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**External
Evaluation
Panel
1992 Report**



Collaborating Institutions

United States

Research and Development Bureau, United States Agency for International Development (USAID)
Board for International Food and Agricultural Development and Economic Cooperation (BIFADEC)
Joint Committee on Research and Development (JCORD)

Overseas Collaborators

Bolivia Instituto Boliviano de Tecnología Agropecuaria (IBTA)
Indonesia Agency for International Research and Development (AARD)
Kenya Kenya Agricultural Research Institute (KARI)
Morocco Institut Agronomique et Vétérinaire (IAV), Hassan II University

Participating U.S. Institutions

University of California, Davis
Colorado State University, Ft. Collins
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
University of Wisconsin, Madison
Winrock International Institute for Agricultural Development, Morrilton, Arkansas

External Evaluation Panel Report 1992

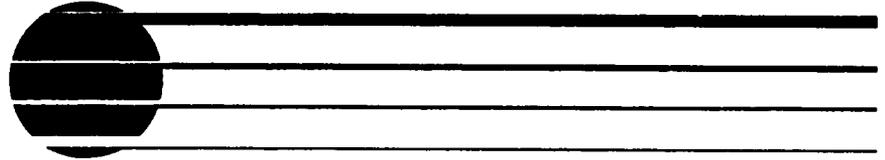


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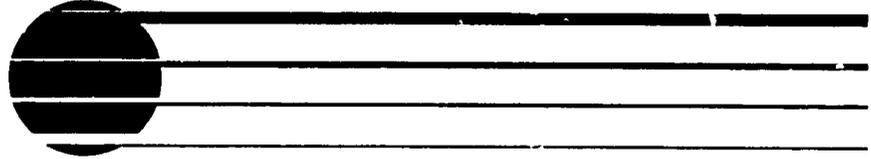
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Cover: Girl with Llama. Photograph taken in Bolivia Altiplano by Patricia Conrad.

Introduction



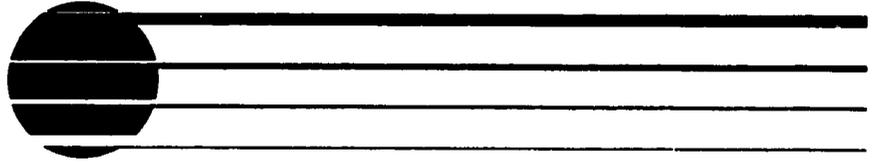
The External Evaluation Panel (EEP) of the Small Ruminant Collaborative Research Support Program (SR-CRSP) was at full strength in 1992. The members consisted of Dr. Cornelia Butler Flora, Sociology; Dr. Hudson Glimp, Nutrition; Dr. Martin Gonzalez, Range Management; Dr. Glen Vollmar, Economics; and chair for the year was Dr. Gordon Campbell, Animal Health. The full slate and the broad distribution of the disciplines involved tremendously facilitated the work of the Panel.

Over the past five years there have been considerable changes made in the modus operandi of the External Evaluation Panel. These changes are an attempt to make the work of the EEP more efficient. They include a "Scope of Work" and a "Preplanning Checklist" for EEP site visits (see appendix A). In 1991, we succeeded in getting a preliminary draft of the EEP report in the hands of the Management Entity (ME) and the United States Agency for International Development (USAID) early in January. It is hoped that the 1992 report will be prepared in the same way and be ready for general distribution early in 1993.

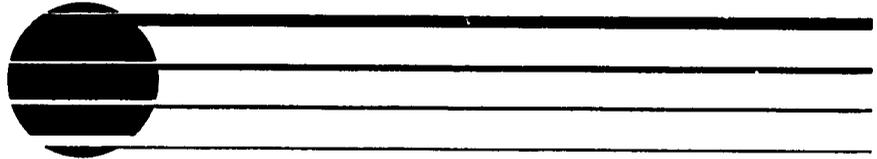
Over the past five years several schedules of visitations have been used by the EEP both at home and overseas. This year, at the suggestion of Dr. John Glenn, Program Director, the EEP scheduled its visitations as follows: members of the EEP first visited one university site in the United States, usually the home base of the lead U.S. Principal Investigator (PI). All of the U.S. principal investigators involved in the corresponding overseas site assembled there and presented their component projects. This was followed quickly by a visit overseas where the project was reviewed on site. The EEP traveled to Washington State University in the spring to meet with the U.S. principal investigators involved in Kenya; then they traveled in the early summer to Kenya to conduct the remainder of the review. Later in the summer the EEP met with the U.S. PIs in Logan, Utah, before proceeding in October to Bolivia to do the first site review in that country. It was generally agreed by the PIs, the Management Entity, and the EEP members alike that this new system works extremely well and has definite advantages over previous procedures. However, it required a great deal of work on the part of the principal investigators at the two sites, Washington State University and Utah State University, and Dr. Travis McGuire and Dr. Ben Norton are to be commended for their hard work and fine planning which made this process so successful. The EEP plans to continue this system in the future with one modification—we feel it would be beneficial if *all* EEP members visit each U.S. home institution even though all members will not participate in host country site visits.

It is the defined role of the EEP that its members carry out an evaluation of the projects and make specific recommendations to the ME, USAID, and the Board of the Directors. The EEP members have been helped tremendously in this effort by the friendly cooperation of the principal investigators. They have also been helped by the considerable administrative backup given by the Program Director, Dr. John Glenn; the entire Management Entity staff; and the Project Officer, Ms. Joyce Turk, of AID/Washington. The cooperation received from USAID missions is also appreciated. It is very gratifying for the EEP to see the results of some of their recommendations come to fruition. This has been particularly true during 1992, and it is the hope of the EEP that our critique of these excellent projects will continue to help guide the progress of the Small Ruminant CRSP in a constructive fashion.

Review



Bolivia



Agropastoral Component



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U.S. Participants Review

Introduction

Two members of the External Evaluation Panel, Campbell and Gonzalez, visited Utah State University on 2 September 1992 to meet with the U.S. PIs working in Bolivia and to do a brief institutional evaluation Utah State University. This was a part of the new system of evaluation and was found to be most useful.

Administration

During the one day visit, the U.S. PIs involved in Bolivia made the following individual presentations:

- Overview of the Agropastoral Program, Fred Bryant
- Global Relevance of the Bolivia Agropastoral Program, Layne Coppock
- Animal Nutrition and Feed Resources, Fred Bryant
- Range Ecology, Ben Norton
- Economics, Enrique Ospina
- Sociology, Mike Nolan

These presentations were excellent. The members of the EEP found them most illuminating, and since we had every opportunity to ask questions and seek clarification, they provided an extremely useful preview for our visit to Bolivia and the evaluation of the project.

During the review, the members of the EEP suggested postponing their scheduled October visit to Bolivia since it might be more advantageous if the External Evaluation Panel visited Bolivia early in 1993 after the Bolivia Program Administrative Committee (PAC) meetings with the PIs scheduled for November of 1992. However, it was agreed that the EEP should proceed as planned. They would visit Bolivia in October and convey the essence of their findings to the Project Director, Dr. John Glenn, the Project Officer, Ms. Joyce Turk, and the lead PI, Dr. Fred Bryant, so that they might have the advantage of the EEP's preliminary findings *before* the Bolivia PAC meetings. This plan of action was carried out. The results of our evaluation of the various Bolivian projects are included in this report as are our findings on the administration of the project, so it seems advantageous to dwell only briefly on the administrative backup and research arrangements in Logan.

It is clear to the EEP that the Utah State University campus at Logan is an excellent place to carry out the home-base work of the Small Ruminant CRSP. The academic facilities and the laboratories are absolutely first class; it is a most congenial atmosphere for U.S. scientists and visiting scholars from overseas. All of the facilities visited by the EEP were in excellent condition, some new and others totally

renovated in the not too distant past. The members of the EEP visited the Remote Sensing Laboratory in the College of Natural Resources. This lab is presently being used extensively by the Agropastoral Project in Bolivia.

The members of the EEP met with Chuck Gay, Assistant to the Dean, College of Natural Resources; John Malechek, Head of Range Science; and Paul Rasmussen, Director of Utah State University Agricultural Experiment Station. These senior administrative officers are fully familiar with the work of the Small Ruminant CRSP, both in Bolivia and elsewhere. They have stayed up-to-date with the progress which is being made and have provided first-class support for the Small Ruminant CRSP since its inception in Utah. All spoke very highly and very candidly about the work. They clearly take a major interest and will continue to do so in the future. There is no question in the minds of the EEP about the backup support afforded by Utah State University's work with the Small Ruminant CRSP.

Host Country Review

Introduction

Three members of the External Evaluation Panel—Gonzalez, Flora, and Campbell—visited Bolivia during the week of 11-17 October, 1992, and carried out a review of the Small Ruminant CRSP activities there. Their detailed itinerary is appended (Appendix B). The Panel had opportunities to visit with the resident scientists, their Bolivian counterparts, and a large number of administrative officers in La Paz. They spent Thursday, 15 October on site in San Jose Llanga. Thanks to the fine planning of Dr. Morty Ortega and his colleagues, the Panel had an excellent opportunity to conduct a comprehensive review of SR-CRSP activities in Bolivia. Considerable care and extensive discussion were given to the administrative aspects of this project, hence this section of the report is more exhaustive than is usual for more "mature" projects. However, the Panel did review the actual projects which were underway. Although the results are modest at this stage, project evaluations are also included as a baseline for future reports.

The first working day of the EEP's visit was Monday, October 12: the 500th anniversary of the encounter between the Old World and the New. Numerous demonstrations took place in La Paz and around the country. The EEP was advised by the AID/La Paz Mission to remain confined to the hotel. It was observed that Bolivia is probably the most security-conscious of all of the global sites now included in the Small Ruminant CRSP.

AID/La Paz Mission

The EEP had two visits with the AID/La Paz Mission in La Paz; the first visit was with Mr. Hernan Muñoz and Mr. Bill Baucum, the Agricultural Development Officer upon entering the country, and the other was with Dr. John Spooner upon leaving.

The members of the EEP were impressed with the excellent relations which exist between the Small Ruminant CRSP and the AID/La Paz Mission in La Paz. We were gratified to learn that Mr. Hernan Muñoz had been appointed Director of Liaison between the Mission and the Project, an appointment which we found to be unique to Bolivia and advantageous to all concerned. All three AID/La Paz officers with whom the EEP met were familiar with the work of the Small Ruminant CRSP and were working in close cooperation with the project. Their knowledge of the project is also enhanced by the fact that the La Paz Mission is deploying a substantial amount of PL480 funds in support of salaries and research work of the Bolivian counterparts to the U.S. principal investigators. The External Evaluation Panel is impressed with the cooperative work of the Mission and the Small Ruminant CRSP. We commend it and feel that this model of cooperation should be copied elsewhere on the global scene.

Host Country Administration

Members of the EEP spent three full days talking to Instituto Boliviano de Tecnología Agropecuaria (IBTA) participants from various administrative levels, from the Director of IBTA to the Bolivian students, about their impressions of the overall structure, administration, and function of the relatively new Small Ruminant CRSP component in Bolivia. A consistent series of observations were made at all levels and by all parties. These are summarized and presented below, not in any order of priority but rather to establish the basis for the recommendations which follow. These recommendations are an attempt to enhance the overall administration of the Small Ruminant CRSP in Bolivia.

Observations

While the EEP feels that the new Bolivian site was a good choice for the Small Ruminant CRSP and observed some good work in progress, the Panel feels that the following observations should be brought to the attention of all concerned so that they can be noted and where desirable rectified as promptly as possible to alleviate difficulties and to facilitate the progress of the project.

1. Coordination of the project must be improved at all levels. For example, key documents should be exchanged and everyone involved should have a clear vision of what they are expected to do and how individual work contributes to and complements the total program.
2. Planning and the effective use of time of PIs and Co-PIs must be strengthened considerably.
3. The biological scientists must communicate better with the social scientists at all levels and vice versa.
4. The U.S. PIs must take the responsibility for leadership, and the U.S. lead PI must take responsibility for overall coordination of the project, including frequent visits to Bolivia.
5. The plan of work must be developed in detail, mutually agreed upon, and made clear to all participants (coordination at the local level is essential).
6. With one notable exception (sociology), coordination between U.S. resident scientists and their Bolivian counterparts is poor.
7. The Bolivian students are hungry for information, and this must be supplied by optimum supervision and access to information (reprints, etc.). At the moment the supervision of students goes from excellent (sociology) to non-existent.

8. It is alleged that a number of unfulfilled promises have been made to the San Jose community. These include help with the village water supply and with the installation of irrigation canals. These promises are presently unfulfilled.
9. The original site at San Jose Llanga must be confirmed and continued. Any new site added must include arid lands.
10. It is not entirely clear what the research agenda is in economics. This must be clarified by the PI, endorsed by the resident and Bolivian scientists, and implemented. The Bolivian and resident scientists must cooperate in this effort.
11. The biological sciences are relatively weak in this project, and this must be rectified.
12. There are two range management institutions involved in the Bolivian Small Ruminant CRSP, yet overall the discipline is underrepresented in Bolivia, i.e., there is only one expatriate scientist on site.
13. Many of the administrative procedures are unwieldy and demand excessive amounts of time from the resident scientist in charge (site coordinator).

Possible Solutions for the Present Administrative Concerns

Most of the discussions during the Bolivian visit concerned administrative matters, and it is clear that all is not well in this respect. While the EEP is not accustomed to offering major administrative recommendations, the members of the EEP suggest that the Management Entity, USAID, the Board, and the Technical Committee consider the following possible solutions to the present situation:

1. Redefine the projects; seek endorsement by all the scientists working in Bolivia; and ask those with fundamental disagreements with the agreed approach to resign and be replaced.
2. Planning and reporting must be done collectively by all participants, particularly the members of the Small Ruminant CRSP and IBTA. Information, including research budgets, needs to be discussed relative to the priorities set by the Global Plan, the PIs, resident scientists, and their Bolivian counterparts.
3. Specific job descriptions must be formulated for all personnel, and these must include their reporting responsibilities. These should be available to all SR-CRSP participants.
4. The biological sciences must be strengthened with closer supervision by the U.S. PIs on site.
5. It is our recommendation that an additional biological resident scientist be appointed to serve on site. Once the baseline data have

been assembled for the social sciences, their research efforts must be guided by the technical recommendations of the biological sciences.

6. There are several options available to resolve the present coordination problem at the local level.
 - A. Reassign both the U.S. expatriate site coordinator and his Bolivian counterpart so that they stay in the organization, but not in a leadership role.
 - B. Subsume the Small Ruminant CRSP under the leadership of another agency, for example under the leadership of IBTA/IDRC with reporting responsibility to the Livestock Program of IBTA.
 - C. Appoint a senior range management or a nutritional scientist as the expatriate site coordinator and make sure that this is done with the endorsement and approval of IBTA.
 - D. Change the collaborating agency; for example, cooperate with a Bolivian university or IAGAACA.
 - E. Place appropriate trees in the already dug holes in San Jose Llanga, and in future make no promises to the community which cannot be fulfilled or do not fit the collaborative objectives of the project.
 - F. Reconsider the delegation of responsibility by the site coordinator. Currently, all transactions require action by the site coordinator, which greatly curtails efficiency and active field work by that resident scientist.

Range Management and Nutrition

Goals and Objectives

Limited results have been obtained so far and include the progress reports of the students doing their theses in San Jose de Llanga. It appears that from the beginning, specific goals, objectives, and priorities for both the U.S. and Bolivian participants were not widely discussed nor well understood. This has caused subsequent confusion and misunderstandings.

It is evident that the U.S. PIs of the Range Management and Animal Nutrition components in Bolivia should have spent more time in the host country at the beginning of the program. This would have created a solid base for objective planning and understanding the complex local conditions and production systems.

The relative absence of PIs in Range and Nutrition during the first two years, along with the fact that no U.S. resident scientists have been appointed yet, have resulted in the slow "advance" in these research programs.

Disadvantageous Activities. A majority of the Bolivian counterparts in the SR-CRSP participate in other part-time jobs such as teaching or consulting. To what extent these jobs affect their performance in the SR-CRSP has not yet been determined, since there are other more serious problems limiting the research activities. However, the EEP believes, with the exception of some specific and limited activities which could be beneficial to the SR-CRSP program, all investigators should be on a full-time basis in order to justify their inclusion in the program.

Balance between Research and Training

Research. Practically all of the research is being conducted by the students at San Jose, with occasional visits from their advisors (some more than others). Some interesting preliminary results have been obtained, and all the students will finish their theses in 1993.

It is the opinion of the EEP that this type of training, if well supervised and oriented, should be one of the focal points of the program. It is necessary in order to form a cadre of young scientists ready to be engaged in research. They are the most receptive to understanding the systems approach in research, and some of them could eventually become very good assistant or associate researchers for the program.

The EEP does not think that the objectives of the Global Plan are being fulfilled completely. Original planning appears to have been done from the U.S. without sufficient Bolivian consultation. Present planning does not include linking Bolivia's ecosystems and agricultural and livestock production systems with the priorities of the Global Plan. Therefore budgeting and planning are top down without appropriate consultation with Bolivian counterparts. Budgeting should match program priorities, and a more cohesive and well-organized plan is urgently needed.

Training. The 14 students in San Jose are very good, and they are dedicated and very interested in their projects. All have a positive attitude and willingness to learn. However, it is evident that there is not enough communication with their advisors. The students are isolated in the community, without access to a library or literature that could be provided by advisors such as resident scientists and/or their Bolivian counterparts.

We do not know where these students will be employed once they graduate, but they will be very good prospects for IBTA, universities, or other organizations engaged in research. This new blood could work as an asset for the SR-CRSP or other international research programs.

At this time, there are no U.S. trainees in Bolivia. The EEP feels that it would be beneficial to have some U.S. students do their theses on-site, if some appropriate funding can be arranged. It would be beneficial and enlightening for U.S. students.

Presently, IBTA has 18 persons studying in Wisconsin, but none are associated with the SR-CRSP. The only Range/Forages participant within the program is Humberto Alzerreca, who recently arrived at Utah State for a doctoral program.

Balance Between Domestic and Overseas Research

Research. Within the SR-CRSP, the only overseas research is conducted by students and their advisors in San Jose. The economists have also been conducting some surveys in other regions.

Outside of the SR-CRSP, it seems that IBTA does not have much research going on at the present time with small ruminants. Our visit to the Patacamaya Research Station confirmed this. Nine hundred hectares of good land are sitting almost totally idle, with numerous buildings only partially occupied. A lack of conservation and maintenance is evident.

Not only is adequate funding necessary to make it functional, but a good program is needed where the six IBTA research components can fit together. More than anything, they need an experienced and capable superintendent to manage the program. Founded 33 years ago, more research information and experience should be available than presently exists.

The only domestic research program is the interesting work conducted by Robert Washington at Utah State University with the field verification of the San Jose remote sensing data.

Funding. A frequently mentioned complaint by Bolivian counterparts is that "there is no budget for research or for traveling." Planning should have been made in order to establish priorities and allocate available funds for these priorities.

Collaboration Between U.S. and Bolivia Personnel. There is simply very little collaboration between the U.S. and Bolivia personnel and sometimes none. Severe personality problems arose from the beginning, and it is sad to see how the two groups within the program do not "communicate" effectively—even at the technical level.

Without mutual, close collaboration there is a big loss of effort, money, and time!

Dissemination of Results

There are no results to disseminate yet; however, plans to disseminate any results must be laid now. IBTA does not have an extension service; all extension is left to the NGO's.

The SR-CRSP has a responsibility at this early stage to plan how the campesinos will receive information as it becomes available.

Utilization of Results

This is the other big question which must be addressed. . .*now!*

Cost Effectiveness

In general terms, the cost to benefits ratio is not favorable. Even though the 1991 and 1992 budgets were not funded as high as they could have been, the production is still very low. It is understood that the first year was a "getting started" process, but it went slowly. Expenses in salaries, benefits, travel costs, and overhead by institutions are not justified by the scarce results obtained in two years, and the future does not look better as things are now.

A drastic review must be done in order to adjust the budget, whatever its amount, for a better functioning program. Approximately U.S.\$800,000 have been spent in two years, and more results (or indications of research activities) should be available. It is still very early in the project and cost effectiveness cannot yet be determined, but it does not seem to be cost effective. It is quite clear that a careful review of the budget must be carried out.

Recommendations

1. Adjustments to Program Objectives

A. According to the original MOU, IBTA indicated that their priorities were research in range/pastures and animal nutrition. So far, partially due to the absence of U.S. resident scientists in these areas, the sociology and, to a lesser extent, the economics projects have become better established in Bolivia than the biological projects.

B. Changes must be made to strengthen the Range/Pastures and the Animal Nutrition programs. To begin, U.S. expatriate resident scientists are urgently needed. There are ways to combine the priorities and the national interests of Bolivia with the objectives of SR-CRSP and still remain within the systems approach. The EEP was given the impression that IBTA is not against this approach. If the problem is that they are not very "familiar" with the systems approach, then one of the responsibilities of the SR-CRSP should be to explain it, to teach it, and to convince the Bolivian counterparts and other officers in IBTA that

this approach has advantages. This should have been a priority from the time of the first discussions and the signing of the MOU.

C. One must understand that to modify a national research structure (good or bad), which is accustomed to traditional commodities research, is difficult, but it must be done. This is where communication efforts could have been better.

2. Additions, Modifications, Deletions of Projects

Due to the changes in rural activities during the last few years and other factors, the community of San Jose de Llanga has not proved to be the ideal site for Bolivian interests. As a result, efforts should be made to work at another site where small ruminant pastoralism and farming are the principal production systems. It would be desirable to explore *in detail* the possibilities of a site in Laguna Blanca, Oruro Province, in the Central Altiplano and possible linkages with AIGCA (Integrated Association of Cattle and Camelids for the Andes) without abandoning San Jose, where compromises have been established. According to local references, Laguna Blanca would be a very representative site for the entire Altiplano, since this region deals with Agropastoral systems, including the important role played by small ruminants.

3. Improving Dissemination and Utilization of Results

Aside from publications that may result from ongoing research, there is not a clear plan for the dissemination of results, and how its utilization by peasants and other producers is going to be accomplished.

We know that NGO's in Bolivia are doing some extension work, but it would be convenient for IBTA and the Ministry of Agriculture to find additional ways to deal with the transfer of technology. Working with IBTA, the SR-CRSP should increase coordination with NGO's, such as AIGCA and women's organizations, in order to make them aware of the project and get their input.

4. Bolivian and U.S. Student Training

The SR-CRSP should begin the search and selection of a second group of host country trainees. This group would take the place of the 14 students that will finish their theses next year.

In addition, the SR-CRSP should select some U.S. trainees to do their thesis research in Bolivia. This would require that funds be made available for this purpose.

5. Allocation of Funds

A large proportion of the budget presently goes for high salaries, travel expenses (both international and local), and institutional overhead in the United States. This leaves very little for field research and materials. It would be desirable to have a better distribution of the budget to have more adequate funds for research in the host country.

Economics and Sociology

Introduction

The greatest strength of the SR-CRSP in Bolivia is its systems orientation. The greatest weakness comes from the difficulties of implementing that orientation. There is little coordination among the resident scientists in terms of their research designs, little coordination of the resident scientists with their Bolivian counterparts (with the notable exception of the sociology component), and, again with the exception of sociology, little evidence of input from the PIs in the United States. In the field, the students are gathering a wide variety of data and have been trained to understand a systems orientation and the importance of the human component in Agropastoral systems, including the importance of gender. However, they have not had the guidance necessary to see how their separate parts fit together and how each part could contribute to technology generation and transfer.

Part of the problem could be with lack of integration of the objectives/outputs with the global plan. The output emphasizes "carrying capacity," which the global plan suggests is an irrelevant concept for this system. If the scientists could look at the activities as team efforts and determine the contributions of each toward the whole, it would be easier to do systemic analysis of the research site and for the students and scientists to understand the interrelations of each component of the research.

There needs to be considerably more team building to create a common vision of what the project is trying to accomplish. Systematic training *oriented toward potential interventions* might be particularly useful in helping the Bolivian co-investigators understand the rules under which they are playing. As it is, the Bolivians are working toward establishing component research designs which ignore the interactions among the agro-ecological and socio-economic contexts. Much more team training in field-based research is needed to overcome the experiment station/development program orientation of the Bolivian scientists. In our general discussions, it became clear that only the sociologist, of all the Bolivian scientists, understood the systems orientation or the ultimate goals of the project.

Economics

While everyone acknowledges the importance of economics in the project, there is a definite lack of focus in the economics component and no linkage to the range management aspects which could guide the formulation of a systematic research agenda.

It is not clear how the research agenda (construction of simulations which help guide future research needs and development of an expert system)of the resident scientist fits the short and medium-term project agenda or the systems approach of the project. The research of the Bolivian collaborator appears to be even less focused and less connected to the community system. There are serious disagreements between the resident scientist and the Bolivian collaborator as to what constitutes data for the models they are deriving. For example, the resident scientist recently terminated the Bolivian economist's visits to markets to gather data on livestock prices when she discovered that only one or two observations were being gathered in each market and that there was no systematic quality control to determine the validity of the price data acquired. This indicates a lack of coordination and planning among the scientists. Further, there is no indication that the markets being sampled were based on those at which the people from the community sold their livestock.

There seems to be little relationship between the activities being performed by the economics component and the activities described in the economics workplan. For example, it is not clear that there is systematic economic information being collected on the production systems in San Jose de Llanga. While the project as a whole is establishing the basis for identifying the relationship between Agropastoral systems and land tenure, it is not clear that the economic component is playing a role in that identification. It is curious that the research begins with a model of hide exports to determine the factors that limit marketing and trade of small ruminants and products, when a systems approach would indicate that instead of beginning with a mathematical model, it might be useful to work with the Agropastoral systems themselves and ask the peasants where they marketed their production and their perceptions of constraints, working outward rather than assuming a linkage that might require a complex set of marketing channels that are not in place. Starting from the community would be a good way to begin to see which policies should first be analyzed for their impact on production, marketing, and value-added product opportunities. As it currently stands, there is no economics-related policy research.

The economics thesis advisors have placed great emphasis on theory-driven research models. This is undoubtedly helpful for

meeting standard curricular demands of traditional economics departments and will help legitimize field research in economics at the cooperating Bolivian universities. However, there have been few systematic attempts to link the larger models and theoretical formulations with the concrete circumstances of the community or to link the research with the larger project objectives.

Student Training in Economics. The student economic projects also lack focus. It is not clear what data is being gathered to indicate stewardship.

The lack of coordination between the larger team and the Bolivian economist is evident in the work plan submitted to IBTA. This lists three projects: (1) analysis of the substitution of production systems in the economic structure of peasant units of agropastoral production in the altiplano, (2) evaluation of the assignment of resources and of costs of production in mixed livestock rearing, and (3) analysis of markets and systems of commercialization of products and byproducts of sheep and goats in the Andean area.

The first project involves ex-ante analysis of alternative production systems in terms of their costs and benefits and the larger impact of the realignment of resources for the peasant economy. Unfortunately, this project is dependent on the biological scientists determining alternatives. The alternatives being considered for this modeling include a seemingly random list of projects such as rabbit raising rather than systems. With good collaboration and better definition from all the scientists involved, this project could be a valuable addition to research planning and implementation.

The second project determines the costs of production in mixed livestock systems, using partial budgeting by species and for all species combined, and calculates the profitability of livestock production, by species and together, applying the VAN (presumably a computer model). John Vargas, who demonstrates a good appreciation of gender issues, could integrate these issues into a version of VAN.

The third project identifies internal and external markets for sheep and goats and their by-products (how this will be done is not clear), quantify the internal and external supply and demand for these products, establish the factors which help determine the market price both internally and internationally, and identify basic indicators of the structure of costs of production and commercialization. While several aspects of these three projects in the national plan seem reasonable, the projects need to be coordinated with the work of the resident scientist and the larger Economics workplan. More needs to be done to integrate the Bolivian economist into the overall SR-CRSP effort.

Recommendations

1. Leadership is needed from Winrock International to clarify how the economics activity in Bolivia coordinates with the global plan.
2. Increased coordination is required between the Bolivian economist and the economics resident scientist.
3. Priorities must be set for economics research that are congruent with the larger aims of the global plan, with clear implications for the biological research and systems approach.
4. Research budget resources must be used to meet the highest priority research goals first.
5. Closer relations with the Economics Department at the Universidad Mayor de San Andres in La Paz is needed to justify systems-based research that is applied in orientation. If this is not possible, it might be necessary to collaborate with another Bolivian university where there is an agricultural economics program or a greater understanding of applied economics research from a systems perspective.
6. The economics research agenda must be set from the community outward and based on the actual situation of the households within the community.
7. The emphasis on gender must continue and some of the newer methodologies for assessing the gendered nature of the economics of the agro-pastoral system must be integrated.

Sociology

The goal of the sociology component is to design interventions that will improve the quality of life of small ruminant producers in agropastoral areas by mitigating the effects of drought and other environmental risks. The key concept of this goal is that sociology has no goal other than to inform the design of the interventions. The unit has worked well to orient their research toward such interventions. However, without the presence of a solid biological scientific core, it is difficult for them to know what interventions make biological sense in order to test their socio-economic compatibility. As a result, the sociologists are focusing on determining past practices, which could then be evaluated for their sustainability by the biological scientists.

The projects which the sociology unit have designed have the potential for making the agropastoral system of San Jose de Llanga more sustainable. However, they all need to be focused, which only can be done through the participation of the biological scientists. Together they have to answer the "So what?" question about each piece of sociological data gathered.

The historical research to be undertaken is important to understanding changing strategies of human, land, and animal interaction and in validating community experience. However, more attention needs to be given on how the data will be analyzed and integrated with the biological data. It is important that the biological scientists work closely with the sociologists to determine the right questions to ask and the implications of the answers for the specific problems which the SR-CRSP is addressing.

The notion of baseline data is still too broad. Greater focus of the gathered data is needed in order to avoid the common problem of too much data and too little analysis. While the sociology unit could produce a fine ethnography of the community, that is not what the project is about. Only with more information provided by the range management and nutrition scientists can the sociologists begin to determine which socio-economic data might make a difference for the kind of range management practices which might emerge.

The sociologists were supposed to be important in site selection, through identifying Bolivian production systems where small ruminant production is important for small farmers operating in semi-arid marginal zones where dryland cropping and livestock production interact. However, the site apparently was suggested by a Bolivian range scientist who has left the project to seek an advanced degree. Currently, the Bolivians define the site as unacceptable. The sociologists, working with the University of Utah mapping group, have identified the area as one of major environmental deterioration. It is clear that the agropastoral system in place is not sustainable. It is important to keep studying this site to determine how the current system contributes to deterioration and what can be altered to reverse or at least reduce the deterioration of the pasture resources.

Student Training. The sociologists have identified two key research areas that impinge directly on the management of small ruminants: access to and control of land and livestock. Two students are in the field undertaking this research. They determined that control of and access to land, while different, are both important to understanding the interactions of humans, animals, and pasture. They have succeeded in mapping land ownership and access of community in order to determine constraints to range management. They have determined the importance of separating ownership and access and the importance of the role of migration in the livelihood strategies of households and its impact on access to land.

The student studying livestock acquisition and control has recently begun his research, which identifies the mechanisms of animal

acquisition, traces the development of individual/family herds over time, and evaluates the correlation between herd size and wealth. Working with the resident scientist and the Bolivian scientist, they have determined the gendered nature of animal acquisition and the relatively low correlation between small ruminant ownership and wealth. In contrast, bovine ownership, which tends to be male, is correlated with wealth, and is not nearly as dispersed throughout the community as is small ruminant ownership.

The third sociology student's work will involve natural resource conservation and gender. It is important because it will identify local attitudes toward and categories of natural resources, determine the means of access to and stewardship of land, fuel, water, and other resources, and describe past and present conservation practices. If closely integrated with the work of biological scientists, this could provide an exciting basis for establishing alternative practices for on-farm trials.

The student sociologists are doing an excellent job in working with their colleagues within the community to ascertain the implications of those patterns. It will be important to overlay the land access map to the other mapping activity currently underway by Utah State.

The sociology unit, working with all of the students in the field, has determined that there is little rationale behind current range management practices. One concludes that the community represents not only a deteriorating environment, but a social system in transition. More interaction with the biological scientists could help focus the questions the sociologists ask about herding patterns and rationales.

One of the major objectives for sociology is the assessment of environmental and market risk and the identification of institutional, cultural, and social mechanisms to reduce these risks. The sociology unit has begun an interesting and potentially productive line of research on perception of risk that is revealing a more complex set of criteria and definitions than originally anticipated.

The sociologists involved in the project all should be commended for their commitment to sound field work. The continued good relations with the community is due in large part to the unstinting efforts of the Bolivian counterpart sociologist. The sociology resident scientist's determination to spend maximum time in the community is commendable and will yield better data more relevant to technology development which will actually be used than a more distant approach.

The constant communication between Jere Gilles and the Bolivian sociologist was key to keeping the project focused and working from project document to implementation. The ability to communicate directly with the University of Missouri—including a visit by the

Bolivian sociologist to the University of Missouri—helps explain the good relations among the sociologists. Further, the lead of Missouri in planning and executing the November 1990 workshop helped orient the project before beginning the field phase. The proceedings from that conference were published in early 1992 by the University of Missouri.

Christian Jetté, the Bolivian sociologist, selected excellent sociology students to work in the community. One of them speaks Aymara, the other speaks Quechua. While all of the students chosen speak an indigenous language, only two of the 15 speak Aymara. Due to the high rate of migration to and from San Jose de Llanga, a number of individuals, especially those who have worked in the mines in Oruro, which is south on the highway near which the community is located, speak Quechua. However, one wonders if there will be a problem communicating with the women in the community, who are more likely to be monolingual in Aymara than the men.

Despite the limitations, the Sociology component of the project is clearly the strongest one in the field. They have a good grasp of a systems approach to agropastoralism and are working on good data gathering and analysis strategies to help improve them. However, unless the biological part of the study is markedly strengthened, they will not be able to fulfill their potential in understanding and improving the existing agropastoral systems in Bolivia and similar areas.

Recommendations

1. Establish a stronger biological research base which communicates directly and interactively with the sociologists and the economists not only in the research site, but at the national and international levels.
2. Continue and expand the work on gender, making sure that the relative scarcity of Aymara speakers among the researchers does not unduly bias the data gathered.
3. Carefully review all data gathering instruments with the other scientists on the team, including the students in the field in all disciplines.
4. Combine the social mapping activities with the GIS-generated maps.
5. Make clear the methods of analysis to be used with the historical data in order to make it most useful for the biological and economic scientists.
6. More of the SR-CRSP papers and other relevant documents should be translated into Spanish.

Kenya



- **Animal Health Through Biotechnology Component**
- **Dual Purpose Goat Component**



Introduction

The SR-CRSP has two research components in Kenya: Dual Purpose Goats Component and Animal Health Management Through Biotechnology Component. Each component was reviewed separately by the EEP. However, since several factors such as host country administration and the AID/Nairobi Mission affect both components, this report will evaluate these factors first.

In preparation for the overseas visit and the review of the projects in Kenya, three members of the External Evaluation Panel—Gordon Campbell, Glen Vollmar, and Hudson Glimp—visited Washington State University April 27-28, 1992. The agenda included the following presentations concerning the various projects in Kenya.

- Summary of Small Ruminant CRSP components in Kenya, Travis McGuire
- Dual Purpose Goat Production Systems, Will Getz
- Dual Purpose Goats Economics, Fanny Nyaribo
- Dual Purpose Goat Sociology, Jere Gilles
- Dual Purpose Goat Breeding Component, Jerry Taylor
- Multivalent Vectored Vaccine for Sheep, Jim DeMartini
- Multivalent Vectored Vaccine for Goats, Travis McGuire

Excellent presentations were made by most of the investigators and every opportunity was afforded to members of the EEP to question the presenters and clarify the issues involved. Only sociology's presentation was weak. In fact, we still do not understand what they are doing in Kenya regarding the vaccine study. Most PIs were able to provide illustrations and examples which enhanced the presentation of future plans and work. It would not be appropriate here to pass any further comment on these presentations because the projects which they represented will be reviewed under the appropriate component.

The visit provided extremely useful preparatory information for the members of the EEP. It was felt by both the PIs and the members of the EEP that we should pursue this format for future years as it had many advantages over our previous review system.

Administration

AID/Nairobi Mission

Three members of the Panel met with Tom Hobgood (Agricultural Development Officer), recently appointed to AID/Nairobi, and other AID/Nairobi mission staff. Since he was relatively new to Kenya and had received limited time to study the activities of the Small Ruminant CRSP, Mr. Hobgood suggested that members of the EEP pay particular attention to the following:

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1. The integration of the Small Ruminant CRSP into the mainstream of KARI research.
2. The analysis of the impact which the Small Ruminant CRSP projects have had on the Kenyan economy, environment, and families.
3. The fact that veterinary services are likely to be privatized. This fact should be borne in mind with particular attention paid to the likely economic impact of the multivalent vaccine.
4. The candidacy of the DPG for privatization. Mr. Hobgood believes strongly in this idea. AID/Nairobi is under the impression that 1000 DPG's will be available in 1994.
5. The impact and future of SR-CRSP activities in Kenya.

The AID/Nairobi Mission made it clear that the Small Ruminant CRSP model has modest support in Kenya, and the AID/Nairobi Mission doesn't have an overwhelmingly strong interest in it. This is because there is no place for agriculture per se in their current mission strategy. By and large its interest in the Small Ruminant CRSP model in Kenya is relatively short-term since they believe that the work of the Small Ruminant CRSP would be better continued by privatization and institutionalizing future efforts. We perceive this to mean that the vaccine efforts would be better conducted by private industry. The other efforts undertaken by the Small Ruminant CRSP would be best institutionalized under KARI. AID/Nairobi suggested that we might keep our research activities in Kenya focused over the next two years and select very carefully from amongst them for the future efforts of the Small Ruminant CRSP. It was stressed that the global aspects of such efforts as multivalent vaccines should be seriously considered and continued if the SR-CRSP feels that they hold potential for global use.

The AID/Nairobi Mission is particularly interested in the Small Ruminant CRSP clearly defining in the next two years the following:

1. The potential for privatization of the SR-CRSP animal health efforts.
2. The careful documentation of the impact of the SR-CRSP's efforts.
3. The integration of these efforts into KARI for the future.
4. The selection of the best collaborative research work for application on a global scale.

The members of the EEP would like to make it clear that they are not necessarily in agreement with all of these statements. However, they feel that these suggestions reflect the planning environment of USAID at the time of the EEP's visit and should be noted so that those who are planning the continuation of the Small Ruminant CRSP

beyond the span of the current grant will duly note them, take them under advisement, and make plans accordingly.

Host Country Administration

The members of the EEP met with the Director of the Kenya Agricultural Research Institute (KARI), Dr. Cyrus Ndiritu, and Dr. J.S. Wachira. The EEP team had an excellent meeting; Dr. Ndiritu had prepared a summary of the project's achievements and status and its integration into KARI. This summary is included as appendix C.

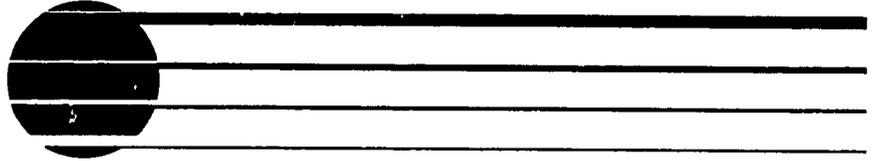
In addition to his written report, it became clear that Dr. Ndiritu does not consider that the cooperation between KARI and the Small Ruminant CRSP is optimal. Despite this, he noted several positive institutional impacts which the SR-CRSP projects have had on Kenya. First, he noted the impact of the new biotechnology group working in Kenya; second that the Socio-Economics group has brought these disciplines to KARI for the first time; and third, that institutionalizing the Farming Systems Model would allow its application in other areas of Kenya. This system could be used to evaluate components for inclusion into all farming systems of Kenya.

Dr. Ndiritu has clearly laid plans for the transition of the Kenyan personnel from the Small Ruminant CRSP to KARI, and he is optimistic about that transition. He expressed the opinion that there is some lack of coordination between the work of the Small Ruminant CRSP and the Kenyan National Programs as well as some animosity between the Kenyan and the overseas counterparts. Indeed he stated that their working relationship is "not optimal." It is his feeling that at the end of the present life-span of the Small Ruminant CRSP the network would be supported by ILCA and the EEC, and the Dual Purpose Goat could be used nationally. Further, the work carried out on farming systems would have regional value. He also stated that KARI would be pleased to incorporate the scientists who have been trained by the Small Ruminant CRSP.

International Livestock Centre for Africa (ILCA)

The members of the EEP met with Dr. R.L. Baker representing ILCA. Dr. Baker pointed out that he has a working relationship with Nairobi University, and they have a project involving disease resistance of goats sited on 500 acres near Mt. Kenya. He expressed considerable interest in cooperating with appropriate components of the Small Ruminant CRSP, particularly if it were extended. He also expressed an interest in cooperating with future small ruminant networking efforts in Africa. ILCA is interested and concerned with the long-term future of the DPG, but they are not prepared to make a commitment to preserve its development after the SR-CRSP grant ends. EEP members also met with the AFRNET coordinator on Small Ruminants.

Animal Health Management Through Biotechnology Component



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U.S. Participants Review

Administration

While in Pullman, the members of the External Evaluation Panel met with Dr. David Prieur, Chairman of the Department of Veterinary Microbiology and Pathology. Dr. Prieur is enthusiastic in his endorsement of the work of the Small Ruminant CRSP. He assured us that the quality of the scientific effort is first class, and he is extremely pleased with the training given to the graduate students within the program. He also indicated that a long-term Kenyan scientist with the Small Ruminant CRSP, Dr. Fred Rurangirwa, is now a member of the faculty of Washington State University with all of the responsibilities and privileges of that role. Despite Dr. Rurangirwa's absence in Kenya for much of the time, Dr. Prieur indicated that he feels that this is an excellent appointment and the work carried out in Nairobi in conjunction with Washington State University is of the highest possible order.

It is clear to the members of the EEP that the scientific facilities at Washington State University are first-class. The faculty involved in the Small Ruminant CRSP is of the highest possible caliber, and the entire effort both in Pullman and in Kenya has the strong endorsement of the Department Chair. It should be noted that the principal investigator, Dr. Travis McGuire, was honored in the fall of 1992 by the American Association of Veterinary Immunologists as their Outstanding Immunologist of the Year. This is a singular honor which is richly deserved and reflects extremely well on Dr. McGuire.

Members of the EEP found that there is unquestioned support from all members of the administration at Washington State University for the work of the Small Ruminant CRSP. The members of the EEP, being familiar with the scientific laboratories of the veterinary college, took the opportunity to visit the off-campus goat facility. This boasts one of the finest Saanen goat flocks in America. Once more the members of the Panel were gratified to see such splendid animals kept in first-class condition, an extremely useful adjunct to the caprine work of the Small Ruminant CRSP in Pullman.

Host Country Review

Introduction

As a part of the Small Ruminant Collaborative Research Support Program's *Global Plan 1990-1995* there was a major health component proposed in an attempt to solve small ruminant health problems through the development of a multivalent vaccine for small ruminants. A monovalent vaccine was developed for contagious caprine pleuropneumonia during the first decade of the SR-CRSP in Kenya. The new approach was to develop an efficacious multicomponent vaccine which could be economically produced and distributed to vaccinate small ruminants against more than one disease. Using an

interdisciplinary approach, it was proposed to construct a recombinant vaccinia virus vectored vaccine which would induce immunity against multiple infectious diseases of small ruminants: one multivalent vaccine for goats which would protect them against several important infectious diseases and another multivalent vaccine for sheep. In the Global Plan it was suggested that a goat vaccine include the components necessary for protection against mycoplasmosis and heartwater, and the sheep vaccine include the agents of heartwater, ovine pulmonary carcinoma, and ovine progressive pneumonia. It was realized at that time that the appropriate technology was rapidly becoming available, and the hope was that within the five years available, 1990-1995, such multivalent vaccines would be successfully developed through research.

Research Institutions

Two major U.S. institutions are involved in this research, Washington State University where the program has been conducted to develop a multivalent goat vaccine under the leadership of Dr. Travis McGuire and Colorado State University where a similar sheep vaccine is being developed by Dr. James DeMartini. In addition, the Small Ruminant CRSP supports a laboratory at Kabete in Kenya where research is conducted under the leadership of Dr. Fred Rurangirwa. In addition to these primary institutions, the nature of the research, involving sophisticated modern biotechnological methods, has attracted the collaboration of a large number of other scientists who are involved in basic biotechnology research and development. There are at least a dozen other institutions involved in exchanging information on vectors and key genes; these organizations range from the United States National Institutes of Health to Pirbright in the United Kingdom and the Institute of Livestock Research and Agricultural Development (ILRAD) in Kenya. It should also be noted that this state-of-the-art research has allowed the principal investigators involved to attract highly competitive funds from the United States Department of Agriculture and the National Institutes of Health, among others.

Evaluation

The original project goals as outlined by the Global Plan were quite general and involved "the development of a suitable virus vector and appropriate subunit vaccines for important diseases of sheep and goats." While the scope of the project has been broadened to include a larger number of component subunits, the basic objectives have been well maintained and progress has been made towards these goals. Several important changes have also been made. The original vector

proposed was vaccinia virus. Recently this has been changed, and presently investigation is being made into the suitability of capripox as the vector. This is an appropriate change in view of the circumstances which exist in Africa and the world in general at this time.

There have also been several additions made to the list of subunits which might be included in the vaccine. The original list included mycoplasmosis and heartwater of goats and heartwater, ovine pulmonary carcinoma, and ovine progressive pneumonia in sheep. These diseases were cited as examples and with the passage of time the overall list of vaccine components has increased to include Nairobi Sheep Disease, Rift Valley Fever, Caprine and Ovine lentiviruses, capripox virus, peste des petites ruminants, contagious caprine pleuropneumonia, heartwater, and haemonchus. These are all appropriate agents for a multivalent small ruminant vaccine.

This increase in the scope of the work has had the advantage that it allows the inclusion of basic work by other scientists around the world. However, it does suffer from the disadvantage that the Small Ruminant CRSP scientists are now engaged with a substantial number of different agents covering a wide spectrum from viruses, mycoplasmas, rickettsiae, and nematode parasites (worms). There can be no doubt that the research conducted in the animal health through biotechnology components, if successful, will contribute substantially to the health and well-being of small ruminants around the world. The basic concept of a multivalent vaccine as an alternative to a substantial number of single component vaccines was a very attractive one in 1989, and it still is. Should this project come to fruition, the multivalent vaccines would serve a very important niche in global veterinary medicine.

Balance Between Research and Training

The animal health component of the Small Ruminant CRSP has an exemplary record with respect to training both American and African scientists. This fine record continues. Indeed the presence of a viable research laboratory at Kabete is testimony to the tremendous effort that the U.S. and Kenyan PIs have made to transfer modern biotechnological research to Kenya. The laboratory at Kabete continues to be a major source of training for Kenyan scientists, a substantial number of whom are carrying out advanced degrees under the leadership of Dr. Rurangirwa and Dr. Rwambo. These trainees represent an important contribution to Kenya's future. This training effort receives support both from Washington State and Colorado State universities. The end result has been the establishment of a fully functional, modern biotechnology laboratory in Kenya. This is a major

accomplishment. It should be noted that all three of these institutions—Washington State University, Colorado State University, and the Kabete Laboratory—stay in very close contact with each other and with the rest of the global scientific community.

Balance Between Domestic and Overseas Research

In a research project of this type it is particularly difficult to comment upon each individual research activity because coordinated research activities are going on in the three major laboratories in Pullman, Fort Collins, and Nairobi, and each of them is seeking major components to be included in the final multivalent vaccine. It is perhaps pertinent to note that the project is proceeding on a broad base with the major emphasis now being on the use of capripox virus as the vector and with a large number of vaccine components being investigated for inclusion into the final vaccine. In addition, this collaborative research work is being carried out in other laboratories around the world, and if it is successful, additional components may well be available for a multivalent vaccine.

It would appear to the members of the External Evaluation Panel that there has been adequate funding to allow for a considerable amount of modern biotechnological research to be conducted on the multivalent vaccine. In addition to the funds supplied by the Small Ruminant CRSP, other sources have been sought to fund components of this project (the Nairobi Sheep Disease agent, for example, is also supported by other USAID funds).

The degree of collaboration between the U.S. and host country personal appears to be exemplary. The principal investigators have excellent communication, and Drs. McGuire and Rurangirwa communicate frequently and discuss at length the progress made in the two laboratories in Kabete and Pullman. In this vein, the balance between domestic and overseas research is well maintained with perhaps a slight preponderance of research being carried out in the United States. However, this is understandable because of the highly sophisticated nature of the equipment required to carry out some of the research.

Dissemination of Results

Throughout its lifetime the animal health component of the Small Ruminant CRSP has been extremely productive. There has been a substantial number of publications presented in internationally referred journals, e.g., *The Veterinary Record*, *Research in Veterinary Science*, *The International Journal of Parasitology*, etc. In addition, there has been a steady flow of theses and workshops. Because of the collaborative

nature of the research, many of the publications are multi-authored, and they are accepted by journals at the cutting edge of modern veterinary science and biotechnology. It can be safely assumed from the above that results generated in the animal health component of the Small Ruminant CRSP are disseminated and available to a global audience. A list of the publications from animal health (Washington State University) since 1990 is included as appendix D. It is an impressive list.

Since the multivalent vaccine is not yet completed, it is not possible to examine the effectiveness and the utilization of the results achieved. However it is the opinion of the EEP that the virus vector chosen for this project, capripox, is a very likely candidate and that some of the results of the candidate units, notably, haemonchus, are promising.

At this stage of the program it is extremely hard to measure the cost effectiveness of the work on the multivalent vaccine. The EEP is convinced that the funds disbursed for this project have been extremely well spent (see Appendix E for summaries of the 1991-92 and 1992-93 budgets). However, modern biotechnological research is expensive and so is the training of young scientists. It is also true that the principal investigators involved have used the funds supplied by the Small Ruminant CRSP to leverage a substantial number of other funds. In some instances these are considerably larger than the Small Ruminant CRSP funds, but there is little doubt that the Small Ruminant CRSP funds have provided a very important base from which to operate.

The Board of the Small Ruminant CRSP has announced that it will fund only one U.S. institution for this project in the future. This change will require some very careful decision making on the part of the principal investigators. It should be noted that the laboratory equipment in Kabete is adequate but minimal, and it is felt by the members of the EEP that lack of availability and maintenance of equipment there might slow the project. This is in part because there are a fairly large number of students involved in the work; they have to learn to use the equipment, and frequently there is only one piece of equipment of a certain type available.

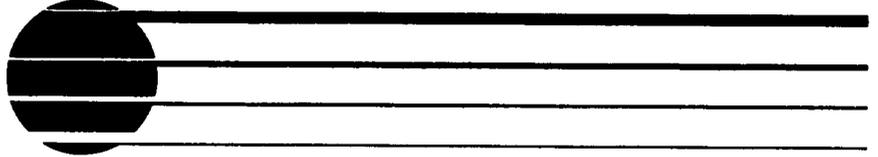
Despite the laudatory description above, the members of the EEP feel strongly that the scientists involved in the health component should focus over the next two years on verifying the efficacy of the selected virus vector and restrict their list of candidate sub-units to two or three agents. We see this as a time to focus efforts and produce a multicomponent vaccine, albeit with a limited number of components, before the end of the current USAID Small Ruminant CRSP grant.

Vaccine Impacts

Dr. Jere Gilles' (University of Missouri) report presented at the Washington State University meeting outlined the University of Missouri's research project on the impacts and cost of vaccine production and distribution in Kenya. He indicated that there were a lot of unknowns and that this research is most difficult.

Dr. Ralph Brown, University of Missouri, has collected data and information in Kenya for study of the costs of producing and distributing contagious caprine pleuropneumonia vaccine (CCPP). The EEP looks forward to the report from Dr. Brown regarding this study. The EEP is expecting a discussion of institutional constraints to the production and distribution of the CCPP vaccine in Kenya.

Dual Purpose Goat Component



U.S. Participants Review

Goals and Objectives

Production Systems Research

The report was presented in Pullman by Dr. Will Getz, Winrock International. The objectives of this research have been to incorporate dual purpose goat production into the existing smallholder agricultural system and household unit. On-station and on-farm research have led to production packages that allow dual purpose goats to be a viable part of agricultural systems. Production technologies include nutrition, health, housing, management strategies, and many other practical guides. Other significant components developed include use of multipurpose tree species for forage, sweet potato vines as a milk replacer for goat kids, establishing the importance of goat manure as a fertilizer, development of a local double cob maize cultivar, and cost effective methods of harvesting and storing locally grown forages. This project has developed, from good scientific knowledge, very practical and workable DPG production systems.

Genetic Research

Dr. Jeremy Taylor, Texas A & M University, reported in Pullman on the breeding research results and plans. Herd inventories were presented, indicating that having a breeding herd of 500 DPG does by 1994 will be a challenge. Research results show that the DPG is superior to native breeds in milk production, growth rate, and carcass merit. The research team in the United States and Kenya has placed major emphasis on the genetics of Haemonchus resistance in the DPG, with 38 resistant goats identified. Major emphasis is being placed on selection for resistance and DNA screening. Primary emphasis in development of the DPG breeding herd is being placed on:

1. Use of embryo transfer to accelerate increase in DPG numbers;
2. Identifying collaborator multiplier flocks;
3. Progeny testing bucks in cooperator herds;
4. Emphasis on parasite resistance in selection and progeny testing;
and
5. Continued improvements in facilities and management at OI' Magogo.

The EEP recognizes the importance of the DPG development efforts and strongly endorses its high priority. However, the Panel has some serious concerns which are listed on pages 46-47.

Balance Between Research and Training

Production Systems Research

The production systems program at Maseno has had excellent on-station and on-farm research programs. The training component has included both graduate training and field training of Kenyans and U.S. interns. This project has been very prolific in the output of both research publications and training materials.

Breeding

The breeding component has trained a number of master's-level Kenyans in Animal Breeding and one doctoral student. One M.S. student is currently at Texas A & M University. The EEP has repeatedly pointed out in its reports that Kenya is very thin in Ph.D. level animal breeders and has emphasized the need for more Ph.D. training in this area. The project has initiated training in artificial insemination and embryo transfer technologies in Kenya. The publication of research results from this project has been both prolific and of high quality.

Balance Between Domestic and Overseas Research

The Production Systems and Genetics research programs have largely and logically been conducted overseas. This has resulted in the development of both production systems and goats adapted to the environment and management capabilities in-country. Domestic research has primarily consisted of data analysis and publication of results. The recent interest in basic research studies related to *Haemonchus* resistance is resulting in increased domestic research in this area.

Dissemination of Results

The production systems research project at Maseno has effectively disseminated its results through station and on-farm field days and training courses, techpacks and training in their use, several videotapes and other media reports, as well as extensive publications of results in scientific journals. Further recommended efforts in this area are discussed later.

The genetics research program has largely disseminated results through the publication of research papers and participation in research meetings. The dual purpose goat, via shows, sales, and systems research at Maseno, has done a very effective job of selling itself. There is huge interest from farmers, government, NGO's, and others. All the research continues to support the hypothesis stated 14 years ago in justifying this project—the small ruminant fits the small farmer.

Host Country Review

Introduction

After a site visit to Washington State University and presentations by all the U.S. PIs, three EEP members, Campbell, Glimp, and Vollmar, visited Kenya during the week of June 22-26, 1992. There they met with AID/Nairobi representatives, the Director of the Kenya Agricultural Research Institute (KARI), and International Centre for Livestock and Agriculture (ILCA) personnel. The three EEP members then proceeded to Ol'Magogo where they spent a day visiting the foundation flock of Dual Purpose Goats (DPG). From there, they proceeded to Western Kenya to Kisumu where they visited the farming systems project and the other DPG projects operating at Maseno. The members of the Panel had excellent visits with USAID personnel in Nairobi.

Production Systems Research

The Maseno Farming Systems Research Program has been conducted over a 12-year period, 1980-1992. The dual purpose goat component of the research was hampered for several years due to lack of available goats for on-farm studies. When goats were made available, they were two-breed crosses (native x dairy breed) rather than the four-breed synthetic that is considered the dual purpose goat. Even with this constraint, strong farmer interest existed and much valuable data was obtained. This project will be phased out by Spring, 1993.

This project has evolved into a world class model of successful farming systems research. In spite of major personnel changes over the years, major accomplishments can be documented by the farming systems team. Dr. Patterson Semenyé, in his June 1992 annual report, documented 18 major accomplishments for the DPG Production Systems Research Program at Maseno. Many of these have been incorporated into a DPG Techpack developed by the team. It is interesting to note that many of the major accomplishments have broader application than the DPG program, e.g., the local double cobber maize that outproduces hybrids, proper fertilizer recommendations for maize production, research results on studies of *Sesbania sesban*, and *Leucaena* varieties.

Dr. Semenyé has an ambitious schedule through this winter to summarize and publish all of the production studies and team research. Dr. Fanny Nyaribo is completing an ex post economic analysis of small farmer project cooperators, those that started with the project but dropped out, and non-participant farmers. Dr. Corinne Valdivia is completing an economic impact analysis as part of her postgraduate studies at the University of Missouri. The Director of KARI has indicated a strong commitment to institutionalize the Maseno DPG Farming Systems model and to extend this model to other locations in Kenya.

The EEP recommends that support be provided to make certain that team members such as Dr. Semenyé, Dr. Fitzhugh, Dr. Getz, and others as appropriate document the DPG Farming Systems program *process* and accomplishments through publication. This is a major achievement of the SR-CRSP that has potential application in much of the developing world. Dr. Semenyé also suggested, and the EEP supports his suggestion, that pilot small ruminant farming systems projects be established in other countries. These pilot projects could (1) further test the Maseno Farming Systems model, (2) extend the technology, and (3) identify future potential SR-CRSP project sites.

Breeding

The Kenyan Dual Purpose Goat breeding program is directed by Dr. B.A.J. Mwandotto and Dr. Jeremy Taylor. Breed development and evaluation research is conducted at Ol'Magogo, which is now administered by the KARI National Animal Breeding Centre at Naivasha. At the time of the EEP visit during June, 1992, there were approximately 1100 goats at Ol'Magogo. Only 175 of these were breeding-age DPG females, with an additional 260 breeding-age does that are F1, or two-breed crosses. The FY 1992 Plan of Work includes establishing alfalfa pasture for grazing, but this had not been done and no plans were being made to get it done. The goats appeared to be healthy and well managed. Although the plans call for development of a breeding herd of 1,000 does by 1994, the facilities appear to be handling close to their limit at 435 breeding age does.

Research results document the superiority of the DPG over native breeds in body size, growth rate, milk production, and carcass merit. Farmer interest throughout Kenya is very high in obtaining DPG males and females. International interest also exists. These all confirm the importance of this project. However, several comments, concerns, and suggestions are considered appropriate by the EEP that could affect the future direction of this project.

- KARI and AID/Nairobi continue to operate under the assumption that the goal of 1,000 DPG breeding does will be reached by 1994. This is impossible. There is a need to be realistic in the next report.
- The embryo transfer program, initiated in an attempt to increase DPG numbers, failed in 1991 and will likely fail again in 1992. The conditions at Ol'Magogo—facilities and management—simply are not capable of supporting this technology. It is neither appropriate nor good training to transfer a highly sophisticated technology under such conditions. Furthermore, it delayed the development of the DPG goat rather than accelerated it.

- There is concern among the EEP about the emphasis on selection for parasite resistance, gene mapping, and other basic research in this area. The merit of this research is not questioned, but it was not the primary objective of DPG development and could potentially detract from the primary project goals. It is also expensive.
- The EEP recommends that the project immediately adjust its recommended Ol'Magogo DPG breeding doe herd size to 400-500 does and communicate this to KARI and AID/Nairobi. The following reasons are given: (1) this size is within the management capabilities of Ol'Magogo; (2) this can be achieved by 1994; (3) more intensive selection for genetic improvement would be permitted much earlier.
- The project needs to review the need for progeny testing of bucks by cooperators for the following reasons:
 - A. Likelihood of success is low and data collection will be difficult and expensive.
 - B. This restricts the number of people or agencies that could be good potential DPG breeders.
 - C. A massive grade-up program, with quality of males controlled by KARI, would be much simpler to manage. The Kenya Livestock Commission herd of 1,500 goats at Ol'Magogo would appear to be a logical candidate herd for grade-up.
- The EEP continues to recommend training additional Kenya scientists for the Ph.D. in animal breeding. At this time there is only one qualified scientist in Kenya to carry out this research.

Sociology- Economics and Farming Systems

Introduction

The SR-CRSP presence in Kenya has been a factor in KARI establishing a Socio-Economics unit within KARI. This unit is relatively new with a base of experienced and new researchers. The unit has considerable socio-economics research potential.

Western Kenya

The Farming Systems research in Kenya is directed at the integration of crops, trees, and goats and includes sustainable systems, family nutrition, and family income. The DPG collaborative research is with

families and includes women's leadership and their involvement in production and marketing.

The DPG Farming Systems research project at Maseno has been phased out. Dr. Patterson Semenye has given effective leadership to this project which has a program base of small ruminant nutrition and DPG. Alternative methods of harvesting, storing, feeding, and nutritional evaluation of forages and the impact on goat growth and production were studied. This project with Winrock has been very successful and the approach has potential in other areas of Kenya. The EEP recommends that a semi-arid area be considered for a similar farming systems research project as the Maseno project.

The Maseno farming system project has carried on a very successful outreach, technology transfer effort with the development of techpacks, workshops, field days, demonstrations, and ties with individual producers who have dual purpose goats. Linkages were established with the Kenyan agricultural extension system. The farming system project has been well supported with publications and outreach materials. The EEP visited a Women's Cooperative where the members had a DPG project. In order to make DPGs available to an increased number of families, the goat's host family keeps the kid(s) and passes on the doe to another family. The demand for goats available to Maseno project cooperators far exceeds the supply.

The research of economist Dr. Fanny Nyaribo and rural sociologist Dekha Sheikh have contributed to SR-CRSP research. Nyaribo has studied the impacts of biological projects in Kenya, whole farm models with income impacts, and the off-farm variables such as policies, prices, and market structure that influence goat supply, demand, and prices.

Sheikh's research is with DPG adaptive behavior by households, large and small farms, high and low income groups, male and female decision-makers, male and female heads of households, and by age of household heads. Sociology's most powerful finding to date has been to demonstrate the interaction between ethnicity and goat based farming systems. Also ethnicity has been shown to have a powerful impact on decision making.

Winrock and the Kenyan scientists and support staff should be complimented for the effectiveness of the Maseno Farming Systems project and the productive use of SR-CRSP funds.

Impact Analyses

Dr. Nyaribo's research at the University of Missouri is on the impacts of the DPG and vaccine research. The AID/Nairobi mission raised a question in regard to Nyaribo's linear programming analysis in regard to the use of assumptions in regard to DPG performance. In her de-

fense, this is the best that she could do until more performance data are available on milk output and other aspects of DPG performance. The analysis has merit recognizing her assumptions. She might do alternative analyses where a range of key variables are assumed such as milk production of two, three, and four liters of milk per doe per day, varied prices, etc. The impact of goats cannot be assessed except as part of a sophisticated strategy with major market and non-market considerations.

Networking

The structure is in place to further develop a network of Kenya SR-CRSP research project with other east African nations. AFRNET is a possibility. The Kenya DPG, vaccine, and farming systems research provides information that should be networked to others who have an interest and would benefit from the information.

Recommendations

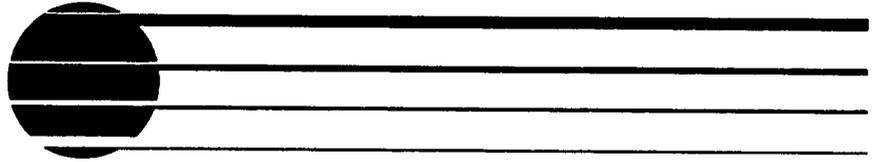
1. Serious consideration should be given to the development of a Farming System research program at a site in semi-arid, eastern Kenya. The positive experience with the Maseno Project would be an asset for developing such a site.
2. The SR-CRSP should continue to work on impact analyses. There is a need for more resources going into economic, environmental and social impacts. The research needs to quantify impacts as much as possible. What are the cost-benefits? What is the return on the investment in SR-CRSP research?
3. The methodology and purpose of the vaccine production and distribution in Kenya needs to be made much clearer. In particular the utility of the research for production and distribution of multivalent vaccine needs to be integrated into development design.

General Comments

1. The SR-CRSP's collaboration with KARI scientists has been very influential in the establishment of Socio-economics and Biotechnology units within KARI.
2. The SR-CRSP has contributed to the institutionalization of small ruminant research in KARI.
3. The SR-CRSP should be complimented in regard to the SR-CRSP benefits brochure (*SR-CRSP: Global Research that Benefits the United States*). This is an excellent start with host country and U.S. impacts. Hopefully, economics and sociology impact research will add to the impacts of the vaccine and DPG as more of the research is completed.

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Recommendations



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Management Entity

1. The ME should be complimented for the leadership and fine management that it is contributing to the project. Director John Glenn and the staff have done an excellent job in working with the Board, Technical Committee, USAID, host country research leaders, and others to keep the SR-CRSP program on course.
2. We are pleased with the degree to which the ME has taken a proactive leadership role in the affairs of the SR-CRSP. In an attempt to optimize communication between the members of SR-CRSP and the ME, the EEP strongly recommends that the Director maintain regular informal communications with all branches of the organization, especially with the U.S. PIs.
3. The ME should take an active role as soon as it is clear that major problems are emerging, e.g., the recent administrative problems in Bolivia.

Bolivia

1. The SR-CRSP needs immediately to identify appropriate resident biological scientists and a site coordinator for Bolivia.
2. The EEP recommends that serious reconsideration be given to the biological science disciplines represented in Bolivia. The Bolivian project might be better served by a combination of range management and animal nutrition.
3. The EEP gives the strongest possible commendation to the inclusion of Bolivian students in this project and would recommend strongly that this component be strengthened and continued, recognizing that these students will provide an excellent base for the continuation of work in Bolivia.
4. We recommend that U.S. students be funded to carry out thesis and dissertation research on the Bolivian sites.

Kenya

1. The EEP was pleased to observe that their 1991 recommendation to reduce the number of U.S. institutions involved in animal health in Kenya was taken. The EEP, while recognizing that excellent work is being done in Kenya, strongly recommends that the animal

health PI's carefully focus their efforts on the identification of a suitable vector virus and a limited number of promising sub-units to be included. In this way, a multivalent vaccine, with for example three sub-units, could be completed and tested for efficacy by the end of the present grant.

2. The DPG Production Systems research program in Maseno from 1980-1992 evolved into a world class Farming Systems research and training program involving a strong multi-disciplinary team. The EEP recommends that a team of Kenyan and U.S. PI's representing the full spectrum of disciplines document this success. Patterson Semenye is suggested as team leader, and Will Getz would be the logical U.S. principal investigator.
3. The EEP recommends that the DPG project adjust its goal for the Ol'Magogo breeding doe herd size to 400-500 does and communicate this to KARI and AID/Nairobi. The reasons for this are: (1) this size is within the management capabilities of Ol Magogo; (2) this can be achieved by 1994; (3) more intensive selection for genetic improvement would be possible at an earlier time.
4. The EEP is concerned about the emphasis on selection for parasite resistance, gene mapping, and other basic research. The merit of this research is not questioned, but it is not a primary objective in development of the DPG and could potentially detract from and delay the primary goals.
5. The distribution of the DPG beyond this project needs serious evaluation and a plan developed that (1) maintains and improves breed integrity and quality; (2) *maximizes distribution to the intended smallholder farmers*; (3) minimizes risk of political decisions that may result in loss of the DPG resource, and (4) moves aspects of the DPG breeding program into the hands of private enterprise producers.
6. The objectives and methodology of the vaccine production and utilization research in Kenya need to be clarified.
7. Work must continue on impact analyses. More resources need to be deployed in economic, environmental, and social impact analyses. The research needs to quantify impacts as much as possible.

8. We acknowledge the publication of *SR-CRSP: Global Research that Benefits the United States* and strongly support the continued publication of such impact reports.

General

1. We urge the ME and USAID to incorporate a broad base of expertise in the development of the next Global Plan (the request for extension). This plan should be sensitive to USAID's new and emerging priorities.
2. The EEP strongly commends USAID and particularly the Project Officer, Ms. Joyce Turk, and the missions of Kenya and Bolivia for their continued interest in and cooperation with this project.
3. The EEP was extremely gratified to find that AID/Washington and BIFADEC has satisfactorily brought to resolution the issues regarding the USAID Indonesia Mission's support of the Small Ruminant project in Indonesia.
4. The EEP believes that the SR-CRSP should be involved in projects in arid-lands, especially since over 50% of the sheep and goats of the world are kept in this environment. It is essential that the SR-CRSP give the most serious consideration to work in arid lands for future projects. Further, although the Technical Committee suggests otherwise, we do not recognize the Bolivia site as typical of global arid lands ecosystems.
5. The SR-CRSP needs to seriously consider inclusion of an extension/technology transfer function in all production/farming systems research programs.
6. The EEP recommends that all members of the Panel be included in all U.S. site visits to enhance the interdisciplinary quality of the reviews.

Appendix A

Preplanning Checklist for EEP Site Visits

1. Interviews: all PIs about one hour each.
2. Presentations: each major component, by PIs and/or major collaborators/graduate students.
3. Visits
 - a. All sites involved
 - b. All laboratories involved
 - c. All animal facilities involved
 - d. Other important facilities, plant collections, model farms, etc.
4. Administrative review (visit as appropriate)
 - a. USAID Mission
 - b. Appropriate Department of Agriculture/University Office
 - c. Vice President of Research or equivalent
 - d. Dean or equivalent
 - e. Department Chair or equivalent
 - f. Section Chief or equivalent
5. Finances: review current budget (one or two page summary of overall spending; to include list of personnel and persons in training funded by SR-CRSP)
6. Documentation desirable
 - a. Current reprints (last 12 months)
 - b. Current publications list
 - c. Personnel roster (name, function, project)
 - d. Copy of current annual workplan
7. Travel funded by SR-CRSP and purpose
8. Time frame
 - a. Domestic: one to two working days and travel time
 - b. International: five working days and travel time

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Scope of Work

With direct reference to the responsibilities legislated for the EEP, the following Scope of Work, if applied to each project (and in some defined areas to each activity), at each site, each year will best serve the *evaluation* of the SR-CRSP and make constructive *recommendations* possible.

Evaluations

1. Evaluate whether the project goals and objectives are being maintained and accomplished.

Procedures:

- A. Evaluate results achieved which contributed to, or accomplished, project objectives.
 - B. Identify changes made and their expected/accomplished effects on the project's objectives.
 - C. Identify activities which are disadvantageous to the project's objectives.
 - D. Comment upon the project's contribution to the goals of the Global Plan "for research on problems and constraints, global in nature, whose results are applicable and transferable regionally and globally (world-wide)."
2. Consider effective balance between research and training (for development of institutional research capability).

Procedures:

- A. Research. Comment upon the overall research activity with respect to its appropriateness to
 - The host country research capability
 - The objectives of the global plan.
- B. Training. Comment upon the status of the training program in the host country and the U. S. with respect to
 - The training of host country personnel
 - The enhancement of host country institutional research capability
 - The training of U.S. personnel.

C. Comment on the balance between research and training for development of institutional research capability.

D. Evidence of institutionalization of host country trained personnel and research results.

3. Assess balance between domestic and overseas research (for effectiveness in solving constraints in developing countries).

Procedures:

A. Comment upon

- Each domestic research *activity*
- Or if in the host country each overseas research *activity* with respect to its effectiveness in solving constraints in host country worldwide.

B. Comment upon each research activity with respect to adequacy funding facilities personnel conformance to annual work plans.

C. Collaboration. Comment upon level of collaboration between U.S. and host country personnel.

D. Comment upon the balance between domestic and overseas research.

4. Examine effectiveness of dissemination of results.

Procedures:

A. List the major results of the project

- During the past year
- During the entire life span of the project and comment about their dissemination in the host country or the U. S. globally.

B. Indicate any domestic or international linkages, collaboration/cooperation, resulting from the research results.

5. Examine effectiveness of utilization of results.

List examples of the effective utilization of results of the SR-CRSP

- In the host country and/or U.S.
- Globally.

6. Evaluate cost effectiveness (versus alternatives).

Procedures:

A. Audit/project management reviews.

- Date, by whom, findings and follow-up. If no audit, has one been requested?

B. Adequacy of funding and/or cooperation by CRSP participants with

- AID host country—comments/actions
- U. S. university—comments/actions
- Other institutions or agencies
- Other CRSPs.

C. Problems regarding funding, budgeting, release of funds, procurement of supplies and equipment in U.S. and host country.

D. Adequacy of current policies and procedures on use of funds.

E. Adequacy of current administration by the following:

- PI
- Host government
- U.S. institution
- AID (Washington, D.C., or HC Mission).

7. Identify inadequate performance and irrelevant, marginal activities (to the project and to SR-CRSP objectives).

Procedures:

From the list of *activities* identify any which are

- Inadequate
- Irrelevant
- Marginal

to the overall project and to CRSP objectives. State specific reasons for these judgements.

Recommendations

Having done the above assessment, the EEP is expected to make recommendations as follows:

1. Recommend changes in program objectives with respect to
 - A. Host country objectives.
 - B. U.S. objectives.
 - C. Global objectives.
2. Recommend additions, modifications, deletions of projects or activities.
 - A. Research recommendations with brief justification:
 - Additions to existing activities.
 - Modifications of activities.
 - Deletions of activities.
 - B. Training recommendations with brief justification:
 - Additions (host country, U.S., elsewhere).
 - Terminations (host country, U. S., elsewhere).
 - C. Comment upon current balance between Research and Training.
3. Recommendations for the improvement of the distribution and utilization of the results (locally and globally).
4. Recommendations for increasing the cost-effectiveness of the program.
5. Overall rating of the program using the following rating system:
 - A. Highly satisfactory.
 - B. Satisfactory as is.
 - C. Satisfactory if modified, with suggested modifications.
 - D. Unsatisfactory, SR-CRSP should consider radical changes or orderly phase out.

Appendix B

Bolivia Review Itinerary

Activity Calendar 11-17 October 1992

Sunday, October 11

18:30 Informal dinner at the Hotel Presidente

Monday, October 12

500 years later . . .

Tuesday, October 13

09:15 - 10:00 USAID/B, Security briefing

10:15 - 10:30 Introductions EEP - IBTA/CRSP

10:30 - 10:45 Coffee break

10:45 - 12:00 SR-CRSP office, general overview of the project (EEP, Residents & Co-I's) IBTA library

10:45 - 11:00 M. Ortega: Why is SR-CRSP working in the Altiplano?

11:00 - 11:15 S. Scholz: Why is SR-CRSP using systems approach?

11:15 - 11:30 L. Markowitz: Is CRSP gender conscious?

11:30 - 12:00 Discussion

12:00 - 14:00 Lunch Break

14:00 - 17:40 SR-CRSP research update (EEP, Residents & Co-I's)

14:00 - 14:20 Sociology, Work plan and Expenditures, L. Markowitz

14:20 - 14:50 Sociology, Research work accomplished, C. Jetté

14:50 - 15:10 Range Ecology, Work plan and Expenditures, M. Ortega

15:10 - 15:40 Range Ecology, Research work accomplished, J. Valdivia

15:40 - 16:00 Coffee break

- 16:00 - 16:20 Economics, Work plan and Expenditures, S. Scholz
16:20 - 16:50 Economics, Research work accomplished, J. Vargas
16:50 - 17:10 Feeding and Nutrition, Work plan and Expenditures,
M. Ortega
17:10 - 17:40 Feeding and Nutrition, Research work accomplished,
C. Salinas

Dinner on your own

Wednesday, October 14

- 08:00 - 09:00 Jack Sleeper, Bill Baucom, and Hernán Muñoz
(USAID/BN offices)
09:00 - 10:00 Hernán Muñoz, Technical aspects (USAID/B offices)
10:30 - 11:00 Dr. Armando Cardozo & Dr. Teddy Monasterios (IBTA
Directors, SR-CRSP offices

11:00 - 11:30 Dr. Edmundo Espinoza (Livestock Program Director),
SR-CRSP Offices

11:30 - 12:00 Dr. Tom Yuill, World Bank Project Leader, SR-CRSP
offices

12:00 - 14:00 Lunch Break

14:00 - 16:00 EEP - Residents meeting, SR-CRSP offices

16:00 - 16:15 Coffee Break

16:15 - 18:15 EEP - Co-l's meeting

Dinner at Hotel Presidente

Thursday, October 15

- 08:00 - 09:30 Trip to San José Llanga

09:30 - 10:30 EEP - San José Llanga authorities

10:30 - 12:30 Visit San José Llanga

- 12:30 - 14:00 Lunch Break
- 14:00 - 16:30 Students research, each EEP member will visit with students
- 16:30 - 18:30 Return to La Paz

Dinner on your own

Friday, October 16

- 09:00 - 11:00 Administration at SR-CRSP (EEP, M. Ortega and G. Calderón)
- 11:00 - 12:00 Open
- 12:00 - 14:30 Lunch Break
- 14:30 - 15:30 Exit visit to AID

Appendix C

KENYA AGRICULTURAL RESEARCH INSTITUTE

With Compliments of: _____



Kenya Agricultural Research Institute

Director: *C.G.NDIRITU, BVM, MSc., Ph.D.*

P.O. Box 57811
Nairobi, Kenya
Tel. Off: 444144 / 444156
Telex: 25287 KARIHQ KE
Fax: 440771

SMALL RUMINANT
COLLABORATIVE RESEARCH SUPPORT PROGRAM
(SR-CRSP)

A brief on Project Status
(22nd June, 1992)

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Introduction

The Small Ruminant Collaborative Research Support Programme (SR-CRSP) in Kenya was launched in 1979 to carry out research on Dual Purpose Goat (DPG) production systems. Its mandate was to generate improved technologies to support increased production of food protein through milk and meat; improved cash flow through marketable goats and goat products in smallholder farming systems of Kenya; and to provide training which would enhance the long-term capability for research and development with sheep and goats in Kenya and other tropical countries.

The SR-CRSP is supported by the United States Agency for International Development (USAID), a number of participating US based institutions. Following the establishment of KARI with the mandate to manage all agricultural research in the country, arrangements were made three years ago to transfer SR-CRSP from Ministry of Livestock Development to the Institute and its responsible Ministry of Research, Science and Technology.

The SR-CRSP in Kenya is an interdisciplinary programme consisting of various research components all directed at the development of the DPG. These components are: multivalent vaccine development (MVD), at the Veterinary Research Laboratories at Kabete; the breeding component at the Ol'Magogo Farm of the National Animal Husbandry Research Centre, Naivasha; and the feed resources, rural sociology and agricultural economics component at the Maseno Veterinary Farm.

Each of these components is linked to and controlled by a corresponding US-based institution as follows:

<u>Component</u>	<u>US-based Institution</u>
Breeding and System Analysis	Texas A and M University
Multivalent virus-vectorized vaccine for goats and sheep	Washington State University and Colorado State University
Animal Nutrition and Management	Winrock International
Feed Resources	Winrock International
Agricultural Economics	Winrock International
Rural Sociology	University of Missouri

University of California serves as the Management Entity (ME) for the programme. Each component has a Principal Investigator (PI) at each of the participating US-based institutions and one or more Resident Scientists (RS) at each of the worksites in Kenya. Programme funds are disbursed from the ME to the participating US-based Institutions and, once the budgets are agreed upon, the funds are disbursed directly and regularly to each PI and to the corresponding RS. Each RS operates an institution bank account for his/her project.

Project Achievements and Status

Multivalent Vaccine Development Project:

Health problems including internal parasites and other infectious diseases continue to limit the improvement of sheep and goat production in areas of the world where these animals form an important source of human food and fibre. The MVD project component of SR-CRSP in Kenya is carrying out research directed at developing a single vaccine that is economical and will protect against several infectious diseases. This will be achieved through the development of multivalent, recombinant, virus-vectorized vaccines. Five major diseases are being investigated here in Kenya for incorporation into the multivalent vaccine:

Capripox virus: The vaccine strain of capripoxvirus which is used in Kenya is being evaluated as a vector in addition to it being a vaccine. It is already being transfected with p1114 which is a vaccinia insertion vector with TK gene sequences. This indicates that foreign genes can be introduced into the capripox virus using p1114.

Haemonchosis: Infection of dual purpose goats and all other small ruminant with Haemonchus is a big problem in Kenya. The project has a 2 pronged address to this problem: (1) In collaboration with Breeding project and University of Nairobi, we are trying to identify goats that are genetically resistant to either infection or the effects of infection. Selection of such resistant goats for multiplication and adaptation would be the best long term control method for Haemonchus infection. So far, goats have been identified that resist Haemonchus larval challenge. (2) Attempts to vaccinate/immunize sheep/goats are being looked into and preliminary data indicate that it is possible to control haemonchosis by vaccinating the susceptible animals with gut antigens from the worms. Gut antigens are being characterised and genes coding for the antigens are being sought for incorporation in the multivalent vaccine.

Work on CCPP has been directed at identifying mycoplasma components that induce protection against the disease with the aim of isolating corresponding genes coding for them for incorporation into a multivalent recombinant vaccine for goats. So far monoclonal antibody (Mab) panel has been produced. Some of these Mabs react with the F38 proteins and others react with the F38 carbohydrate. Work is in progress to assess the effect of the Mabs on the viability/growth of F38 in vitro. The Mabs which inhibit the growth of F38 will be used to isolate the components they react with from F38. The components will be used to immunize goats and assessed for induction of protective immunity. Genes which code for these antigens will be sought and incorporated in the vector.

Heartwater which is caused by the rickettsia C. ruminantium infects all ruminants including sheep and goats. The disease causes very high mortality and can be devastating in susceptible populations. The research approach is to identify C. ruminantium surface proteins which are involved in induction of protective immunity, clone genes coding for the proteins and incorporate them in the multivalent vaccine. This will be achieved via the Mab route. Some Mabs which recognise the surface of elementary bodies have been produced others are being made. We are in the process of assessing their effect on the viability of the elementary bodies. The development of a DNA probe for C. ruminantium and detection of individual infected vector ticks has been achieved.

Training: On each of the above mentioned diseases, there is a Kenyan graduate student attached:

Capripoxvirus	Dr. R. Soi	Ph.D
Heartwater	Dr. L. Ndung'u	M.Sc.
CCPP	Dr. S. Kihara	M.Sc.
Haemonchus	Dr. F. Karanu	Ph.D.

Nairobi sheep disease: Nairobi sheep disease (NSD) is caused by a bunyavirus transmitted by Rhipicephalus appendiculatus and is the most pathogenic infection of sheep in Eastern Africa. Its high mortality rates and abortion cause significant economic losses. The virus has been adapted to replicate in various cell cultures and methods for its purification have been determined. The replication strategy and morphogenesis of the virus in infected cells has been determined. Analysis of the virus nucleic acid has shown that the RNA is segmented into three species. Using a nairovirus primer a cDNA genomic library to clone the genes encoding immunoprotective antigens of NSD virus is in progress. The gene when cloned will be a component of the multivalent virus-vectored vaccines for sheep.

Work on sheep retrovirus infections in Kenya has started with the assistance of Dr. Flora Mbithi who is scheduled to join CSU for MS training. Recent studies have shown that ovine lentivirus and Jaagsiekte (locally known as "Laikipia lung disease" since 1933) cause heavy losses (10-30% annual loss) in the sheep industry in Kenya. Dufton Mwaengo, A Ph.D student from Kenya is

fully supported by SR-CRSP funds for his research on identification and cloning of vaccine genes from ovine lentivirus. The cloned gene will be part of the multivalent virus-vectored vaccines for sheep.

Breeding of Composite DPG

The Kenya DPG when declared a breed under the Kenya Stud Book will be a composite goat with equal proportions of East African, Galla, Toggenburg and AngloNubian with a stabilized production of about 2 kg of milk at its peak while nursing a kid and with over 35 kg Adult live weight. It will lactate for at least 120 days and preferably a non-twiner.

The genetic composition of the goat will make it a suitable base for adaptation to all agroecological zones of Kenya, especially for small scale farming systems. The DPG promises to be an appropriate technology as the small scale farmer is becoming widespread even in dry areas.

At Ol'Magogo breeding site, work is on-going to develop a nucleus breeding stock of 1000 does. This is well on course and 140 animals are currently in place. Efforts at Ol'Magogo site will continue to refine the breed and will include the incorporation of genes of "resistance" to the stomach worm, Haemonchus contortus, to lower flock maintenance costs.

The KDPG development will be a demonstrated achievement in the following areas:

1. A synthetic goat developed from indigenous genetic resources complete with a low cost management package - an appropriate new technology.
2. Multidisciplinary research approach that will open the way for on-farm small scale farming research.
3. Technology transfer - Artificial insemination and embryo transfer in goats and possibly gene markers for Haemonchus resistance will have been tested in Kenya.

4. An excellent example of technical cooperation between the Governments of Kenya and the USA in developing an answer to a current farming problem.

Feed Resources

The Feed Resources (FR) project of the Kenyan SR-CRSP has obtained several research results and developed some technologies for enhancing production of adequate quantities of feeds of high quality for round-year feeding of the Dual-Purpose Goat in particular, and other livestock in general. FR project has also selected and developed food crops with high potentials for increased yields not only of feeds, but also of food for human consumption. These include:

1. Screening of several multi-purpose tree species (MPTS) for generating high quality feeds through border-row planting, feed banks and alley cropping. These include Sesbania sesban var nubica, Laucaena leucocephala, Calliandra spp and Gliricidia spp. FR Sesbania gene bank in Maseno is now the second largest in Africa, after the Sesbania gene bank in ILCA headquarters in Addis-Ababa.
2. Simple and effective vegetable propagation techniques of high yielding fodder grasses like Pennisetum spp. (Bana grass, clone 13, Pakistan hybrid) and Guatemala have also been developed by FR.
3. The use of goat manure as a fertilizer is well documented in several trials by FR. Because of low soil fertility in many areas, addition of organic manures has been shown to increase feed and food crop yields by more than 300% over inorganic fertilizer, in the acid soils of western Kenya.
4. On-farm simplified feed conservation technology such as hays or gunny-bags silage have been developed.

5. FR has combined several simple technologies to develop a 0.5 ha "model farm" which produces enough feeds for six adult goats (maize, beans and sweet potato tubers) without decreasing total food crop production for an average household of six people.

Rural Sociology and Agricultural Economics

This component of the SR-CRSP has shown the economic return to adoption of DPG production package and described the socio-economic environment in which the technology has to be adopted and practised in Siaya and Kakamega Districts. The on-farm research of the component has largely been confined to these areas of Western Province but future direction will be to extend these activities to other areas where DPG will be disseminated in the country.

Technology packages and out-reach activities

The SR-CRSP has developed technology packages for dual purpose goats (DPGs). This technical package summarizes the current management recommendations and is targeted at extension personnel and middle level training institutions. The package has and continue to be evaluated at the farmer level for social, economic and technical feasibility.

The project has been working with KARI to adopt and extend the SR-CRSP model to other KARI centres. SR-CRSP has also been very active in organizing farmers workshops and participating in the various agricultural shows as part of its outreach activities.

Institutional Building

SR-CRSP continues to play a significant role in institutional building in KARI and related institutions.

- * Training: Today, SR-CRSP has trained a total of 31 Kenyans, 6 PhD, 23 MSc and 2 BSc while 2 and 5 other Kenyans are under-going training at PhD and MSc levels respectively. This goes to emphasize that one of the greatest achievements of the programme has and continue to be building the capacity of Kenyan scientists to continue research in small ruminants when the project ends.

- * Physical facilities: the contribution of SR-CRSP in terms of capital equipment is not a mean achievement.

Integration of SR-CRSP into KARI

The integration of SR-CRSP into KARI is a continuous process. Some components of SR-CRSP (i.e. Breeding, Production Systems, and Socio-Economics) are to phase out with September 1993 as the target date. Between now and then KARI plans to fully integrate these components into KARI through NARP phase II.

The other component, the Multivalent Vaccines Development is expected to continue through to 1995 under the present funding. Integration of this component shall continue through graduate training of KARI scientists development of KARI facilities and collaborative research.

Future of Multi-purpose Trees (Gene Bank) at Maseno

KARI acknowledges the good work carried out by SR-CRSP on screening of several multi-purpose trees species for generating high quality feeds. This effort has been done in collaboration with the International Livestock Centre for Africa. It is proposed that the material will be transferred to our National Plant gene bank at Muguga. A live gene bank will also be established at our Regional Research Centre at Kakamega. It is planned to test the performance of these species in other research centres.

Appendix D

**Washington
State University
Publications:
1990-January
1993**

A. Refereed journals:

Dilbeck, P.M., Evermann, J.F., Crawford, T.B., Ward, A.C.S., Leathers, C.W., Holland, C.J., Mebus, C.A., Logan, L.L., Rurangirwa, F.R. and McGuire, T.C. Isolation of a previously undescribed Rickettsiaceae from an aborted bovine fetus. *Journal of Clinical Microbiology*. 28:814-816, 1990. (This new organism cross-reacts with *Cowdria ruminantium*, the cause of heartwater in goats, sheep and cattle.)

Kocan, K.M., Crawford, T.B., Dilbeck, P.M., Evermann, J.F. and McGuire, T.C. Development of a rickettsia isolated from an aborted bovine fetus. *Journal of Bacteriology*. 172 : 5949-5955, 1990.

Rurangirwa, F.R., Kouyate, B., Niang, M. and McGuire, T.C. CCPP: Antibodies to F38 polysaccharide in Mali goats. *Veterinary Record*. 127: 353, 1990 .

Mwamachi, D.M., Rurangirwa, F.R., Musoke, A.J. and McGuire, T.C. Clone-specific immune colostrum induces increased resistance in goat kids challenged with *Trypanosoma congolense*. *Acta Tropica*. 49 : 27-36, 1991.

Rurangirwa, F.R., McGuire, T.C., Mbai, L., Ndung'u, L. and Wambugu, A. Preliminary field test of lyophilised contagious caprine pleuropneumonia vaccine. *Research in Veterinary Science*. 50: 240241, 1991.

Oluoch, E.A., Magnuson, N.S., McGuire, T.C. and Barbet, A.F. *Trypanosoma brucei*: Peptide mapping of partially homologous variable surface glycoproteins. *International Journal for Parasitology*. 21:573-578, 1991.

Waghela, S.D., Rurangirwa, F.R., Mahan, S.M., Yunker, C.E., Crawford, T.B., Barbet, A.F., Burrige, M.J. and McGuire, T.C. A cloned DNA probe identifies *Cowdria ruminantium* in *Amblyomma variegatum* ticks. *Journal of Clinical Microbiology*. 29:2571-2577, 1991 .

Jasmer, D.P. and McGuire, T.C. Protective immunity to a bloodfeeding nematode (*Naemonchus contortus*) induced by parasite gut antigens . *Infection and Immunity*. 59 : 4412-4417, 1991.

Mahan, S.M., Waghela, S.D., McGuire, T.C., Rurangirwa, F.R., Wassink, L. and Barbet, A.F. A cloned DNA probe for *Cowdria ruminantium* hybridizes with eight heartwater strains and detects infected sheep. *Journal of Clinical Microbiology*. 30:981-986, 1992.

Yunker, C.E., Mahan, S.M., Waghela, S.D., McGuire, T.C., Rurangirwa, F.R., Barbet, A.F. and Wassink, L.A. Detection of *Cowdria ruminantium* in infected bont ticks, *Amblyomma hebraeum*, by means of a DNA probe, pSC20. Submitted for review.

Mahan, S.M., McGuire, T.C., Jongejan, F., Rurangirwa, F.R. and Barbet, A.F. Molecular cloning of a *Cowdria ruminantium* gene expressing an immunodominant 21kD protein. Submitted for review.

B. Unpublished theses: (Both are M.S.)

Karanu, F.N. Identification of proteases with diverse characteristics in adult *Haemonchus contortus* excretory-secretory products. Washington State University. Pullman, Washington, 1992.

Kihara, S.M. Identification of *Mycoplasma F38* surface antigens with goat serum antibodies. Washington State University. Pullman, Washington, 1993.

C. Abstracts from SR-CRSP Kenya workshops:

Rurangirwa, F.R., McGuire, T.C., Wambugu, A.N. and Kihara, S.M. Identification and characterization of a target antigen of a monoclonal antibody (wm-25) which inhibits the growth of *Mycoplasma* strain F38. Proceedings of the Ninth Small Ruminant-CRSP Scientific Workshop, Muguga, Kenya, 1991, pp. 49-59.

Waruiru, R.M., Karanu, F.N., Mwandotto, B.A.J., Ruvuna, F., Gichanga, E.J., Taylor, J.F., Jasmer, D.P., Rurangirwa, F.R. and McGuire, T.C. Evidence of resistance to *Haemonchus contortus* infection in goats on artificial challenge. Proceedings of the Ninth Small Ruminant-CRSP Scientific Workshop, Muguga, Kenya, 1991, pp. 60-70.

Rohrer, G.A., Taylor, J.F., Davis, S.K., Waruiru, R.M., Ruvuna, F., Mwandotto, B.A.J., McGuire, T.C. and Rurangirwa, F.R. The use of randomly amplified polymorphic DNA markers in analysis of susceptibility to *Haemonchus* and *Coccidia*. Proceedings of the Ninth Small Ruminant-CRSP Scientific Workshop, Muguga, Kenya, 1991, pp. 71-85.

Soi, R.K., Crawford, T.B., Rurangirwa, F.R. and McGuire, T.C.
Capripoxvirus as a vaccine expression vector. Proceedings of the Tenth Small Ruminant CRSP Scientific Workshop, Nairobi, Kenya, 1991, p. 14.

Muriu, D.N., Ndung'u, E.K., Rurangirwa, F.R., McGuire, T.C. and Wambugu, A. Exposure of sheep and calves to goats infected with Mycoplasma strain F38. Proceedings of the Tenth Small Ruminant CRSP Scientific Workshop, Nairobi, Kenya, 1991, p. 15.

Jasmer, D.P., Perryman, L.E., Crow, S., Conder, G. and McGuire, T.C.
Gut surface antigens as targets to immunize against *Haemonchus contortus*. Proceedings of the Tenth Small Ruminant CRSP Scientific Workshop, Nairobi, Kenya, 1991, p. 16.

Waruiru, R.M., Karanu, F.N., Githigia, S.M., Gichanga, E.J., Mkuu, S., Mwandotto, B.A.J. and Rurangirwa, F.R. Prevalence of gastrointestinal nematodes, coccidia and lungworms in a goat herd at Ol'magogo, Naivasha. Proceedings of the Tenth Small Ruminant CRSP Scientific Workshop, Nairobi, Kenya, 1991, p. 16.

D. Other Abstracts:

McGuire, T.C. Approaches for multivalent recombinant vaccines for animal diseases. Proceedings of the National Conference on Plant and Animal Biotechnology, Nairobi, Kenya, 1990. In press.

Rurangirwa, F.R., McGuire, T.C., Wambugu, A.N. and Kihara, S.M.
Identification and characterization of a target antigen of a monoclonal antibody (WM-25) which inhibits the growth of mycoplasma strain F38. Ninth International Congress of the International organization for Mycoplasmaology (IOM), Ames, Iowa, August 2-7, 1992.

Appendix E

Summary Budget for 1991-92

Categories	Disciplines	PI	Amount
SUBGRANTS			
UCD	Genetics	Bradford	\$233,000
Colorado	Animal Health	DeMartini	\$175,000
Montana State	Network	Burfening	\$106,412
N. Carolina State	Nutrition	Pond	\$227,000
Texas A&M	Breeding	Taylor	\$140,000
Utah State	Range-Ecology	Norton	\$115,000
Texas Tech	Range-Nutrition	Bryant	\$115,000
Missouri	Sociology	Nolan	\$202,442
Washington State	Health	McGuire	\$175,000
Winrock Int'l	Economics	Ospina/Knipscheer	\$202,558
Winrock Int'l	Production Systems	Getz	\$150,000
Total Subgrants			\$1,841,412
HOST COUNTRIES			
Indonesia			\$150,000
Kenya			\$70,000
Bolivia			\$65,000
Subtotal			\$285,000
Morocco Site Administration			\$20,000
Total Host Countries			\$305,000
PROGRAM ENHANCEMENT*			\$43,588
*The suggested uses for these funds are \$14,000 for Indonesia Network and \$29,588 for Linkage Grants.			
MANAGEMENT ENTITY			
M.E.			\$477,483
EEP			\$55,176
Technical Committee			\$31,350
Board Meetings			\$12,540
Administrative Council			\$18,810
Meetings-Variou			\$5,536
Publications			\$9,105
Total Management Entity			\$610,000
TOTAL BUDGET			\$2,800,000
			=====

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Summary Budget for 1992-93

Categories	Disciplines	PI	Amount
SUBGRANTS			
UCD	Genetics	Bradford	\$185,000
Colorado	Animal Health	DeMartini	\$137,000
N. Carolina State	Nutrition	Pond	\$195,000
Texas A&M	Breeding	Taylor	\$129,000
Utah State	Range-Ecology	Norton	\$115,000
Texas Tech	Range-Nutrition	Bryant	\$118,000
Missouri	Sociology	Nolan	\$186,000
Washington State	Health	McGuire	\$146,000
Winrock Int'l	Economics	Ospina/Knipscheer	\$177,000
Winrock Int'l	Production Systems	Getz	\$107,000
Undesignated	Sociology	Indonesia	\$15,000
Undesignated	Economics	Kenya	\$9,000
Total Subgrants			\$1,519,000
HOST COUNTRIES			
Indonesia			\$95,000
Kenya			\$46,000
Bolivia			\$65,500
Total Host Countries			\$206,500
MATCHING TRAINING FUNDS POOL			\$40,000
NETWORKING			\$54,700
LINKAGES			\$70,000
NEW PROGRAM INITIATIVES			\$459,800
MANAGEMENT ENTITY			\$450,000
RESEARCH SUPPORT			
EEP			\$55,000
Technical Committee			\$40,000
Board Meetings			\$20,000
Administrative Council			\$20,000
Meetings-Variou			\$10,000
Publications			\$15,000
Total Research Support			\$160,000
TOTAL BUDGET			\$2,960,000

Management Entity Response to the 1992 EEP Report

Introduction p. 3

The ME supports having all EEP members participate in the U.S. institution reviews (even though all members may not participate in host country site visits) because of the integrated multidisciplinary nature of the SR-CRSP projects.

Bolivia: Agropastoral Component p. 17-19

Following the EEP visit to Bolivia, arrangements were made for an experienced biological scientist and administrator, Dr. Martin Gonzalez, to go to Bolivia for six months to address the EEP concerns and recommendations. Soon after Dr. Gonzalez arrived, a new Director of IBTA was appointed and a major reorganization implemented. Dr. Gonzalez has been working closely with the new Director and deserves recognition for the progress he has made regarding the following specific areas.

1. Adjustments to Program Objectives

The biological science projects have been strengthened by the arrival in Bolivia of a Resident Scientist for the Range Ecology component. The recruitment process for a Resident Scientist in Range Nutrition is underway and the successful candidate is scheduled to arrive in June. The presence of these two scientists will greatly strengthen the biological components and further the integration of the biological and social sciences.

With the change in IBTA administration, the IBTA objectives are currently being clarified, and ME personnel will travel to Bolivia to meet with USAID/Bolivia, IBTA, and SR-CRSP personnel to review the current IBTA objectives and see how best to integrate the objectives and activities of IBTA and the SR-CRSP. If objectives and activities are determined not to be compatible, then the only other alternatives are to look for an alternate collaborating agency or move the project from Bolivia.

2. Additions, Modifications, Deletions of Projects

Extensive discussions were held with the new IBTA personnel and agreement was reached that San Jose de Llanga was indeed a suitable research site to both IBTA and the SR-CRSP. The value of selecting a second site for comparison purposes was recognized and the criteria for

selection were jointly developed by the U.S. and Bolivian counterparts. Several sites were evaluated and one was selected by mutual agreement. Funding for work at this site was approved.

3. Improving Dissemination and Utilization of Results

The issue of technology transfer is being addressed from the standpoints of participation by IBTA, increased collaboration with some of the NGO's working in Bolivia, and relocation of the Latin American Network office to La Paz. Meetings have been held with NGO personnel and a number of collaborative projects are underway. This area will need continued attention, but the groundwork is being laid for dissemination of results as they are developed.

4. Bolivian and U.S. Student Training

As the current students complete their theses, new students are being selected for participation in the research projects. Hopefully some of the students trained will be able to find employment in IBTA. The number of students coming to the U.S. for training has been small because of budget limitations. However, this year two additional students will come to the U.S. to begin advanced degrees.

5. Allocation of Funds

On the one hand, employing Resident Scientists is costly, but on the other hand it provides a full-time, highly qualified scientist to provide guidance and training. As host country personnel develop scientifically, the need for resident scientists should decrease and free up more money to support direct research costs. It is no secret that there is a finite and thus limiting amount of money that has to be allocated to cover the global nature of the SR-CRSP. Until base funding increases, this situation will not change.

Recommendations

p. 22

1. The U.S. Principal Investigator and the Resident Scientist have been working to clarify the coordination of the Bolivian economics activity and the global plan. At the time of the EEP visit, the economics Resident Scientist had been in Bolivia for less than six months and program plans were still being formulated.

2. The issue of coordination between the Bolivian economist and the Resident Scientist is currently being addressed by both IBTA and the SR-CRSP, and the issue should be resolved by the time of the ME visit to Bolivia.

3. As mentioned above, the issue of convergence of IBTA and SR-CRSP objectives and activities is currently being addressed. As part of this, performance of personnel is also being undertaken. Planning for integration of economics with sociology and the biological sciences had taken place at meetings in Kansas City, Lubbock, Denver, and during the PAC meetings. However this integration has been difficult when there was only one biological resident scientist present in Bolivia who was having to devote a major part of his time and efforts to getting the entire program up and running. The economics program set out to work on some production parameters in agreement with the preparation of the baseline analysis for future economic impact analyses. The major focus has been on marketing and distribution, followed by training of students. The current round of discussions with the new IBTA administration should resolve this issue.

4. The Program and Budget Committee (PBC) is currently reviewing the budgetary recommendations made by the Executive Technical Committee and the Program Director. A draft copy of this EEP report and the annual reports are being used as background material.

5. This is certainly an option that can be explored, but its pursuit needs to come after we see the results of the current discussions. Hopefully adjustments can be made within the current collaborative framework.

6 & 7. These suggestions were taken under consideration and are being incorporated by the economics and sociology components in modified activities in this year's as well as in next year's workplans.

Recommendations

p. 25

1. This issue is being addressed by the addition of biological resident scientists and increased interaction between the disciplines.

2. In fact all three sociology students speak Aymara so there should not be communication problems with a resultant bias of data collected.

3, 4, & 5. These recommendations were all taken under consideration by the sociology component and are addressed in the workplan for the coming year.

6. Increased emphasis will be placed on this by either utilizing existing personnel or hiring someone in the program in Bolivia. Accomplishment of this may require additional budget input which will have to come from within component budgets or by special requests for augmentation by the ME.

Summary Comments

Although it appears that the program has been slow to get started, one must remember that the Memorandum of Understanding was signed less than a year before the EEP visit. Identification of counterparts at IBTA and placement of resident scientists took longer than anticipated. In comparison with the start-up in Peru, more progress has been made in less time. Right after the MOU was signed, IBTA started the process of a major overhaul of its administration and activities, a process funded by a grant many times higher than that of the SR-CRSP. Unfortunately, the SR-CRSP has been somewhat caught up in the resultant upheaval. The steps taken since the EEP visit have clarified and addressed these issues. The EEP will be asked to visit Bolivia again in October 1993 to evaluate the success of the changes made. As a footnote: the workshop mentioned in page 25, paragraph 1, took place in May 1991 rather than November 1990.

Kenya: Animal Health Component and Dual Purpose Goat Component

p. 51

1. The DPG scientists have requested funding to extend the DPG work to Eastern Kenya as well as into Tanzania and Zimbabwe. The collaboration with KARI will also be extended to several other KARI sites.
2. A major effort in the area of impact assessment is being proposed for this next year.
3. Sociology will be responsible for a major effort next year to address the issue of the utility of the research for production and distribution of multivalent vaccine.

Summary Comments

One principal investigator expressed concern that the Animal Health component was evaluated as one unit rather than as work by two separate institutions and that the issue of budget allocation to the component was not addressed. Although the DPG embryo transfer program did not generate as many kids as hoped for, it did not delay the multiplication efforts since the embryo donors only skipped a cycle within the breeding season. As a footnote: Dr. Nyaribo (bottom of page 48) is employed by with Winrock International rather than the University of Missouri.

Recommendations

p. 53

Management Entity

1. The ME appreciates the compliments and is committed to excellence for the SR-CRSP. However, the credit for the program progress really belongs to everyone who participates.
2. The Program Director has been working with the Executive Technical Committee as a means of improving communication with the U.S. principal investigators.
3. The Management Entity tries to address problems in a timely manner but unfortunately is not always informed early on in their development. The only solution to this is to strive to improve communications among all parties involved.

Bolivia

1. The issue of biological resident scientists and a Program Representative has been addressed (see above).
2. The issue of appropriate disciplines will be the subject of the upcoming discussions in Bolivia. In the meanwhile, program enhancement funds have been allocated to help strengthen the nutrition research capabilities in IBTA.
3. The inclusion of Bolivian students into the research programs is scheduled to continue.
4. Matching training monies have been made available to stimulate participation of U.S. students at overseas sites. One such student has already gone to Bolivia.

Kenya

1. Washington State University is now responsible for the animal health work in Kenya, and the focus of the project has been narrowed as recommended by the EEP.
2. This issue is being addressed in the next year by extension of this work to other sites in Kenya as well as Tanzania and Zimbabwe. Drs. Semenyé and Getz will both be involved.
3. Adjustment of the DPG animal numbers goal has been communicated in annual reports and to a wide variety of people; however, acceptance is another matter. This is an issue that will continue to need addressing.

4. The efforts in parasite resistance, gene mapping, and other basic research are being conducted as ancillary projects which use the DPG because of the availability of animals supplied by the breeding project.

5. A major effort has been devoted to getting multiplication of the DPG into the hands of NGO's and private enterprise, as well as KARI. This has proven to be a challenge but real progress is being made, thanks to the persistence of Dr. Taylor.

6. The Sociology project personnel have been working with the animal health project to clarify the objectives and methodology of the vaccine production and utilization research they will be conducting this next year.

7. Extra emphasis will be focused on impact assessment studies in all aspects of the Kenya projects. This is especially important as the SR-CRSP prepares for submission of the grant renewal document.

8. Credit for this publication goes to the principal investigators who assisted and to Mr. Reed Merrill, the International Agriculture Development student intern in the ME office, who was primarily responsible for this accomplishment. It benefited both him and the SR-CRSP.

General

1. The grant renewal process is going to be approached from a number of viewpoints: personnel from the ME are meeting with USAID personnel; Technical Committee members are working on the strategy, the Administrative Council will participate; and a scientific workshop will be held in September 1993 to bring together the accomplishments of the SR-CRSP and solicit input from the wide range of people slated to attend.

2. The Management Entity personnel add their appreciation for the commitment and tireless efforts of our Project Officer, Ms. Joyce Turk, and for the cooperation of the USAID mission personnel in the host countries.

3. Again, this issue was successfully resolved because of the cooperative efforts of a large number of people.

4. The issue of arid-lands research will be a major subject of discussion as the grant renewal document is developed.

5. The issue of the degree to which technology transfer should be incorporated in projects is a subject of hot debate. On the one hand the primary SR-CRSP mandate is research but it would be negligent to ignore stimulation of research result adoption. The ideal solution would seem to be development of closer ties with NGO's, whose primary mandate is technology transfer rather than research. Again this will be included in the grant renewal discussion.

6. As mentioned earlier, the ME is very supportive of having all EEP members in attendance during U.S. site visits.

Country	Discipline	Principal Investigator	Collaborating Scientist
Indonesia	Animal Nutrition Breeding Economics	K. Pond E. Bradford E. Ospina	L. Batubara Subandriyo S. Karo Karo
Kenya	Animal Health Breeding Production Systems Sociology	T. McGuire J. DeMartini J. Taylor W. Getz M. Nolan	F. Rurangirwa P. Rwambo B. Mwandotto D. Siamba A. Mbabu
Morocco	Genetics Nutrition	E. Bradford K. Pond	A. Lahlou-Kassi F. Guessous
Bolivia	Economics Range Ecology Range Management Sociology	E. Ospina B. Norton F. Bryant M. Nolan	J. Vargas J. Valdivia C. Salinas C. Jetté
Networking	Latin America Network	J. Homan	R. Peña E. Tejada

**Technical Committee
1992-3**

Eric Bradford	University of California, Davis
Fred Bryant	Texas Tech University
Jim DeMartini	Colorado State University
Edmundo Espinoza	IBTA, Bolivia
Jim Fitzgerald	USDA Sheep Experiment Station, Dubois, Idaho
Will Getz	Winrock International
Jane Homan	University of Wisconsin, Madison
Travis McGuire, Chairman	Washington State University
Mike Nolan	University of Missouri-Columbia
Ben Norton	Utah State University
Enrique Ospina	Winrock International
Kevin Pond	North Carolina State University
Marwan Rangkuti	CRIAS, Indonesia
Jerry Taylor	Texas A&M University
open	KARI, Kenya