SR-CRSP, the Mission's funding has been severely reduced and it could not make any promises for future collaboration.

All SR-CRSP principals who travel to and from Kenya communicate with Mission personnel on a regular basis. The Mission has requested proposals from SR-CRSP scientists in response to its interest in maintaining a Dual Purpose Goat component and expanding the DPG into other areas of Kenya and in continuing the breeding research. Both efforts would receive AID Mission funding if resources become available.

Not having visited Morocco, or having any feedback from other sources, I am unable to comment on the USAID Mission there and our relationship with it. I will assess the situation when I review the program next February.

H. Publications, Workshops and Reports

During the past year the ME compiled a list of all communications produced by the SR-CRSP since its beginning in the form of a document entitled "Communications 1978-87". It is a catalogue of host country and project publications listed alphabetically by author within the following categories: 1) Books and Chapters in Books; 2) Theses; 3) Journal Articles; 4) Abstracts; 5) Technical Communications, and 6) Oral Presentations.

Each year all publications shown in the annual report will be added to the Master File and an updated document can be produced on demand.

The workshop held in La Paz, Bolivia in May 1988 was conducted by the Peruvian Co-Principal Investigators in Spanish, and the proceedings published in Spanish in September. Two similar workshops were held in Peru, one in Lima and one in Arequipa in late September with the proceedings of the Bolivian seminar serving as a reference for the 150 who attended. Dr. Enrique Nolte, Site Coordinator prior to October 1, 1988, organized the workshops, presided at each and was responsible for the publishing of the proceedings.

Good progress is being made with technological packages referred to in another section of this report. Plans call for all packages to be published in English plus the primary language of the country which will be the beneficiary.

Eleven scientific papers were presented by SR-CRSP authors at the International Animal Agricultural Symposium held at Rutgers University in July 1988. The American Society of Animal Science provided partial support for two Small Ruminant scientists from Morocco and Peru to present their papers. Plans call for the series of papers which cover historical and future perspectives of the program plus the technical aspects of the entire SR-CRSP since its inception to be published in the Journal of Animal Science in

1989. This will give world-wide visibility to and provide a permanent record of the SR-CRSP for the community of animal, plant and social scientists.

I. The Training Component

With the uncertainty of funding beyond September 1990, and the prospective phase down of research activity in most countries, the decision was made to complete the training of those students currently supported by SR-CRSP funds and not initiate new programs that could not be completed by 1990. Consequently only two new students were identified for master's degree training in the U.S. during 1988. Eighteen Ph.D and 17 Master candidates were in training in the U.S. or overseas during 1988.

In-country non-degree training will continue much as it has in the past. In 1988 the following workshops, short courses and conferences and non-degree oriented training sponsored, or co-sponsored or supported by the SR-CRSP:

<u>Site</u>	<u>Purpose</u>	<u>No. in Attendance</u>
Rabat, Morocco	To develop sheep production Manual	45
Bogor, Indonesia	5-month English conversation, presentation skills and technical writing course is continuing for research and support staff.	5
Bogor	Course work for students involved in village training. Computer Application Course.	5
Western Kenya	Four workshops were organized to introduce Tech. Packs. on nutrition-management and feed resources.	Families, field staff, extension staff primary and secondary school teachers.
Kenya	Two Kenyan scientists participated in workshops and regional conferences during the year.	
Western Kenya	A number of lectures, talks and demonstrations on goat nutrition and management were presented to a variety of audiences including scientists, students and teachers from primary and secondary schools.	
Western Kenya	AI short course on goats	25 technicians
Lima and Puno, Peru	Microcomputer and data management workshop	20
La Raya and Puno, Peru	Alpaca management for Bolivian Extension specialists.	10
La Paz, Bolivia	Workshop on Alpaca and Sheep Production.	150 scientists, government officials and practitioners.
Lima, Peru	Workshop on Alpaca and Sheep Production	100 professionals and practitioners
Arequipa, Peru	Workshop on Alpaca and Sheep Production	50 professionals and practitioners

J. Phase-Down of SR-CRSP Projects.

Most of the 1987-88 annual reports have not included phase down plans because this was the first year of the present three-year extension of the grant and research was at a high level of activity. For Peru and Indonesia, the PI's and Co-PI's addressed future planning at their annual PAC meetings. In fact I asked both groups not to plan new research beyond September 1990 and use the next two years to complete current activities. I expect the 1988-89 reports will reflect this kind of direction. By mid-1989 the SR-CRSP will need to have addressed most of the planning for 1990-1993, the next extension of the grant if AID so decides. Theoretically, the 1989-90 plans will include the phasing-down/out and phasing-in activities for the next four years. Both Morocco and Kenya have yet to address their future plans but these are agenda items for their Administrative Committee Meetings in February, 1989. The Technical Committee will discuss forward planning in light of the Ten Year Strategic Plan at their meeting in January, 1989.

K. New Directions for Development Assistance.

The ME appreciates the EEP response to the draft of the Strategic Plan for the Second Decade. For the most part, your comments have been incorporated into the final draft that will be reviewed by the T.C. and Board in January. The plan addresses many of the environmental issues of the day and how Small Ruminant research can impact positively these concerns. Also, the plan, if implemented, will attempt to develop innovative methods for supplementary funding of the SR-CRSP and explore ways to extend its research activities into existing AID projects. The Basic Ordering Agreements (BOA's) are presently available for all the CRSP's and it is expected that these instruments will extend the influence of collaborative research. Also, a Small Ruminant Science Network and continued linkages with present host country scientists will be a part of the next decade of activity for the Small Ruminant program.

Response to Host Country Recommendations:

Indonesia

Having returned from the PAC meeting in Indonesia in early November, I can indicate that several positive developments have occurred since your visit a year ago. Without going into a great amount of detail and to substantiate what Drs. Knipscheer and Raun reported at the recent session we had at Winrock International, I can relate the following:

1. Dr. Luis Iniguez has returned as Site Coordinator and his presence has made a difference in the management of the flocks and our rapport with the Indonesians.

2. The drought has passed and the sheep and goats were in relatively good condition, much better than a year ago.

3. The large number of nutrition projects were reduced to four or five and they focused on narrower nutrition objectives appropriate for support by the SR-CRSP.

4. A small project was proposed and approved on studying the traditional techniques used to treat diseases in sheep and goats. The assistance of veterinarians associated with Balivet of AARD will be solicited. Both Drs. Nari and Purnomo will support the effort and make people available for the study. Dr. Iniquez plans to coordinate the activities. The SR-CRSP will be putting resources into the project and at the same time building linkages for the SR-CRSP with AARD. With this entree we can call on the veterinary service including the Australian advisors from Cook College to assist us with disease diagnosis, health management and other veterinary concerns. At least now we have a mechanism through which we can collaborate with some funding support.

At Sei Putih, Dr. Sanchez is using the disease investigation center near Meuan for disease diagnosis and comments on sick animals. Although they have not been that responsive we do have the direction and support of Dr. Purnomo to make use of these services as well as those around Bogor. Hopefully, we will be able to pay some transportation for an occasional veterinarian to accompany our own personnel when in the field. Though still somewhat informal we feel that we can strengthen the linkages and access the veterinary expertise through this new project activity. In another year we may be able to appropriate more resources to effect a stronger feed-in by Balivet. As you know, they do not charge for their services, but they are very limited in terms of operating expenses.

5. A publication is proposed for public relations purposes entitled "The Small Farmer in Focus; Small Ruminant Research and Applied Technology Testing in West Java". This booklet will outline the history, objectives and an FSR prospective of CRSP activities as exemplified by the outreach pilot project. It will be patterned after similar various promotion publications such as "Through Farmer's Eyes" from Nepal, and another from the Philippines entitled "No Turning Back". Also we plan to produce some films on small ruminants in Indonesia.

Morocco.

Informal discussions are being held with officials from the University of Minnesota, Colorado State University and UC Davis relative to a mechanism that would help develop Hassan II staff to work in Frankofone, West Africa as a development effort. Perhaps

an informal consortium would be one arrangement whereby US personnel could assist Moroccans to become involved in their own development activities. We feel this idea has merit and can probably be sold to USAID, World Bank or some other agency. There are sufficient Moroccans now trained in many fields to be most helpful in the development process in French speaking West Africa. Thus it may be our role to help them accomplish these ends and in a sense institutionalize their research efforts. It is not clear how the SR-CRSP can institutionalize its efforts with the government of Morocco. Obviously the development of the Technological Package which is nearly completed and will be in French will be a step in extending the SR-CRSP results. This "product" can be useful in training others within Morocco to spread the results of the SR-CRSP research findings.

COUNTRY	<u>SR-CRSP DISCIPLINE</u>	<u>PRINCIPAL INVESTIGATOR</u>	<u>COLLABORATING SCIENTIST</u>
Indonesia:	Animal Nutrition	K. Pond	B. Haryanto
	Economics	H. Knipscheer	T. Soadjana
	Breeding	E. Bradford	B. Gunawan
	Sociology	M. Nolan J. Gilles	K. Suradisastra
Kenya:	Breeding/ Systems Analysis	T. Cartwright	C. Ahyua B. Mwandotto
	Animal Health	T. McGuire	S. Chema S. Waghela
	Economics	H. Knipscheer	F. Nyaribo
	Production Systems Feed Resources Nutrition Management	H. Fitzhugh	K. Otieno M. Mathuva M. Simba
	Sociology	M. Nolan J. Gilles	A.N. Mbabu
Morocco:	Genetics	E. Bradford	A. Lahlou-Kassi
	Nutrition	K. Pond	F. Guessous
	Range	J. Malechek	H. Narjisse
	Sociology	M. Nolan J. Gilles	A. Hammoudi
Peru:	Animal Health	J. DeMartini	E. Ameghino
	Breeding	P. Burfening	J. Chavez
	Economics	H. Knipscheer	D. Martinez
	Range Management Sociology	F. Bryant M. Nolan K. Jamtgaard C. McCorkle	A. Florez M. Abuhadba M. Estafonero

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* Member of Board of Directors
Host Country Representative

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