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# **Small Ruminant Collaborative Research Support Program**



**External Evaluation Panel  
Report**

**1987**

## COLLABORATING ORGANIZATIONS

### Federal (U.S.):

United States Agency for International Development  
Science and Technology Bureau

Board of International Food and Agriculture

Joint Committee on Agricultural Development

### Overseas Collaborators:

**BRAZIL**--Empresa Brasileira de Pesquisa Agropecuaria (EMBRAPA)

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

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

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

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

### State Subgranted Institutions:

University of California, Davis

Colorado State University, Fort Collins

Montana State University, Bozeman

University of Missouri, Columbia

North Carolina State University, Raleigh

Texas A&M University, College Station

Texas Tech University, Lubbock

Utah State University, Logan

Washington State University, Pullman

Winrock International Institute for Agricultural Development,  
Morrilton, Arkansas

NINTH REPORT OF THE EXTERNAL EVALUATION PANEL

**Small Ruminant Collaborative Research Support Program**

November, 1987

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## I. INTRODUCTION

There are approximately 400 million sheep and over 300 million goats in the developing countries of Asia, the Near East, Africa, and Latin America. While these small ruminants now make a significant contribution to the economy and food supply in these countries, there is a large potential for increasing this contribution through innovations developed by research.

The Small Ruminant Collaborative Research Support Program (SR-CRSP) is a joint effort of the U.S. Agency for International Development, U.S. universities, and governmental agencies in five developing countries. It was supported for the first 5-year period by a \$15 million Title XII grant and by additional contributions of over 30 percent of this amount from participating institutions. \* With the present three-year extension the annual level of funding from USAID will be approximately \$2.8 million per year. Estimates indicate that matching support from the universities now exceeds 35 percent of the total cost of the program.

The SR-CRSP is administered by the University of California-Davis. U.S. universities involved in the original program were as follows:

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

At present nine American Universities and Winrock remain active in some phase of the research. Field locations for the program were 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 July 1988.

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

## II. ACTIVITIES OF THE EXTERNAL EVALUATION PANEL

Three members of the External Evaluation Panel (EEP) resigned in 1986-87 leaving two carry-over members:

Dr. William A. Flinn, President, Midwest Universities  
Consortium for International Activities  
Dr. Gerald W. Thomas, President Emeritus, New Mexico State  
University

In August 1987, two of the three replacements for the EEP were cleared through USAID and BIFAD:

Dr. S. Gordon Campbell, Associate Dean, New York State  
College of Veterinary Medicine, Cornell University  
Dr. Saul Fernandez-Baca, Project Manager, FAO/UNDP/Project  
on "Technical Assistance to the National Center for Livestock  
Research" (CENIP)

The delay in appointments to the EEP made it difficult to conduct field reviews of the various SR-CRSP projects in a timely fashion. Only two members of the EEP were able to attend a scheduled meeting in Indonesia in October, 1987. Also, a final attempt to bring the EEP together in Dallas, Texas November 30-December 2, 1987 was only partially successful due to an automobile accident involving Dr. Fernandez-Baca.

In spite of these scheduling problems, the visit to Indonesia by two members of the EEP was very productive. In addition, Dr. Fernandez-Baca conducted an individual in-depth review of the SR-CRSP program in Peru. All members of the EEP had access to the annual reports of the project investigators and made other contacts with research personnel as appropriate. The chairman of the EEP (Dr. Thomas) attended meetings of the Technical Committee and the Board of Institutional Representation (BIR).

## III. GENERAL OBSERVATIONS

### A. Significance of the SR-CRSP Approach

The External Evaluation Panel (EEP) strongly recommends continued and adequate support for the Collaborative Research Support Program for Small Ruminants (SR-CRSP) in the developing countries. This recommendation is based upon the following observations:

1. The SR-CRSP multi-disciplinary approach offers the best opportunity to combine the scientific talent in the U.S. universities with the host country research team to clearly

define the constraints to small ruminant production and to evaluate alternative interventions.

2. Livestock are an important and integral part of most agricultural systems in the developing nations. For example, USAID background papers indicate that livestock account for about 1/3 of the agricultural gross domestic product for Africa. Most farmers own a few livestock and much of the land area can best be utilized by combining livestock with crop production.
3. Most families depend upon livestock products for balanced family nutrition. Direct use of goat milk, for example, may be critical to child survival, but difficult to measure in the standard economic terms of industrial societies.
4. Small ruminant animals will play an increasingly important role as population pressure forces further land subdivision and smaller farm units. Sheep and goats are gradually replacing cattle on small farms because of limited access to grazing and greater ease of management.
5. Livestock are an important element in the social structure of the farm family and the rural community. The sociology component of the SR-CRSP has helped in the selection of socially acceptable interventions.
6. As USAID phases out direct support for many other livestock projects in the developing countries, the continuation of the SR-CRSP programs will provide visibility for the agency and some indication of continued interest in the livestock sector.
7. The unique collaborative mode is designed to evaluate all contributing factors to complex agricultural systems including economic, social, and environmental constraints.
8. The SR-CRSP approach to the problems of food production requires adequate consideration of "sustained use of the natural resource base" as well as other environmental concerns.
9. Any major attempt to preserve "biological diversity" in the developing world must take into consideration the role and proper management of livestock -- particularly in terms of the possible negative and/or positive impacts on the vegetation base. The SR-CRSP is designed to yield information on this important environmental problem.
10. The training component of SR-CRSP has been highly successful and has resulted in a contribution to the host country and to U.S. institutions that will have a lasting impact.

11. The SR-CRSP scientists and collaborators have made substantial contributions to the literature concerning small ruminants (more than communications).
12. The SR-CRSP model has been very effective in generating matching support from U.S. universities as well as stimulating host countries to provide both in-kind and direct financial support to the program.

B. Indicators and/or Measures of Progress in Small Ruminant Research

The EEP is pleased the USAID is taking another look at livestock projects and is re-assessing its position that livestock projects have not been successful. It is the EEP's opinion that the primary conclusion about livestock projects was derived from a narrow set of indicators which masked the larger picture. The most readily available indicators have been production and income figures while little has been done to measure sustainability, resource degradation or renewability. More attention must be given to the development of indicators of success which include social, political, and environmental as well as economic factors. Livestock production must be viewed as a complex production system rather than as a single commodity.

Even if one only uses income as a measure of success, the question immediately arises as to what constitutes income. Monetary return for the production of livestock probably constitutes only a portion of the actual return to the family if such factors as home consumption of milk, meat, and wool are considered.

On the other hand, if other economic measures are used alone, they may also not provide a complete picture. For example, return per unit of land is a commonly used indicator. Small ruminant production, however, usually involves marginal land with low opportunity costs. If return to labor is used as an indicator, it too is misleading since small ruminant care is often performed by children, women, and older family members who have lower opportunity costs. In the long run the consequences of increased production may have adverse effects on children's schooling and the physical health of the women who must perform more work related to the increased production. These factors must be considered as we evaluate any increase in income.

There are social costs as well as economic costs involved in changing the sheep/goat production system. It is difficult to imagine a social structure in which the number of animals is a symbol of wealth and power, changing emphasis to quality of the animal and concern for maintaining a balanced range program. This would require a complete cultural change.

This makes measurement of success more difficult and costly than simply determining the tons of meat produced. For example,

devising an experiment to determine the increase in nutritional level of children receiving goat's milk versus non-receivers requires precise anthropometric measurement and an elaborate research design. The results, however, may be more dramatic than increasing family monetary income.

In the end, families probably will not adopt range management practices which will not pay for themselves no matter how much environmental sense these practices make. The challenge for the future will be developing practices which are compatible with the "livestock system" and devising appropriate measures to determine their success prior to the introduction of the practices. The EEP recommends that after the Log Frame is revised, more consideration be given by all scientific collaborators to reinforcing the measures of success and/or the indicators of progress toward all objectives of the SR-CRSP.

Some specific examples of progress in the SR-CRSP program are cited below:

- Progress in identifying the genetic control of multiple births in sheep thus adapting sheep to the environment.
- The development of a new vaccine for contagious caprin pleuropneumonia in Kenya which is of importance to countries extending from West Africa into Asia and affecting at least 48 million goats.
- The upgrading of Criolla sheep in Peru which is expected to increase the production of carcass meat by 8,000 metric tons and grease wool by 20 million kg. per year.
- The elimination of a severe white muscle disease problem in Morocco which could save many lambs in certain areas of the country.
- Increased Alpaca fiber yields in Peru from a low of six pounds up to 17 pounds per animal for added incomes of approximately \$40-\$50 U.S. per animal.
- In Kenya, Caprine Arthritis Encephalitis was identified and a technique developed for its eradication. This is worth approximately \$20 million to goat producers world-wide.
- The publication of a new comprehensive reference book entitled Genetics of Reproduction in Sheep with scientific contributions from 50 scientists representing 17 countries.
- The proper use of green legume foliage in Indonesia to increase weight gain by 120% and feed efficiency by more than 80%. This is projected to improve the growth rates of over one million young sheep and goats.

- The placing of dual-purpose goats on Kenyan farms and guiding the forage production programs has increased the food yields of these farms by 66%. The goats themselves are generating about \$52 U.S. additional income/ hectare.
- The farmer demand for Dual Purpose Goats as sires for cross-breeding demonstrates promise of wide-ranging increases in productivity.
- Books in preparation by SR-CRSP personnel including a book on social research in several CRSP locations and one on sheep production in Mediterranean countries.
- Initial research indicates good potential for grazing Hair Sheep under rubber trees in North Sumatra.

#### IV. IMPACT OF THE INSPECTOR GENERAL'S AUDIT

A draft audit report of the Small Ruminant CRSP was released by the Inspector General of USAID on November 6, 1986. The major recommendation in this report was that the program be terminated because ". . . the SR-CRSP has not produced technologies to permit an increase in food production." This draft report generated a great deal of correspondence mostly directed to the Science and Technology Bureau of USAID where the final decision about the future of the SR-CRSP was to be made.

In spite of the input, the final audit report, dated May 26, 1987 still contained the following strong language:

Specifically, the Small Ruminant CRSP has not yet (i) developed technology packages to increase food production, (ii) oriented its research toward applied technology, (iii) developed project sites that will lead to world-wide application of research results or (iv) developed plans and procedures to link research results to local and national extension services so that research benefits would be extended to poor producers of small ruminants.

These conditions could have been prevented by greater emphasis on obstacles to effective application of research results, and by better planning and management. As a result of these conditions, there has been neither a measurable benefit to the small ruminant producer, nor an increase in food production from the \$27.4 million previously provided the CRSP.

Significant improvements in program management, direction, and implementation are needed in order to realize tangible future benefits from the \$12.6 million of new

A.I.D. funds. Unless A.I.D. management is willing to ensure these necessary improvements are fully implemented, the SR-CRSP should be phased out.

The EEP acknowledges the strong statement of support for the SR-CRSP concept by Dr. Nyle C. Brady, Senior Assistant Administrator of the S&T Bureau of AID. A portion of Dr. Brady's response to the IG report is quoted below:

. . . I have determined after a thorough review of your report and an analysis of the performance of the SR-CRSP towards the accomplishments of its objectives, that the likelihood is great that the SR-CRSP will continue to progress towards its ultimate goal of ameliorating world food, nutrition and poverty problems. This determination is based on my own review of this CRSP, an independent evaluation of four major CRSP's including the SR-CRSP led by Dr. Ed Hogan and the comments received on the Audit by respected scientists both inside and outside of this CRSP. All confirmed that the research was now on target, progressing satisfactorily and meeting high scientific standards.

Field research by its nature yields a combination of results -- some of which are of particular local application, some of broader regional application, and some which are a mix. I have reviewed the SR-CRSP sites and have concluded that they adequately meet the global objectives of the CRSP program and offer an excellent opportunity for conducting research of benefit to small ruminant producers generally.

A particular concern of the audit (Recommendation b) was the promulgation of research findings to farmers in a form usable by them. The CRSP's do not have extension functions. The recently conducted Hogan report confirmed the inappropriateness of involving the CRSP's in extension. Nevertheless, the ultimate goal of the CRSP depends on the translation of CRSP research into farming practices. There are presently a range of technology verification and diffusion activities directly or indirectly related with the SR-CRSP which address this point.

Dr. Brady further stated that follow-up meetings and workshops would be held with USAID staff and all CRSP Management Entities including representatives from the Technical Committees, External Evaluation Panels and Boards of Directors. This was done and for SR-CRSP a major "Strategic Planning Conference" is scheduled for Raleigh, NC on January 13-15, 1988.

While the EEP does not support the general observations by the IG that lead to a recommendation for termination, there are some valid points in the report worthy of consideration and

response. For example, more attention must be given to "Technology Packages" as one possible technique to facilitate the transfer of new research findings to the small ruminant producer. Also, an examination of the Log Frame of the SR-CRSP is in order. A later section of this report will deal with these and other recommendations for future directions of the SR-CRSP.

At a meeting of the Board of Institutional Representatives (BIR) on June 29-July 1, 1987, Dr. Harvey Hostik, Program Officer, USAID, Washington, reported that Dr. Nyle Brady and the Inspector General's auditor have met, resolved their disagreements over the audit report, and agreed to extend the Small Ruminant CRSP for a three-year period.

## V. REACTIONS TO THE HOGAN, RACHIE, ROBINS REPORT

Due to the serious nature of the IG Audit Report, the ME concurred in a request that Dr. Edward Hogan undertake a rigid program review of the oldest of the CRSP's -- Tropical Soils, Small Ruminants, Bean and Cowpeas, and Sorghum-Millet-Intsormil. To assist Dr. Hogan, contacts were made with Dr. John Robins and Dr. Kenneth Rachie.

The final report of the task force was submitted in April, 1987 after a preliminary report was made to BIFAD in February, 1987. Since the "Hogan Report" had a substantial impact on the decision makers in USAID as well as the Project Investigators for the SR-CRSP, key portions from the Executive Summary are quoted below:

### 1. Research Direction and Accomplishments

The research undertaken by the four CRSP's reviewed appears to be effectively addressing important research problems in less developed countries. Participation in the CRSP has also expanded the research horizons for U.S. researchers, some of whom had been rather insular in their outlook. This has provided the basis for increasing the technological options available to U.S. agriculture. It is interesting to note that one U.S. growers' association has proposed providing funding for a CRSP research activity.

The CRSP's are consistent with AID food and agriculture policies and strategies. They are focused on areas which have generally received less than adequate attention, for the most part, by less developed country national research organizations and are only partially addressed by International Agriculture Research Centers. . . .

The quality of the research undertaken has been judged by the Research Advisor to "with few exceptions,

appear to be of excellent quality and quantity." Other members of the review team concur in this assessment as do the International Agriculture Research Center scientists and administrators interviewed. . .

. . . The review mechanism established by each CRSP appears to be operating effectively. . .

## 2. Linkages

The process of establishing effective linkages with International Agriculture Research Centers and host country institutions has been evolving in a positive manner since establishment of the CRSP's. . . Formal agreements between host countries and U.S. universities exist in all instances and substantive working relations are being appropriately developed.

Collaboration with International Agriculture Research Centers has developed to the point where participating institutions agree that the CRSP's and Center research is mutually supportive. There are memoranda of understanding between CRSP's and a number of appropriate Centers. . .

CRSP collaborative linkages with field Missions has been uneven. Continuing efforts by both parties are needed for each can be of considerable value to the other's program. Both AID and CRSP Management Entities need to devote additional effort to USAID/ CRSP linkages.

Collaboration among universities within a CRSP has been excellent but there needs to be developed an effective system for establishing collaborative linkages among the CRSP. . .

While the CRSP are not intended to be institution building programs, they have made a substantial contribution to increasing research capability in less developed countries. . .

## 3. Management Effectiveness

The four CRSP's examined have developed management systems which have demonstrated that they can take the decisions necessary to maintain research standards and to make program changes required by budget reductions according to agreed upon criteria. While all four CRSP have quite similar management structures, they operate differently in achieving objectives. The management systems do operate effectively in maintaining collaboration among the universities.

CRSP costs appear to compare favorably with other international research institutions such as the International Agricultural Research Centers. Overhead costs appear to be somewhat less for the CRSP and capital costs have been substantially less than for the Centers. Overhead costs of the CRSP are established in

accordance with U.S. government standards and average a bit more than 20 percent of the AID grant. The sub-grant system used by the CRSP does not cause a pyramiding of overhead costs.

The CRSP's do an effective job in reviewing the scientific merit of proposed and ongoing research projects. This review is done by the Technical Committee and/or the External Evaluation Panel, often with assistance from the Management Entity. . .

. . . this paper. . . provides suggestions on ways in which External Evaluation Panel evaluations could be broadened for each CRSP so that the External Evaluation Panel could make a more substantial contribution to the usefulness of CRSP activities. . .

#### 4. Program and Budget Issues

. . . there is a continuing tendency to expect the CRSP's to broaden their activities to include such things as extension and institution building. Clearly, in a period of declining budgets, and probably without declining budgets, attempting to expand the scope of CRSP activities beyond collaborative research and the dissemination of research results to less developed countries and other interested parties can only lead to a diminution in the quality of CRSP research.

As AID budgetary resources have declined so have budgetary allocations to the CRSP. Reductions in budgets and uncertainty with respect to future budget allocations have or soon will reach the point where the CRSP can no longer operate effectively. Within the near future AID and the CRSP universities will need to come to grips with this situation.

The EEP has cited these portions of this Hogan Report because it concurs with the observations and conclusions and feels that to restate these important points would be redundant.

#### VI. UNCERTAINTY OF BUDGETS AND FORWARD FUNDING

Each of the preceding EEP reports has emphasized the demoralizing impact of budget reductions. This factor, taken by itself, can be dealt with by proper planning and management. The more serious concern relates to uncertainty of forward funding and program extension. This was particularly crucial during the period of debate over the IG report.

In August, 1987,, Dr. Clarence Gray issued an extensive memorandum to all CRSP directors and AID/CRSP managers on the topic "Impact of the Budget Cuts on the Collaborative Research Support Programs." The EEP believes that certain sections of the Gray memo are worthy of note. The study was done at the request

of BIFAD with special emphasis on the following CRSP's -- Tropical Soils, Small Ruminants, Agriculture, and Fisheries Stock Assessment. Dr. Gray is a member of the EEP for both the Bean/ Cowpea and Sorghum/Millet CRSP's. Statements from the Gray memo follow:

. . . The costs have had different impacts on the capacities of the CRSP's to achieve their objectives.

. . . The global nature of the Small Ruminant CRSP has been compromised to a degree by the loss of one research site and greatly reduced operations at another; never-the-less, it is still viable and remains a potent international force for the improvement of sheep and goats.

. . . Substantially reduced operations impose longer time frames for the accomplishment of CRSP objectives. . .

The 1986 cuts of 18% not only reduced the level of operation of all CRSP's, it also wiped out accumulations of programmed, unspent funds -- the pipeline. For the CRSP's this was an additional cut, i.e. the loss of forward funding and a lower budget. . .

Congress reduced the 1987 AID Development Assistance Budget by 3.9%; however, extensive earmarking in the legislation, meant much higher reductions for unprotected bureaus and accounts. In the case of the CRSP's, despite best efforts by the S&T Bureau to shield the CRSP's, reduction came 13.5%.

In addition to these general comments on budgets, the Gray memo shows the following schedule of funding for the SR-CRSP:

10/01/84	\$ 3,134,988
03/12/85	4,000,000
01/26/86	2,580,000
06/30/87	346,000
Total	<u>\$10,060,988</u>

or 84% of original planning figure of \$12 million through FY 87.

The approved budget for year 9 (1987-88) is \$2,808,000 or 70.02% of the originally planned \$4.0 million/yr. This CRSP sustained a substantial portion of the total reduction through the pipeline.

These budget limitations have led to the reduction in international trips from 125 in 1984 to 62 in 1987 and a reduction in new starts for MS and Ph.D. training from 24 to two. Matching contributions made by U.S. institutions to the SR-CRSP have varied from \$1.8 million to slightly less than \$1 million. Percentage-wise the match from U.S. universities has increased over the years and now stands at about 35 percent of the total support.

Data are still incomplete on the dollar value of host country contributions to the SR-CRSP. However, the EEP has received estimates that Morocco has contributed approximately \$1.15 million; Brazil, 2.28 million; and Peru about \$250,000 to the programs. Estimates of the Indonesian contribution were not available at the time of this report.

## VII. PROGRAM EVALUATION

### A. Status of "Technological Packages"

One of the consistent recommendations of the External Evaluation Panel has been to encourage the development of "technological packages" for each of the countries participating in the SR-CRSP program. This recommendation was again highlighted in the Inspector General's Audit Report of May 26, 1987.

The concept of a "technological package" has varied among the project investigators and host country participants. A possible outline for such a report was proposed for Kenya in the Eighth Report of the EEP submitted in October of 1986. Although this model is only one example, 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 "package" was not necessarily designed for direct use by farmers and pastoralists.

The present status of these "technological packages" is as follows:

1. A technological package for Morocco is under production by Dr. Eric Bradford. The draft is now in the review process. Anticipated release is early 1988. The EEP has not had an opportunity to review this document.
2. The technological package for Peru is under the leadership of social scientists. Work is continuing on this manuscript. No firm date for publication has been established.
3. For Brazil, a technological package is being proposed with anticipated release in 1988.
4. The technological package for Kenya has not progressed as rapidly as anticipated. The proposed outline by EEP will be altered to better suit the needs of the host country. Changes in personnel have further slowed the process of completion.

5. The nature of the technological package for Indonesia is not yet clearly defined. It is unlikely that this package will be completed in 1988. The EEP strongly encourages a more aggressive approach to this project since it is obvious that much progress has been made in Indonesia that is worthy of a summary report.

To encourage the completion of all the technological packages, the EEP makes the following suggestions:

1. Reaffirm and designate one person responsible for the production of the technological package for each country;
2. Provide specific support, if necessary, for its prompt production;
3. Establish a reasonable deadline for each package;
4. Accept the technological package in lieu of one annual report; and
5. Ensure that appropriate credit is given to the original source of the material used in each technological package.

#### B. Revision of the Log Frame

The EEP concurs with the recommendation that the logical framework (Log Frame) of the SR-CRSP be revised with a more clearly defined and realistic set of goals. The Inspector General's team reported that the SR-CRSP had not fulfilled the promises stated in the present Log Frame. Dr. Harvey Hostik, AID representative to the CRSP team, has also pointed to the need for a revised Log Frame. The EEP notes that the Log Frame has undergone three versions since the inception of the SR-CRSP. The need for further refinement has the concurrence of the ME and the BIR.

#### C. Measuring Progress Toward the Goals

After the Log Frame is revised, the EEP encourages the PIs to give serious consideration to measures of success. The EEP notes the difficulty of such an undertaking, but such efforts are necessary to capture both the latent and manifest consequences of technological change in the very complex livestock system. Better measures of sustainability, social costs, nutrition, and environmental impact must be developed in addition to the traditional economic measures.

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

An important function of the EEP is to constantly monitor and evaluate the performance of SR-CRSP projects. This is done by reviewing project annual reports and work plans and representation of the EEP at the TC and BIR annual meetings. Also, on-site visits have been made to participating U.S. institutions and to view host country programs. The EEP then submits an annual report to the ME.

The EEP is an external group of four scientists with experience in developing countries. The reports have been purposely forthright in evaluating the plans and activities and in presenting recommendations. The recommendations have been objective and constructive in nature with the purpose of strengthening SR-CRSP projects.

The ME, on occasion, has asked the EEP to give special attention to specific sub-projects. Some have been discontinued as a result. In another instance, the EEP was represented on a special committee of SR-CRSP participants charged with an in-depth evaluation of the progress of a particular project. As a result, there was project redirection.

Following each EEP report the ME has written a detailed response to each recommendation. In most cases, the ME has concurred and with the cooperation of the TC and BIR committees changes have resulted. The EEP has been pleased with the positive response of the ME and PIS to their recommendations. In instances where the EEP's recommendations have not been followed, the reasons are usually financial -- lack of funding -- rather than acceptance of program redirection or change.

E. Comments on the Management Entity (ME)

The responsibilities of the ME are clearly stated in Article IV of the revised By-Laws for the SR-CRSP. Carrying out these responsibilities is much more difficult in times of financial uncertainty. The management problem has been further exacerbated by the change in Program Directors. The untimely death of Dr. Robinson necessitated the appointment of an acting director. Dr. William Weir assumed the responsibility and not only carried out the management functions, but made a special effort to facilitate the appointment of the new director. Dr. David Robertshaw was named Program Director for the SR-CRSP in September of 1986. He served well in this capacity, but resigned on September 1, 1987 to become head of the Department of Physiology at Cornell University. Under his leadership the by-laws were changed. A quotation from his letter of resignation indicates his frustration with the funding uncertainties:

. . . I have enjoyed my participation in the SR-CRSP and my admiration of the concept and development of the SR-CRSP is profound. It was a privilege to be asked to succeed Dr. David Robinson and be part of a program with such a proven record of achievement. However, I have been disheartened by two main problems:

1. The lack of any forward planning on the part of USAID in terms of funding the project in the last two years. Sudden reductions in funding and a review of "pipeline" finance in a project such as ours has made it almost impossible within the present structure of the SR-CRSP to maintain an orderly program plan. As an example, in the past two weeks we have received the resignations of two of our leading scientists who have joined the International Centers. One of them was a site coordinator, and the other, a key leader who will be difficult to replace.

2. The draft evaluation of the SR-CRSP by the Inspector General's office was sufficiently bizarre and disturbing as to cause me to lose faith in the system and to question the whole concept of overseas aid in the form of collaborative research. The principles which were espoused in our grant document are noble and sincere, the dedication of the scientists involved is excellent and the spirit of international goodwill generated in the whole process is worthy of recognition. The recent report by Dr. Hogan recognizes these qualities, but the evaluation by the Inspector General's office is destructive and demoralizing.

It would be my hope, therefore, that in the years to come the SR-CRSP will be given a chance to sustain the vision of those pioneers who were responsible for the Collaborative Research Support Programs in general and the Small Ruminant program in particular and that their efforts be evaluated objectively and the programs be allowed to flourish. I have found the science stimulating and I will certainly retain my interest and enthusiasm for the program.

Dr. William Weir was again willing to move into the position of Acting Program Director while a new search was conducted. The EEP notes Dr. Weir's capable and willing leadership in this emergency.

At the time of this report the search for a new program director is essentially complete. The EEP welcomes this appointment in the belief that leadership of the SR-CRSP will be strong and stable. At this time, the EEP recommends that the new program director re-examine his or her role, re-examine the by-laws and structure of the SR-CRSP with a view toward improved efficiency and exert a major effort to improve the effectiveness of

management. Good communication with U.S. university personnel, AID central bureaus and missions, and host country administrators and scientists is an essential part of these responsibilities. If this appointment can be made soon, the SR-CRSP Planning Conference in North Carolina in January should serve as an opportunity to re-examine the role and functions of the Management Entity. This conference will focus on the desing of a strategic plan for the future of SR-CRSP.

F. Implications of Recent Changes in By-Laws

The recent changes in the SR-CRSP By-Laws as approved by the Board of Institutional Representatives (BIR) should improve the efficiency of the program. Under the new rules the BIR will be replaced by an "Administrative Council" (AC) which will meet from time to time to address issues involving the participating institutions and field sites. The Board of Directors (formerly the Executive of BIR) will not address issues involving institutions. The Technical Committee structure will remain as is.

These changes in the By-Laws will bring the SR-CRSP more into conformity with the SR-CRSP guidelines, including a more precise statement on the role of the Management Entity. The EEP compliments the Future Directions Committee on this and other proposals which will improve the effectiveness of the CRSP structure and management.

G. Cooperation with Field Missions

In view of the commonality of interests between the SR-CRSP projects and the AID Missions, the EEP encourages the closest possible working relationships between the two. Communication with the field missions is particularly important at the time of change in personnel or project re-orientation. For example, some AID missions have been helpful for completing the project objectives. Since training funds are becoming more limited, the missions can also provide assistance insuring continuity and support for students destined for U.S. universities. Contact with the missions will help with public relations and can facilitate cooperation with host country ministries and agencies.

While the level of cooperation with the missions has been variable, the EEP commends the AID Central Bureau for their special efforts in calling the SR-CRSP program to the attention of these field locations. An example of this effort is shown by the request of the Bolivia Mission to become a part of the SR-CRSP activity including the offer to host a working meeting between the SR-CRSP PIs and Bolivian and Peruvian scientists.

## H. Publications, Workshops and Reports

The EEP felt that the present efforts dedicated to seminars, workshops, publications and reports were adequate and the results of good quality. The SR-CRSP projects have now been underway for long enough that complete books are in preparation or have already been published. 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 felt 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 one area where productivity has been universally slow is that of comprehensive technological packages. This problem is addressed elsewhere in this report.

## I. The Training Component

One of the strengths of the SR-CRSP approach is the emphasis on training as a part of each project. Graduate students and young scientists from the host countries have the unique opportunity to interact with senior host country researchers and administrators as well as U.S. project leaders and collaborators. Research on MS theses and PhD dissertations is usually performed in the host countries and frequent opportunities are provided for oral and written presentations of research findings or program evaluations.

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

1. The 185 students trained in eleven different U.S. universities under SR-CRSP sponsorship represent 21 countries, including 62 U.S. graduates.
2. Approximately 139 students were trained at overseas universities, primarily at the Bachelor's or Master's level. Those students received support from U.S. universities and the interaction among U.S. and host country scientists has been very effective in increasing the standards and effectiveness of the training.
3. Informal (non-degree) training has been reported for 23 subject-matter topics involving several hundred participants.
4. Support for many individual students or co-workers has been provided by the SR-CRSP for each of the sub-projects.

5. The SR-CRSP has sponsored over 25 short courses in the host countries.

J. Phase-down of SR-CRSP Projects

The EEP recognizes the finite nature of the SR-CRSP funding; presently three years. In addition, many of the present projects in small ruminant breeding, selection, and husbandry have relatively long-term horizons for completion (20-25 years). In light of this the various Program's Advisory Committees (PACs) in concert with the PIs should make appropriate plans for phased reductions, the future deployment of the trainees, and continuation of appropriate elements of the projects by agencies of the host countries. Regional networking, alternate funding, and heavier involvement by other elements of national agencies will all play a role in eventual phase-down by SR-CRSP. These alternatives should be sought early in the project development rather than waiting for this contingency to develop.

The EEP strongly recommends that all future annual reports include plans for phase-down, prepared under the direction of the PAC, the PIs and the country coordinators.

K. New Directions for Development Assistance

The EEP applauds the initiative of BIFAD, USAID, the University Community, and the World Bank to strengthen their programs relating to the environment and proper sustained use of the natural resources in the developing countries. More specifically, we recommend that every project or sub-project of the SR-CRSP program contain an objective relating to sustainability and environmental management. The preservation of biological diversity, the problems of desertification and/or vegetation change, and the reduction in soil erosion in most complex farming systems requires more knowledge of the role of livestock (particularly sheep and goats) and the management options for the small holders and pastoralists.

## VIII. HOST COUNTRY REPORTS

### INDONESIA

The EEP visited Indonesia from September 28 through October 10, 1987. Due to circumstances beyond their control Dr. William L. Flinn and Dr. Saul Fernandez-Baca were unable to make the trip so the review was conducted by Dr. Gerald W. Thomas and Dr. S. Gordon Campbell. Dr. Thomas visited the projects in North Sumatra and both spent about a week in Bogor, Java. This was their first visit to Indonesia and the first visit for Campbell to any

SR-CRSP project. For these reasons the visit was a busy one with restrictions imposed on the time available for investigating all aspects of the projects. It should be noted that the PIs and their collaborators did everything possible in the time available to discuss their projects in an open and cooperative fashion.

There are about 4.2 million sheep and 7.9 million goats in Indonesia (Direktorat Jeneral Peternaken, 1983). These totals are higher than those of any other South East Asian country. About 50% of the sheep in Indonesia and 17% of the goats are in West Java (Gatenby et al., 1987).

The EEP members had an opportunity to attend presentations made by many of the young investigators, to hear the principal investigators outline their plans for the future and to confer with members of the host country. In addition, the EEP members visited several of the sheep research projects around Bogor and had notable visits to a village where sheep are kept in the traditional fashion and to a large OPP extension meeting where a "Shepherd of the Year Award" was made. The two members of the panel, therefore, felt that within the constraints of the time available they did get a good opportunity to evaluate the projects in Indonesia and have the following observations to make.

### Major Strengths

The projects in Indonesia were impressive because of the caliber of the PIs, the enthusiasm of the trainees and the continued excellent focus of the projects. It was clear from our questioning of Indonesians, both the senior administrative officials and the trainees, that all of the principal investigators involved in Indonesia were held in very high esteem and for very good reason. They had shown a particular concern for the welfare and education of the young people training under them and had maintained great interest in the conduct and the success of their programs.

The second major strength of the programs was the high quality of the young Indonesians who had been trained locally and overseas. We had many occasions to meet with them. It is clear that they are bright, they have been well-trained and that they will do an excellent job in the future given the wherewithal and opportunities. This commendation extends to the field where we saw some of these young people in action in an extension role working with farmers and making public presentations of their research findings. They have successfully bridged the gap between the research projects and the working farmer.

The principal investigators have also done well to maintain the focus of their research. They had made in most instances, good choices and undertaken projects which would have high practical value and they had done them extremely well.

In addition, it was clear that the investigators had done an excellent job over the years of committing their research findings to a broad series of written publications. Most impressive was their ability to get the technical information directly to the farmers through their outreach projects (OPP) where we observed young investigators presenting the results of their research and fielding questions from farmers engaged in raising sheep.

The EEP wishes to highlight the potential for increasing small-holder income by grazing hair sheep under rubber trees in Indonesia. Between 60-80% of the rubber trees are in private holdings. In addition, landless workers have the opportunity to graze a few sheep in these plantations for supplemental income--using family members as labor. Dr. Madjed, Director of the Rubber Institute at the Sungei Putih Station in North Sumatra stated that he is so enthusiastic about the results of the preliminary SR-CRSP research that he has decided to incorporate sheep grazing in his overall program of rubber production. He feels that the income for small-holders could be increased by 15% by grazing sheep. Dr. Madjed pointed out that about 40-50% of the total area of rubber plantations (2.6 million hectares) could be grazed due to the open canopy at any given time. The multi-disciplinary approach taken by SR-CRSP to the development of the potential is to be commended. Research on grazing under rubber trees should also be applicable to other tree crops such as Palm and Cocoa.

Finally, excellent progress has been made in the integration of research, training and extension in Indonesia. The EEP members are well aware of how difficult this is to do in any country but it has been accomplished very well in Indonesia.

#### Concerns of the Panel

One of the major concerns about these projects from the EEP's point of view would be the waste of time, materials and energy which would result if they were terminated prematurely. The projects have gone for some eight years now, a number of them, notably in nutrition and breeding, are relatively long-range. Many of the Indonesian scientists are young and considerable hardship and loss of investment would be made if the projects were foreshortened.

While the EEP members were on Java there was a shortage of feed for some of the experimental animals (sheep). There had been a prolonged drought (by Indonesian standards) and this coupled with lack of availability of feed and transport had resulted in relatively short rations for some of the foundation breeding stocks of sheep in Bogor. This shortage was hard to foresee, and it might have been overcome by the availability of emergency funds or plans. However, it is not advantageous for

the outcome of research projects to have animals on minimal or even subminimal rations.

Some concern was also expressed about the communications and transportation difficulties which might arise in the future between the Bogor and the sheep projects in North Sumatra. The North Sumatran project of grazing sheep under plantation crops is a very promising one with excellent personnel involved. It would be a great pity if it were to flounder for lack of communications and adequate transportation facilities.

A note of caution appears necessary for projects of the type being carried out in Indonesia. This relates to the enthusiasm of the young scientific people and their tendency to want to conduct new individual projects -- "a project for every person." While the principal investigators have done an excellent job in maintaining an overall focus in their work, they should be continually aware of this danger and channel the enthusiasm of their trainees towards a team approach to insure that carefully selected projects are pursued in considerable depth even at the expense of covering all of the ground. This might mean restricting the number of feedstuffs investigated, for example, or the number of genetic markers pursued, but in the end it is likely to produce well-founded results which can be used with confidence throughout the region.

#### A. Genetic Improvement of Sheep and Goats

This project has continued to work on various aspects of breeding in sheep. Although there was discussion of the extension of this project to goats, the members of the EEP felt that given the extensive nature of the sheep-breeding projects and the restrictions imposed by funding, it was unlikely that goats would be a substantial component in the near future. Projects involving the genetic improvement of any ruminant are slow; however, the work on breeding is sound and the goals laudable.

Exceptional prolificacy has been noted in certain Indonesian sheep. This is a matter of considerable importance for the future of the sheep industry, particularly if intensive methods of husbandry are adopted. The investigators realizing the importance of this fact intend to investigate thoroughly the inheritance of this exceptional prolificacy. This is clearly a long-range project and progress will be slow in establishing its significance under Indonesian conditions.

Hair sheep were introduced to Indonesia with a view to establishing their value under local tropical conditions. Projects involving comparisons of these, local sheep, and crosses grazed under rubber are now underway and should not be curtailed.

The breeding program has been substantially enhanced by the arrival of Dr. Luis Iniguez to the projects in Bogor. He out-

lined for us ten breeding projects for the future. These involved a range of proposals from evaluation of the hair sheep grazing in North Sumatra to the performance of high and low prolificacy sires.

#### B. Nutrition and Feeding Systems for Small Ruminants

The programs in small ruminant nutrition, predominantly sheep nutrition, are progressing well. A major component of the work on nutrition involves evaluation of a variety of feedstuffs available for small ruminants. These include native grasses, legumes, tree legumes, sweet potatoes and a variety of feedstuffs which are available in Indonesia (rubber nuts, palm oil, etc.).

The most recent component of the nutrition studies involves feeding systems for sheep grazing under estate trees such as rubber. A trial on energy supplementation for grazing ewes has already been conducted. This work is still in its early stages, but given the promise of this particular type of sheep husbandry in large parts of Indonesia presently under plantation crops, it is an important new aspect of the work on nutrition.

The EEP attended a number of research papers on the feeding trials conducted by students in the nutrition program; these were carefully done and well documented. The supporting work being carried out at Raleigh on protein supplementation and forage utilization is very complementary to the Indonesian projects and for the training students.

Another component of the nutrition project involves the compilation of complete diets for small units in Indonesia with the ultimate goal of producing a publication of feeds and feeding practices.

#### C. Economic Analysis of Small Ruminant Production and Marketing Systems

The economics group has progressed well towards its goals of providing a well-trained cadre of agricultural economists and an improved data-base for guiding research and policy to improve small ruminant productivity and meet farmers needs.

The group has evaluated the impact of new feeds (Glericedia maculata) and prolific sheep on the farming economy. During 1986-87 a comprehensive review of small ruminant marketing studies was completed and the local market system analyzed. These studies have been helpful in estimating future trends for the sale of meat in Indonesia.

The economists have also measured the impact of the SR-CRSP presence in certain target villages (Tenjonogara) and the

results, though not yet completely analyzed indicate that the SR-CRSP presence has been a positive one.

#### D. Sociological Analysis of Small Ruminant Production Systems

In the recent past the major activities of the Sociology Project have been focused on training and testing technology packages through the OPP. The major technologies involved are drenching, alternative fodder, and mineral block supplementation. At present 15 farmer groups are involved and considerable success has been achieved in this work. Additional work is in progress studying the effects of SR-CRSP input on these groups of farmers including those not served by the OPP.

The Outreach Pilot Project (OPP) has clearly made major gains in the last year in getting the information derived from the various research projects to selected farmers in the field. The Sociology and Economics projects have evaluated the impact of the OPP on the farmers by comparing the OPP farms with others via questionnaires and personal visitations. The OPP projects are an integral and important component of the SR-CRSP projects in Indonesia and the EEP felt that they should be encouraged and strengthened as they represent an excellent model for this type of extension work elsewhere in the world.

#### Publications and Transfer of Information.

The EEP scanned the actual publications that have been produced in Indonesia by the members for the small ruminant program in the various areas of endeavor genetics, nutrition, economics, and sociology. It was the opinion of the EEP that the quantity and quality of these publications in various formats were very impressive indeed. The EEP believes that there is an adequate amount of information already published for the investigators to press on with disseminating it in leaflet form or other suitable formats. An excellent start has been made through the OPP and work of this nature should be encouraged and expanded in the coming years of the program. Twenty-two general articles, six abstracts, three book chapters, and 13 technical communications are cited in the 1986-87 annual reports.

#### Additional New Projects

Two additional new projects were discussed during the time of the EEP review. First, a national workshop to include people working on small ruminant projects in Indonesia (agricultural and veterinary institutes, university and extension agencies and the private sector). It was hoped that such a workshop would present the work and the facilities which are available within Indonesia and, hopefully, coordinate their efforts for small ruminants. A major objective of this workshop would be to inventory the

resources available and maximize their use. In addition, it might produce a "Who's Who" of SR workers and/or a newsletter on small ruminant projects in Indonesia.

The members of the External Review Panel believe that this internal workshop would be a worthwhile venture. In our brief visit it was quite clear that there were many agencies involved in small ruminant research, in the diagnosis of disease and in extension activities in Indonesia and their identification and coordination would improve the efficiency of everyone's efforts.

The second proposal was for an International Southeast Asia Conference to establish a data-base and a networking system for small ruminant workers in Southeast Asia. The External Review Panel did not study this proposal in-depth, but felt that it might be considered after the internal workshop had accomplished its goals and established a suitable networking base for long-range projects on small ruminants.

### Training

During the period that the EEP was in Indonesia we had occasion to hear scientific presentations as well as extension presentations made by Indonesians who had been trained locally, in Australia, and in the United States as part of this program. They were an impressive group of young people. Their scientific work was sound and relevant to the problems of Indonesia and they had clearly enjoyed and profited from the studies and from their continued work with American PIs.

The training programs had avoided the criticism that persons trained overseas, particularly in North America and Western Europe, carry out projects and learn techniques which are quite inappropriate for their home countries. This criticism could not be leveled at the training programs conducted under the auspices of this project. They have been successful in providing pertinent and appropriate research projects for trainees and for the advancement of knowledge on small ruminants. An excellent balance has been maintained between the training afforded and the research produced. It is not anticipated that any changes should be made in this aspect of the projects as they represent a superb investment for the future.

### Cost Effectiveness and Balance of Domestic and Overseas Components

The External Review Panel felt that the investment made in the projects in Indonesia had generally produced excellent results. With respect to cost effectiveness, it was felt that if these projects were foreshortened and not continued for at least another three years, the considerable investment already made would be substantially forfeited. The foundations have already

been laid with respect to ovine nutrition and genetics. They have now to be more widely applied on the ground, notably in the tree plantations setting. Experiments on genetics and breeding are not under any circumstances, short-range and will only come to fruition with the passage of more time.

With respect to the balance of projects between home country and overseas, the majority of these projects have been carried out in Indonesia with backup and training in the United States. This is highly desirable since it has taken the research to Indonesia and has given the local scientists an opportunity to become actively involved.

### Research Results and the Effect of the Research

Research results have been sound, fruitful, and promising for the future. The effect of the research will not be immediately apparent, but will be long-range. Sound nutrition, for example, has some effects immediately, but will be more important in the long-range, and the same is true for genetic research. The sociology and economics components of the work are very important because many such projects in the past have faltered through inability to get the results of research applied in the field. The impression gained by the EEP was that the extension efforts have been successful to date and are promising for the future.

### Recommendations from the EEP

Both members of the EEP were surprised that an animal health component had not been included in the Indonesian projects. It is particularly difficult to introduce animals from overseas without substantial attention being paid to their health. Some of the introduced sheep were, in fact, suffering from caseous lymphadenitis, a common infectious disease of sheep and it was not known whether this was a "new" disease or whether it already existed in Indonesian sheep. The grazing of sheep under young trees is fraught with a large number of potential health hazards, notably from ecto- and endo-parasites (ticks and worms) and this potential danger could ruin these promising projects.

In some of the research projects, both under experiment station and field conditions, very high mortality rates have also been noted in sheep. Not all of these problems could have been avoided with a health component to the SR-CRSP projects, but considerable progress could have been made in defining the causes of these deaths if a health project had been initiated at the start of operations in Indonesia.

Both members of the EEP were impressed with the scope and, indeed, the success of the Indonesian projects, but were somewhat disappointed that the projects had not achieved the prominence which they rightly deserved at a national and international

level. The EEP felt an effort might be made to develop a more prominent public relations aspect for the SR-CRSP projects. This effort might also enhance future extension efforts. The proposed Indonesian workshop for workers on small ruminants would be a very good time to get some national visibility.

The External Review Panel, therefore, recommends that serious consideration be given to continuing these projects for at least three years and incorporating an animal health component with strong local involvement and a more prominent public relations program.

### KENYA

No member of the EEP has visited Kenya since July of 1986. Observations are, therefore, based on an update of the annual reports and contacts with project investigators. The central focus of the SR-CRSP program in Kenya continues to be directed toward the development and evaluation of a dual-purpose goat for the small-holders. The research approach taken is multi-disciplinary, involving scientists trained in animal breeding, animal health, forage production and nutrition, sociology, economics, and systems analysis. A strong training component is a major part of the programs in Kenya.

The EEP remains impressed with the high quality team of host country scientists and trainees in Kenya. The SR-CRSP approach has demonstrated that family incomes can be increased and family nutrition improved with the adoption of the dual-purpose goats. The demand for these goats far exceeds the supply and those small-holder/s who have received goats are so proud of the animals that they take extra care in all aspects of goat management and production. Thus, the dual-purpose goat becomes a symbol of progress and the results of research are spread rapidly through the community.

A brief discussion of the research accomplishments of each of the major research projects follows.

#### A. Genetic Improvement of Dual-Purpose Goats

The "computer designed" four-breed composite synthetic breed (DPG) is now entering the multiplication, breed stabilization and selection phase. Presently there are approximately 150 head of DPG; this number will increase to over 600 in 1988.

A major program was instituted in collaboration with the Health Project to evaluate all male kids for immunity to haemonchus. This evaluation and other data related to fitness to the Kenya environment are to be used as primary selection data for the DPG to supplement the milk production and growth data.

Detailed growth, milk and other data kept on this flock have been, and are continuing to be, analyzed to provide useful information to develop "tech packs" for utilizing DPGs and improving goat production of meat and milk in general.

An overall long-term strategy for breed development has been designed. Feedback data from direct placement of FI bucks with farmers, has been highly favorable and requests far exceed current supply.

New publications released by the project include three refereed journal articles, one extension bulletin, 19 abstracts and one MS thesis.

#### B. Systems Analysis and Synthesis of Small Production Systems

The Systems Analysis project was involved at three work sites in FY 86-87: Peru, Brazil, and Kenya. The major emphasis of the project has been to apply the developed and validated simulation models in different SR-CRSP countries.

Simulations for the Kenya SR-CRSP site are continuing to focus on problems that small-holders in Western Kenya face when engaged in goat production. Because the milk of each doe is to be divided between use by humans and kids, it is critical that kids receive adequate milk to assure an appropriate level of growth.

A second area of work was to determine if dedicating specific land areas (0.1 ha) to forage production for dual-purpose goats had any advantages for small-holders. These results have several far-reaching implications: first, marked improvement in goat product off-take can be obtained by dedicating small land areas for growing forage for goats; and second, the 40/4.0 genotype which is the target genotype for the dual-purpose goat has a high level of robustness enabling it to produce in marginal as well as improved production situations. The results of all these simulations, in detailed quantitative terms, are provided to the Economic Projects for economic analysis.

New publications released by this project include eight refereed journal articles, one monograph, five extension bulletins, 15 abstracts, and one PhD dissertation.

#### C. Economic Analysis of Small Ruminant Production and Marketing Systems

Whole-farm analysis was the basis for two economic studies in the Kenya SR-CRSP. One was the analysis of cash flow patterns of small-scale farm households of Western Kenya, and the other was the development of a PhD's proposal by Ms. Fanny Myaribo.

Evidence from earlier SR-CRSP Economics Project studies indicates that over 50% of foods consumed by farm households in Kakamega and Siaya districts in Western Kenya are purchased from the market. What was not ascertained from these studies are the sources of cash that enable these relatively large food purchases to be made. The cash flow study was therefore conducted to identify sources, levels, and patterns of cash in-flows and out-flows of the farm households. The cash-flow analysis showed that small-farm households in Western Kenya have little or no savings for substantial on-farm investment. Such investment would require access to credit.

Good progress is made in model conceptualization and research design for the development of a whole-farm linear programming (LP) model.

Biological constraints were identified as inadequate quality feeds on a year-round basis, susceptibility of goats to diseases and parasites, and lack of genotypes with the capacity to produce surplus milk beyond kid requirements for human consumption.

Another study focused on the demand for and the supply of milk and small ruminants in Western Kenya. Since DPGs have the capacity to produce extra milk for human consumption in addition to meat, the introduction of the goats would go a long way in alleviating and existing excess demand for milk in Western Kenya.

Four new publications have been released by this project and one dissertation is being prepared.

#### D. Kenya Animal Health Component

Contagious Caprine Pleuropneumonia (CCPP) is the most serious disease of goats in Kenya and is present in at least 33 other countries in Africa and Asia. The disease is caused by F38 mycoplasma and occurs in epidemics that cause high mortality and great economic loss. A project to develop an inactivated and lyophilized vaccine for CCPP is nearing completion. This year's focus was to evaluate the number of doses required and to determine the duration of immunity. Goats given a single vaccination resisted contact challenge two years later. These results, taken with data indicating the vaccine can be stored at room temperature for over one year, show that the vaccine development is complete and that field trials are needed.

A rapid diagnostic test for CCPP is needed for immediate treatment of goats having the disease, vaccination of goats at risk to CCPP, and screening of goats for purchase. A new test is ready for possible commercialization or government-supported distribution.

Progress is being made on the diagnosis and prevention of Heartwater in goats.

Another project is directed toward evaluation of natural resistance of goats to the Haemonchus contortus parasite.

Six articles have been published in refereed journals, one abstract, one thesis, and one dissertation have been released on this project.

#### E. Dual-Purpose Goat Production System

This project deals with forage productivity, feed presentation, establishment of community nurseries, mixed cropping, and forage nutrition. The research has been implemented in three stages. 1980-1982: characterizing the social, economic, and biological activities of traditional farming systems and on-station research in management and nutrition of goats and in agronomy. 1983-1985: monitoring performance of dual-purpose goats on farms; scientist-managed, on-farm research in agronomy and goat nutrition management; on-station research in goat nutrition and agronomy. 1986-1990: evaluating technical, economic, and social feasibility of dual-purpose goat production systems under farmer management. The farming systems approach is emphasized to ensure relevance to the needs and resources of farmers in western Kenya.

DPG multiplication efforts were sharply restricted by reduced funding in 1986, thus jeopardizing the full-scale evaluations scheduled for 1988.

Three refereed journal articles, three monographs, three bulletins, and seven articles in proceedings have been issued in 1986-1987.

#### F. Sociological Analysis of Small Ruminant Production Systems

The sociological component of the Kenyan SR-CRSP research has been very effective in guiding other researchers toward the proper selection of production alternatives.

Good progress has been made on the evaluation of the impact of DPGs in household nutritional status and economic welfare in collaboration with the Economics Project.

Results of the time allocation-labor cost study show that farm families, in general, have adequate time available to invest in DPG production at the current level of two animals per household.

Data indicates that the introduction of dairy goats in western Kenya has a strong potential for improving the nutritional and economic welfare of small-farm households.

Four selected publications on this project have been cited for 1986-87. One dissertation should be completed in the 1987-88 academic year.

## PERU

While spending home-leave in Peru, S. Fernandez-Baca, member of the EEP, visited the SR-CRSP in that country during October of 1987.

Apart from discussion with the site coordinator and representatives of some Peruvian collaborating institutions, as well as some research workers, a visit was made to the community project near Huancayo (Community Technology Validation Project). Unfortunately, it was not possible to visit Puno and La Raya where part of the range and breeding projects are being conducted. It was not possible either to have a direct conversation with the director of INIPA, the national counterpart institution.

The comments that follow are based on the impressions gained during the visits and the information provided by the annual reports.

### A. Research Accomplishments

From all the information gathered it is evident that the program has made sizeable contributions in the different areas of research. The results obtained will eventually lead to the improvement of the small ruminant production systems in Peru and in other geographic regions with similar environmental characteristics, provided they are conveniently applied at the farm level. Specifically small farmers are the target group for the SR-CRSP in Peru.

Special mention should be made of the progress achieved in the knowledge of the nature of the major causes of mortality in alpaca "crias" as well as the cause, pathogenesis, transmission and diagnosis of the major diseases that affect large sheep populations in the highlands of Peru.

In the area of range management, the studies on diet selection by sheep, llamas, and alpacas, as well as the stocking ratios between these species, will be of great value for the proper management of the scarce range feed resources.

The studies in economics have provided useful information on the economic feasibility of the utilization of cultivated pastures for sheep and alpacas.

The breeding project is providing valuable information on the performance of criollo-type sheep and the advantages of cross-breeding with other breeds to increase productivity.

The sociology project has provided useful knowledge on the social constraints to the introduction of technological innovations to rural communities, which is essential for the practical application of research results at the farm level. The results of these investigations have been published in many scientific journals, bulletins, and also have been presented orally in workshops and technical meetings.

## B. Training

The training of Peruvian professionals has been one of the most valuable long-term contributions of the SR-CRSP in Peru. A summary of the Peruvian scientists that have received training at the MS and PhD levels, sponsored by different U.S. institutions is presented in Table 1.

In addition, a total of 69 Peruvian students have received support from the SR-CRSP for their thesis research at different educational institutions in Peru.

It is expected that this trained personnel will play an important role in the improvement of small ruminant production systems in the country and will ensure the continuity of the research and development programs after the termination of SR-CRSP support provided a timely institutional strengthening is achieved.

Table 1

Training SR-CRSP Sponsored Peruvian Students  
in Degree Program in the United States

<u>U.S. Institution</u>	<u>MS</u>	<u>PhD</u>	<u>No Degree</u>	<u>Total</u>
Cal Poly	1	-	-	1
Colorado State U.	-	3	1	4
U. of Missouri	4	1	-	5
Montana State U.	-	1	1	2
Texas A&M Univ.	1	-	-	1
Texas Tech U.	4	3	-	7
Utah State/Range	1	1	-	2
Utah State/ Reproduction	2	2	-	4
Winrock Int'l	4	1	-	5
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TOTALS	17	12	2	31

(Source: Annual Report for Peru, 1985-1986)

### C. Institution-Building

In spite of the above mentioned achievements regarding research and training, the general impression is that the SR-CRSP still remains as a separate entity, rather isolated from the government programs. It appears that individual involvement rather than institutional commitment has been the main feature of the program. This situation has had the advantage of facilitating the execution of the program by avoiding bureaucratic pathways which are usually troublesome. However, the long-term consequences are not favorable since with no formal institutional commitment the program is extremely vulnerable to changes in personnel which unfortunately are a common feature of developing countries. It would have been expected that after seven (7) years the program should have become an integral part of the INIPA's activities with close ties to the other national collaborating institutions. Furthermore, in spite of the recommendations that were given after the on-site visit to Peru by the EEP in 1983, no formal agreement between INIPA and the other national collaborating institutes has been signed. In many instances the participation in the program of the Peruvian research workers is not necessarily through institutional arrangements but rather on an individual basis. In the long-term, this situation may lead to an institutional weakening and the creation of a working environment not compatible with the full utilization of the scientific potential of the trained professional personnel.

It is felt that every effort should be made to ensure a strong institutional commitment and all working arrangements should be made through the proper institutional channels rather than with individuals. It is true that there is generally a marked institutional weakness but that can not be taken as an excuse to avoid the proper lines of communication; on the contrary the SR-CRSP should serve as a catalytic factor for institutional strengthening.

It also appears that there is no involvement of INIPA's regional agencies in the activities of the SR-CRSP. Since INIPA, in addition to its research mandate, has the responsibility for extension work, a close relationship between INIPA's agencies and SR-CRSP activities in the field is highly desirable.

Mention was made during the visits to a process of reorganization that is supposedly going on within INIPA; however, no specific details were obtained. This process may provide a good opportunity for strengthening the commitment of INIPA to the SR-CRSP.

### D. Extension of Results and Community Projects

One of the major concerns regarding SR-CRSP in Peru has been how to apply research findings at the small farm level especially in the peasant communities, in order to effectively contribute to

the improvement of their living standards. Many of the research works have been conducted at large farms, like those of the SAIS, which differ markedly from the conditions prevailing at the peasant communities. The initiation in 1983 of the community project near the Mantaro Valley was, with no doubt, a commendable inter-disciplinary approach to evaluate the process of technology transfer in agro-pastoral communities.

Unfortunately, because of the limitation of funds, SR-CRSP support to the project was markedly reduced during 1986. With the financial assistance of Oxfam America and some support from SR-CRSP, a group of voluntary workers, called Yanapai, which includes some members of SR-CRSP, has been able to maintain the community project in operation in the region of Mantaro Valley. NOW (starting October 5, 1987) SR-CRSP, in collaboration with the group Yanapai, has taken the leadership of the Community Technology Validation Project which will be carried out in the communities of Aramachay, Quicha Chico and Miraflores. These are agro-pastoral communities where agricultural activities are the responsibility of men, whereas livestock care is under women's responsibility.

Disciplines involved in the project will be genetic improvement (Montana), health (Colorado), pastures (Texas Tech), Economics (Winrock), and Sociology (Missouri).

The specific work plans were still in the process of elaboration and discussions; therefore it was not possible to appreciate the overall program to be carried out in the communities.

At the time of the visit to Peru (22 October 1987) by an EEP member, five resident scientists were financed by SR-CRSP and two residents of the group Yanapai. Several other institutions such as the Agrarian University of La Molina (UNA), IVITA and the University of Huancayo, will participate in the project.

People of the two communities visited (Aramachay and Quicha Chico) showed a very positive attitude towards the project and seem to be very receptive to new ideas. This, of course, is an advantage for the project. Apart from a proper inter-institutional and inter-disciplinary coordination, the success of the project will depend on the establishment of a mutually beneficial and fruitful relationship between the project and the communities.

#### E. Publications

The SR-CRSP research in Peru has resulted in numerous impressive publications. For example, during 1986-87 43 general publications, 11 extension bulletins, three books, two monographs, and 25 technical communications have been released. In addition, two dissertations and 14 MS theses have been completed during this period.

## MOROCCO

### A. Significance of Research

Morocco represents all the different types of sheep and goat production found in the Mediterranean area: 1) range, 2) mixed farming/livestock, and 3) intensive use in the Sahara Desert oases. Of all the African countries Morocco has the highest density of sheep with an estimated sheep population of 12 to 15 million. The variation in this population is due to drought conditions.

Obviously Moroccans are highly dependent upon sheep and goats for their livelihood. Some estimates indicate that as many as 4.8 million Moroccans or 600,000 families are primarily dependent upon sheep and goat production for their existence. Not only do these large families (average of eight persons) have the lowest incomes, but their social customs and traditions impinge upon the carrying capacity of the range, which has serious negative long-term impacts on the land and resources of the country. This has sensitized the scientists to look for specific types of interventions which will not disrupt the precarious balance between man, animal, and nature.

### B. Research Accomplishments

Even though the Moroccan site is the newest SR-CRSP country, significant progress has been made with very limited funding. Morocco also is the SR-CRSP country in which the collaborating host country unit is a university rather than a government entity. This is helping foster institution-building and long-lasting linkages between researchers.

During the past year a major effort of the Genetic Improvement of Sheep and Goats Project has been made to prepare a draft of a sheep production manual for cereal-sheep producing areas of the Mediterranean Region, with emphasis on the Moroccan environment. The Annual Nutrition Project has contrived to carry out a number of important experiments on feed and mineral supplements. After several attempts the range management research program has been established, and this key area should contribute greatly to the understanding of the delicate man/land balance in the future. The sociology project concentrated its efforts in the High Atlas Mountains and attempted to determine range management practices and strategies prevalent in the area which affect the carrying capacity of the land and its renewable resources. In mid-1986 the sociology group made plans to shift its activities to the cereal-sheep region of Morocco in order to develop a comprehensive technological package in this important agricultural area; however, SR-CRSP budgeting reductions has made this impossible.

### C. Recommendations and Future Directions

The USAID Mission has recognized the importance of the range management issues and its critical role in renewable resource scheme of the country. The close collaboration between the Minnesota Project and the SR-CRSP has provided the opportunity for additional training opportunities for Moroccans. Hassan II agronomy and IAV is an excellent institution with well-qualified staff. The research findings produced by the SR-CRSP are numerous and important, not only for the Mediterranean area but for the U.S. as well. However, the main task at hand is to obtain sufficient funding to institutionalize these research efforts and develop the technological package.

#### BRAZIL

There still exists in Brazil a cadre of scientists with good facilities and trained staff although there are now no SR-CRSP funds available to carry out the projects started there. Every effort should be made to ensure that linkage is retained in Brazil so that the technological package can be finished and the vaccination trials against Caseous Lymphadenitis completed. It is understood by the EEP that the package will be finished shortly and that the vaccine trial may be continued with other funding. The EEP commands these efforts to bring to a conclusion these two elements which have widespread application.

In the concluding annual reports for the Brazil SR-CRSP projects it is worth noting that the results will be widely distributed through an impressive list of publications. The Brazil PIs and their collaborators have recently published 21 journal articles, 20 technical communications, 21 abstracts, ten proceedings, and 12 Texas Agricultural Experiment Station Reports. In addition, three dissertations and three MS theses were completed during the 1986-87 period and a number of manuscripts have been submitted for publication.

## IX. ACKNOWLEDGEMENTS

The EEP recognizes the dedicated services provided the SR-CRSP by Dr. David Robertshaw, who served as Program Director of the Management Entity from September 1, 1986 to September 1, 1987.

The willingness of Dr. William C. Weir to return to the position of Acting Program Director after Dr. Robertshaw's resignation, his leadership of the program in the interim, his guidance to the EEP members, and his help in the search for a new Program Director is noted with appreciation.

Appreciation is expressed to the SR-CRSP Principle Investigators, members of the BIR and Technical Committees, and all collaborators who provided annual reports, copies of proceedings, minutes of meetings, and other useful documents for the Ninth Report of the External Evaluation Panel.

The members of the EEP, Drs. Thomas and Campbell, sincerely thank Dr. Jan Nari, Director of CRIAS in Indonesia and the many administrators and scientists in Indonesia who made our stay productive and informative. The inspirational statement made by Dr. Jan Nari as quoted below, provides a sound basis for the approach to SR-CRSP activities:

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

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