PD-ABJ-260

# Abstracts and Review Sheets of Proposals Received on Small Ruminant CRSP

May 4, 1978

# TABLE OF CONTENTS

## Volume I

# TABLE OF CONTENTS (continued)

## Volume II

TABLE OF CONTENTS (continued)

Volume III

# TABLE OF CONTENTS (continued)

## Volume IV

1. University of California, at Davis — Small Ruminant Herd Health Programs in LDC's.

Objective: Adapt and modify known successful disease control and preventing systems to small ruminant diseases in LDC's; develop and test new strategies where needed.

| | | |
|---|---|---|
| Total Score | | 75/100 |
| a. | Program Significance | 21/30 |
| b. | Institutional Considerations | 19/25 |
| c. | Technical Approach | 18/25 |
| d. | Personnel | 17/20 |

Location: Arid/Semi-arid, Sudan/Columbia

Discussion:

There must be more production offtake to go with improved health.

Sudan is more appropriate and results are transferrable to Near East, East Africa, and Mediterranean countries.

Participants are limited in geographical experience and specific subject areas.

Timing is wrong in terms of relationship for obtaining results of surveys and evaluation of immunizing agents.

Will get usable results while confined to research institute, but limitation may be another matter because of requirement to incorporate veterinary service.

PI will comment 40% of time.

Parasitology part is good.

Only person to maintain continuity at project site does not have degree yet.

Objectives are very good.

Herd health objective is not in conflict with attack on specific diseases.

Expense of maintaining biological isolation is very high in LDC's and difficult to do.

Some concept of disease control is essential for a health research program.

It should be component of each major research project.

Makes no reference to major epizootic diseases in subject area.

Rating: Good. Need to augment personnel; technical approach needs definition. Topic is critical.

TITLE XII: SMALL RUMINANT RESEARCH PROPOSAL

COVER SHEET AND ABSTRACT

U.S. Institution: School of Veterinary Medicine, University of California, Davis

Title: Small Rumirant Herd Health Programs in LDC's

Arid/Semi-Arid: West Khartoum, Sudan; Veterinary Research Center or

Highlands: Cali, Colombia, I.C.A. Instituto Colombiano Agropuecuario;

L.I.M.V. Laboratorio de Investigaciones de Medicina Veterinario

Project Period: 5 years. Total ~~annual~~ budget, T. XII 1,222,570 Other: 225,065

Principal Investigator: B. McGowan; Others: N. Baker, S. Guss, D. Bailey,

J. Glenn, N. East, B. BonDurant

Abstract: Herd health programs (HHP's) for beef and dairy cattle, swine and poultry are effectively increasing production of animal products in the U.S.A. and other developed countries. Similar programs for sheep and goats in these same countries are embryonic. Pilot programs with sheep in the U.S. indicate a 20-50% production increase in 2-4 years. Basically these programs constitute a continuous disease surveillance program combined with the application of the most appropriate treatment, control and prevention strategies. As each HHP matures, disease prevention and control dominate disease treatment. The most significant production increase will result from the concomitant impact of HHP's and improved husbandry and management techniques, improved nutrition, and genetic modification. Interaction of existing HHP's in the U.S. and those developed in LDC's would produce results valuable to the small ruminant industries of both countries. Diseases controllable by present technology and those needing additional intensive research would be a productive fall out. Personnel selected for this proposal are uniquely qualified to develop herd health programs for small ruminants.

6

2. University of California, at Davis — Pneumonia of Small Ruminants

Objective: Study various etiological factors in Pneumonia High microbial, pathological, and epidemiological data

| | | |
|---|---|---|
| Total Score: | | 75/100 |
| a. | Program Significance | 19/30 |
| b. | Institutional Considerations | 21/25 |
| c. | Technical Approach | 19/25 |
| d. | Personnel | 16/20 |

Location: Brazil

Discussion:

(1) Highly qualified team and PI.

(2) Sound research design; time horizon (5 yrs.) probably not long enough.

(3) One of the most important diseases, but some question about zeroing in on a specific disease rather than concentrating on general herd health programs.

(4) Very high budget.

Rating: Inappropriate as separate proposal; should be included in general herd health project.

2

UNITED STATES INSTITUTION

The Regents of the University of California
School of Veterinary Medicine
University of California
Davis, California 95616

PROJECT TITLE

"Pneumonia of Small Ruminants"

FOREIGN INSTITUTION & CLIMATE

Veterinary Research Administration & Animal Production Research Administration
P.O. Box 8067 Ministry of Agriculture
Khartoum, Sudan Khartoum, Sudan
Climate: Arid/Semi-Arid Climate: Arid/Semi-Arid

-or-

Waldecy Ferreira dos Santos, Coordinator
Plano de Assistencia Tecnica a Caprino-Ovinocultura
Ministerio de Agricultura
Recife, Pernambuco, Brazil
Climate: Arid/Semi-Arid

PROJECT PERIOD

Five Years: October 1, 1978 through September 30, 1983

TOTAL ANNUAL BUDGET

| | 1979-80 | 1980-81 | 1981-82 | 1982-83 | 1983-84 | TOTAL |
|---|---|---|---|---|---|---|
| Title XII: | $198,064 | $244,070 | $257,277 | $214,015 | $198,017 | $1,111,443 |
| Other: | 169,430 | 186,373 | 205,010 | 225,511 | 198,000 | 984,324 |
| TOTALS: | $367,494 | $430,443 | $462,287 | $439,526 | $396,017 | $2,095,767 |

PRINCIPAL INVESTIGATOR & OTHER KEY PERSONNEL

Principal Investigator: J. A. Howarth

Other Key Personnel: H. E. Adler, E. L. Biberstein, D. L. Dungworth, B. McGowan, Jr., D. G. McKercher, H. P. Riemann, R. Yamamoto

APPROVED

J. A. Howarth 2/10/78
J. A. Howarth, Principal Investigator

H. Riemann 2/10/78
H. P. Riemann, Department Chairman

Bennie I. Osburn 2/10/78
Bennie I. Osburn, Associate Dean-Research

F. W. Hill 2/10/78
Frederick W. Hill, Associate Dean

8

ABSTRACT

Pneumonia is a common problem of small ruminants throughout the world. In many of the lesser developed countries (LDC's) it represents one of the most common causes of death. Studies have not brought together sufficient interdisciplinary competence to unravel the multifactorial complexities of pneumonia. Coordinated, modern techniques in epidemiology, microbiology and pathology must be applied to a study of the disease. In this proposal a comprehensive plan for investigation of pneumonia in high and low-incidence flocks is presented. The five-year study will include correlated observations of clinical, epidemiology, microbiological, serological and pathological features of the disease. The results will provide information on the seasonal and environmental incidence of disease, and magnitude of economical loss. Correlation of microbial, pathological and epidemiological data should enable the relative importance of the various etiologic factors to be accurately assessed (e.g., environmental and management factors, viral and bacterial agents). Once these are defined a rational approach to alleviation of the problem can be planned. The proposed collaborating countries of Brazil or the Sudan will have personnel in the United States and with University of California faculty in their countries, learning not only laboratory methodology, but also the means of disseminating information to the livestock producer.

3. Oklahoma State University — Genotype-environmental interactions in ruminants.

Objective: Study performance of crossing breeds under differing environmental conditions.

| | | |
|---|---|---|
| Total Score: | | /100 |
| a. | Program Significance | /30 |
| b. | Institutional Considerations | /25 |
| c. | Technical Approach | /25 |
| d. | Personnel | /20 |

Location: Arid/Semi-arid

Discussion:

(1) Less coverage than Texas A & M proposal (No. 13) - no goats.

(2) Work all done in Oklahoma. Topic should be investigated in LDC's.

(3) There is some complementarity to No. 13.

(4) Better experimental design than No. 13.

(5) Strengthen foreign contact, Sudan, Northeast Brazil, Northeast Columbia, and coordinate with Texas A & M.

Rating: Marginal/Good

3

## COVER SHEET

1. Oklahoma State University, (Department of Animal Science), Stillwater and Southwest Livestock and Forage Research Station, (USDA), El Reno, Oklahoma.
2. Genotype-environmental interactions in ruminants.
3. No foreign location identified but proposal fits conditions in many countries bordering the Sahara desert of Africa and countries in Southwest Asia or Central and South America.
4. No collaborating institution has been contacted.
5. Six years
6. Average annual budget FY 79 to FY 83: Oklahoma State University $71,740, U.S.A.I.D. $252,740 (See Budget p. 10)
7. Joe V. Whiteman with a resource panel of Frank H. Baker, Robert Totusek, Donald G. Wagner and M. E. Wells.

## SUMMARY

The importance of matching the genetic potential for productivity to the nutritional adequacy of the ecosystem is recognized but this relationship has never been adequately studied. Many of the small ruminants of the world are raised in countries and areas where there are long dry seasons or recurrent droughts. One of the reasons for raising these animals is their ability to tolerate these poor feed conditions. There is a great need to know whether the breeds that are hardy enough to survive are more productive in these poor environments than are more productive breeds when supplemented during critical periods and how the two kinds of breeds react in adequate nutritional environments. This study is designed to use breeds of low and high productivity and their cross to study the reproductive and productive performance in a nutritionally inadequate environment and in a very adequate environment. Also critical is the relative amount of heterosis exhibited by crosses between the two breeds under these two sets of environmental conditions. The results should indicate the relative importance of heterosis in the two environments and the relative importance of adapting the genotype to the environment.



11

5. Texas A & M University Small Ruminants Products Systems Models

Objective: Develop dynamic, comprehensive, mathematical models based on biological functions for sheep and goat production systems with the individual animal as the modelling unit and interface these models with economic models.

| | | |
|---|---|---|
| Total Score | | 76/100 |
| a. | Program Significance | 19/30 |
| b. | Institutional Considerations | 21/25 |
| c. | Technical Approach | 19/25 |
| d. | Personnel | 17/20 |

Location: Texas, Africa

Discussion:

There's no forage man or agronomist on this team.

PI's are leaders in animal modeling circles.

This effort may be premature because we may not have the inputs (small ruminants in LDC's).

They have existing contacts with ILCA.

Multi-species modeling is not relevant in Asia.

A lot of biological information (health) is know about small ruminants but we do not know the economic justification for various control programs.

Information they would gather during the first year could give a lot of direction to other elements.

They probably have baseline data on sheep.

Biological and economic models are linked but separate.

Goats and sheep should be done separately.

Baseline data in Bangladesh need to be assembled before they could be put in a model.

Ohio State cooperation should be investigated due to experience in that part of world.

Rating: Good. Wait to see other components of program. It is important to see them as a part of program. Look at inputs from other parts of consortium.

5



Institution: TEXAS AGRICULTURAL EXPERIMENT STATION, TEXAS A&M UNIVERSITY
Animal Science Department, College Station, Texas 77843
TAMU Agricultural Research and Extension Center, San Angelo, Tex. 76901

Subcontractor: Winrock International Livestock Research And Training Center

Title: Small Ruminants Production Systems Models

Foreign Location: Application of systems analysis will be available for all LDCs with linkages with U.S. institutions in the program.

Foreign institutions: International Livestock Center for Africa and others.

Period of Project: 5 years with revision and extension anticipated.

Total Annual Budget: Title XII $69,100.
TAES $59,000.

Principal Project Investigators: T. C. Cartwright, T. C. Nelsen, J. O. Sanders, J. W. Bassett, J. M. Shelton, H. A. Fitzhugh, M. E. Sarhan, R. D. Child, E. K. Byington

## ABSTRACT

The nature of sheep and goat production systems is complex. Each system is affected by multi-order interactions among both inputs and outputs. Therefore, each system must be examined in its entirety if critical constraints are to be recognized and if accurate projections of the effects of specific changes are to be made. Failure to consider the total system with its many interacting parts will sharply reduce the accuracy with which research priorities are set and the effectiveness with which available technology is applied.

To facilitate examination of sheep and goat production systems, mathematical models will be developed for each species. The basic form of these models will follow that already proven successful for cattle production systems. Both sheep and goat models will include comprehensive accounting of inputs and outputs, across time. Models will be based on knowledge of biological functions and will be sufficiently general so that animal performance and flock production can be accurately simulated from feed resource and management inputs. Thus, effects of modifying these resources or practices in a given production system can be predicted for each component of the total system.

Results from the biological models may serve as inputs to economic analysis of benefit-costs. Sheep, goat and cattle models will be interfaced with forage production models to evaluate single and multiple-species grazing systems.

13

6. Texas A & M University — Economic Evaluation of Small Ruminant Systems

Objective: Develop benefit/costs techniques appropriate to small ruminant product systems.

| | | |
|---|---|---|
| Total Score: | | 77/100 |
| a. | Program Significance | 30 |
| b. | Institutional Considerations | 25 |
| c. | Technical Approach | 25 |
| d. | Personnel | 20 |

Location: Africa (no ecozone)

Discussion:

(1) Important topic area.

(2) Weakness: No distinction between macro level and household level economic analysis.

(3) Must be undertaken with No. 5, or similar model building.

(4) Data limitations may limit applicability as decisionmaking tool.

(5) Duplicates some ILCA work in Africa, might be directed toward other area of the world.

(6) Be component of CRSP program; Texas A & M already working with ILCA in this area - small additional funding might multiply impact - potential high cost-benefit ratio.

Rating: Good/outstanding.

| | |
|---|---|
| U. S. Institutions: | Texas A&M University, Lead Institution<br>Winrock International Livestock Research and Training Center, Subcontractor |
| Project Title: | Economic Evaluation of Small Ruminant Systems |
| Foreign Location: | Africa |
| Period of Project in Years: | Five (5) years |
| Average annual budget: | Title XII Funds - $32,000<br>Other Funds - $6,500 |
| Personnel: | M. E. Sarhan, Agricultural Economist<br>R. O. Wheeler, Agricultural Economist<br>H. A. Fitzhugh, Animal Scientist<br>T. C. Cartwright, Animal Scientist |

Abstract:

Application of U.S. research results to small ruminant development projects in LDC's will largely depend on their economic viability. Research to accomplish benefit-cost analyses appropriate to small ruminant production systems should provide efficient, effective means to determine economic viability of transferable technology developed under the Small Ruminant Program.

Benefit-cost analysis models suited to the special characteristics of small ruminant production and marketing systems will be developed. Economic coefficients appropriate to these systems will be determined from analysis of economic data representive of target production and market sectors.

7. Texas A & M — Utilization of Agri-industrial By Produ for Small Ruminants

Objective: Investigate use of agricultural wastes as S-R feeds.

| | | |
|---|---|---|
| Total Score: | | 81/100 |
| a. | Program Significance | 24/30 |
| b. | Institutional Considerations | 21/25 |
| c. | Technical Approach | 20/25 |
| d. | Personnel | 16/20 |

Location: Humid Tropics (Tanzania)

Discussion:

(1) Excellent all around proposal.

(2) Needs some attention to product quality.

(3) Should be conducted on-site in LDCs.

(4) Good orientation to small farmers.

(5) Should include component to investigate life cycle utilization of different products.

Rating: Outstanding.

Texas A&M University

Texas Agricultural Experiment Station
(Subcontractor: Winrock International)

Title: Utilization of Agri-Industrial by-Products for Small Ruminants

Foreign Location: Tanzania

Collaborating Foreign Institution: University of Tanzania

Period of Project: 5 Years

Average Annual Budget: Title XII - 88,000

TAES - 45,000

Winrock International - 7,500

Name of Principal Investigators:

Texas Agricultural Experiment Station:

Dr. C.S. Menzies

Dr. Millard Calhoun

Dr. C.W. Livingston

Dr. Maurice Shelton

Winrock International:

T.D. Nguyen, Animal Nutritionist

G.E. Cooper, Animal Nutritionist

R.D. Child, Range Scientist

Abstract

Local feed resources from agri-industrial by-product and root and fruit crops are often available in large quantities. This may include sorghum stubble, cotton gin waste, cereal straws, rice bran, sugarcane top, molasses, cassava, banana, papaya and poultry house waste. At the present time, the lack of research, both on nutritional value and practical utilization of these feedstuffs, interpreted at the small farm level, may result in a tremendous waste of these types of feed sources.

This research project aims at the traditional farm level to provide basic information and to conduct pilot projects with sheep and goats. Small ruminants will also be tested as a "small food factory" to convert those feed resources to meat, milk, fiber, hides and skins, both in this country and appropriate LDC's.

8. Texas A & M University — Dynamics of Forage Production and Nutrition on Humid and Subhumid Rangelands

Objective: Develop models to evaluate mixed species grazing systems

| | | |
|---|---|---|
| Total Score: | | 72/100 |
| a. | Program Significance | 20/30 |
| b. | Institutional Considerations | 19/25 |
| c. | Technical Approach | 17/25 |
| d. | Personnel | 16/20 |

Location: Humid Tropics

Discussion:

(1) Somewhat duplicates ILCA work.

(2) Lack of immediate applicability.

(3) Need basic ecological data that is not yet available.

(4) Value of systems modelling to small holder systems questioned.

(5) Mixing E & W African data.

(6) Necessary component for total program but expanded to include more types of variables.

Rating: Marginal

8

| | |
|---|---|
| U. S. Institutions: | Texas A&M University, Lead Institution<br>Winrock International, Sub-contractor |
| Project Title: | Dynamics of Forage Production and Nutrition on Humid and Subhumid Rangelands. |
| Foreign Locations: | Humid and subhumid zone of Africa |
| Collaborating Institutions: | University of Ibadan; University of Dar es Salaam; ILCA; IITA |
| Period of Project: | Five (5) years (with potential for extension) |
| Average annual budget: | Title XII Funds - $49,800<br>Other Funds - $9,600 |
| Personnel: | R. D. Child, Range Scientist<br>T. C. Cartwright, Animal Scientist<br>E. K. Byington, Range Scientist<br>J. M. Shelton, Animal Scientist<br>T. D. Nguyen, Animal Nutritionist<br>H. A. Fitzhugh, Animal Scientist<br>ILCA, Range Scientist |

Abstract:

Rangelands in the humid and subhumid tropics currently supports 40 percent of the world's ruminant livestock. Half of these animals are small ruminants. Small ruminants have certain advantages in areas of this tropical region and could play a more increasingly important role in livestock production systems. The development of more efficient livestock production systems requires an understanding of seasonal variation in productivity and nutrient content of available forages.

The vegetation found in the humid and subhumid rangelands of Africa is diverse in species composition and structure. This diversity allows several different species of ruminant to forage in a complementary way. To allow the evaluation of mixed specied production systems the seasonal and structural vegetation diversity must be understoood in a quantitative way. Appropriate conceptual and mathematical models will be developed that will be responsive to evaluation of mixed species grazing systems involving small ruminants.

19

9. Texas A & M University — Small Ruminants and Forage Relationships in in the Humid Tropics

Objective: Collect data on the available and nutritional quality of native vegetation under varying conditions of animal use and seasonabl variation and correlate this date to small ruminant diet performance in the woodland savannah of the Guinean zone of Africa.

| | | |
|---|---|---|
| Total Score | | 75/100 |
| a. | Program Significance | 22/30 |
| b. | Institutional Considerations | 19/25 |
| c. | Technical Approach | 19/25 |
| d. | Personnel | 15/20 |

Location: West Africa, humid areas

Discussion:

PI has little experience.

May not have evaluated other research in Nigeria.

Do not have film linkages.

Nigeria has done a lot of work on forage.

University of Ibadan has done this type of work using cattle to measure year round supply of forage.

Small ruminant work at Ibadan has been done in confined circumstances, not using forage.

Data are needed for systems analysis.

Rating: Good (minus). Should be incorporated with projects on systems analysis.

2C

| | |
|---|---|
| U. S. Institutions: | Texas A&M University, Lead Institution<br>Winrock International, Subcontractor |
| Project Title: | Small Ruminants and Forage Relationships in the Humid Tropics |
| Foreign Location: | West Africa, Humid Tropics |
| Collaborating Institutions: | ILCA; University/Experiment Station in West Africa (linkages to be established) |
| Period of Project: | Five (5) years (with potential for extension) |
| Average annual budget: | Title XII Funds - $28,800<br>Other Funds - $5,700 |
| Personnel: | E. K. Byington, Range Scientist<br>G. E. Cooper, Animal Nutritionist<br>J. M. Shelton, Animal Scientist<br>Foreign Range or Animal Scientist |

Abstact:

Sheep and goats are a major protein source in the humid tropics of West Africa but production must be increased if expanding human needs are to be met. A factor limiting production is seasonal variation in the availability and quality of the primary feed source, native vegetation. This limitation can be overcome through management plans which will control season and intensity of range use, and select mixtures of grazing animals which will utilize each type of vegetation. Plans should also state how crop residues, agricultural byproducts, and improved pastures can be used to supplement deficiencies in native forage. Such plans can not be developed at this time because of the lack of data about the interrelationships between small ruminants and the vegetation of the humid tropics.

This proposal outlines a research project which will use statistically designed grazing experiments in the humid tropics of West Africa. Quantitative data will be collected that will correlate animal performance and forage preferences with varying grazing intensities and variations in availability and nutritional quality of native rangelands. These data will be used to modify existing production systems in order to increase small ruminant productivity. Suggested modifications will be field tested.

10. Texas A & M University Maximizing Animal Production from Rangeland.

Objective: Determine the animal-plant-supplemental feed relationships with combination grazing and adapt the observed relationships to different systems of grazing and stocking rates.

| | | |
|---|---|---|
| Total Score | | 70/100 |
| a. | Program Significance | 16/30 |
| b. | Institutional Considerations | 21/25 |
| c. | Technical Approach | 17/25 |
| d. | Personnel | 16/20 |

Area: Arid and Semi-arid

Discussion:

Good approach. Discusses management in relation to range.

Spells out experimental procedure in detail.

Would do some experimental work in Texas.

Good staffing.

Same concern with whether it will be applicable to very many LDC's because most work would not take place in LDC.

This work has been going on a long time at this institution and is an extension of prior work.

Number of animals involved is very small and could give erratic results.

Objectives are good.

Good technical strength.

Multispecies grazing is common in Africa.

200 mm of rain permits little room for improvement.

Rating: Marginal (good). Topic and objectives are good. Locale is Texas, not LDC. Good technically.

10

Texas A&M University

Texas Agricultural Experiment Station
(Subcontractor: Winrock International)

Title: Maximizing Animal Production from Rangeland

Foreign Location: To be determined Semi-Arid Afrin

Collaborating Foreign Institution: To be determined < Mali Botswana

Period of Project: 5 years

Budget: (1 year basis) Title XII - 98,000

TAES - 71,206

Name of Principal Investigators:

Texas Agricultural Experiment Station:
Dr. J.E. Huston, Animal Nutritionist (Principle Investigator)
Dr. J.W. Bassett, Animal Scientist
Dr. A.J. Dye, Range Scientist
Dr. L.B. Merrill, Range Scientist
Mr. Charles Taylor, Range Scientist
Dr. R.E. Whitson, Range Economist
Dr. D.N. Ueckert, Range Scientist

Winrock International:

Dr. E.K. Byington, Range Scientist
Dr. R.D. Child, Range Scientist

## Abstract

Many of the lesser developed countries of the world depend on products coming directly or indirectly from rangeland resources. Extended periods of near maximum production have led to extensive rangeland abuse and deterioration. Properly managed, small ruminants (sheep and goats) can be valuable tools, both to increase productivity and to establish stability in the rangeland ecosystem. The need for greater knowledge of the relationships between the different livestock species (cattle, sheep and goats) and between these animals and the range vegetation is the impetus for the studies proposed. The relationships resulting from different combinations of cattle, sheep and goats will be indicated by observation of diet selectivity, total voluntary intake and overall animal productivity (Experiment 1). How these relationships are modified by supplemental feeding, stocking rate and rotation grazing will be investigated in Experiments 1, 2 and 3, respectively. Forage production and relative plant species composition will be monitored in all experiments. These basic relationships will become parts of a dynamic model to extend the data across various regions of the world. Collaborating research in selected lesser developed countries will be important to validate these relationships and adapt them to local conditions.

23

11. Texas A & M University — Improving the Storage-Life of Sheep and Meat in Less Developed Countries

Objective: Develop technology for preserving meat for shelf storage without refrigeration.

| | | |
|---|---|---|
| Total Score: | | 76/100 |
| a. | Program Significance | 18/30 |
| b. | Institutional Considerations | 22/25 |
| c. | Technical Approach | 17/25 |
| d. | Personnel | 18/20 |

Location: Humid Tropics & Highlands

Discussion:

1. PI extremely well qualified.
2. Planning for project should include LDC scientists to identify additional methods for preservation.
3. FAO has done a great deal of work in this area.
4. Meat preservation may not improve nutrition of poorest people.
5. Small holders already have developed many appropriate techniques for preservation.
6. Proposed techniques too sophisticated for LDC's.
7. Supply of meat in LDC's so low relative to demand that storage is not a problem.

Rating: Marginal/inappropriate.

Institution: TEXAS AGRICULTURAL EXPERIMENT STATION; TEXAS A&M UNIVERSITY
Meats and Muscle Biology Section, Dept. of Animal Science,
College Station and San Angelo Research and Extension Center,
San Angelo.

Title: Improving the storage-life of sheep and goat meat in less developed countries.

Foreign Location: Tanzania and Peru

Foreign Institution:

Tanzania
Ministry of Agriculture
P.O. Box 9192
Dar-Es-Salaam, Tanzania
(Contact: Dr. S.A. Madallali,Prin. Sec.)

Peru
Instituto de Investigaciones Agro-Indus.
Av. La Universidad 595
La Molina-Apartado 11294
Lima 14, Peru
(Contact: Cesar Flores Cosio,Pres.Direc.)

Period of Project: Five years

Average Annual Budget: ($59,400, Title XII; $43,620 , T.A.E.S.)

Principal Investigators: G.C. Smith and R.N. Terrell
Cooperators: Z.L. Carpenter, M. Shelton, T.R. Dutson and R.L. Hostetler

## ABSTRACT

People of LDCs are often malnourished; their diets are particularly deficient in protein. Adequate dietary protein (30 grams/day) could be achieved by consuming 150 grams/day of meat; but meat, because of its high perishability, is not available to many urban people and most rural people of LDCs on a daily basis. Peru (as a model of high altitude, low temperature ecozones) and Tanzania (as a model of low altitude, high temperature ecozones) have 17.3 and 2.9 million sheep, respectively, and 2.0 and 4.6 million goats, respectively, which could provide dietary protein if meat preservation technology and more efficient marketing-distribution systems could be identified. The proposed research will develop technology for converting highly-perishable sheep and goat meat into nutritious, palatable, shelf-stable products which do not require refrigeration. People in the target countries can use such technology to preserve meat from sheep and goats for their own consumption, for barter or for sale and can develop systems for physical distribution of such products, especially for export. Successful improvement of storage-life of sheep and goat meat in Peru and Tanzania would have direct identifiable utility in solution of meat preservation problems in other LDCs as well as in the United States.

12. Texas A & M University — Fiber and Pelt Attributes of Small Ruminants

Objective: Develop techniques for measuring fibre/hide qualities and factors that improve value of fibres/hides

| | | |
|---|---|---|
| Total Score: | | 71/100 |
| a. | Program Significance | 19/30 |
| b. | Institutional Considerations | 20/25 |
| c. | Technical Approach | 16/25 |
| d. | Personnel | 16/20 |

Location: Not specified

Discussion

(1) Question of applicability to small holder.

(2) May be component of total marketing system.

(3) FAO has done a great deal of work with area - Improvement that is needed is in processing/marketing.

(4) Proposal does not reflect state-of-the-art.

Rating: Inappropriate.

12



Texas Agricultural Experiment Station

Animal Science Department

College Station, Texas

Title: Fiber and pelt attributes of small ruminants

Foreign location: To be determined

Collaborating foreign institution: To be determined

Period of project: 5 years

| Annual Budget (1979): | | |
|---|---|---|
| | Title XII | $50,000 |
| | T.A.E.S. | 45,000 |
| | Total | $95,000 |

Principle investigators:

Dr. James W. Bassett

Dr. Maurice Shelton

Mr. B. F. Craddock

## Abstract

This project proposes that attention be paid to the fibers and pelt attributes of small ruminants. In many cases fibers from small ruminants in LCD's are utilized not at all or little attention is given to an orderly marketing system which would reflect differences in market value and provide incentives for improved selection, management or preparation practices. Measurements will be made of fleece and fiber samples to determine those traits of economic importance and to define the acceptable limits for establishing a sorting or grading system. Attention will also be given to the potential use of fibers from non-wool sheep and meat-type goats for hand spinning purposes.

Pelts may often be the only source of potential income from the slaughter or death of small ruminants. They also are an exportable product representing potential income for LCD governments. Pelt value varies greatly, and while the reasons for the variations may be apparent, the extent to which the variations may be controlled through breeding, selection and management are not known. This project will attempt to determine the genetic and environmental factors which can be controlled to improve pelt values.

27

13. Texas A & M — A Characterization of Fattail Sheep

Objective: Establish fattail sheep breeding and experimental flock in Texas

| | | |
|---|---|---|
| Total Score: | | 70/100 |
| a. | Program Significance | 20/30 |
| b. | Institutional Considerations | 18/25 |
| c. | Technical Approach | 16/25 |
| d. | Personnel | 16/20 |

Location: Not specified

Discussion:

Combine with proposal No. 14 (See 14 for discussion)

Rating: Outstanding, if combined with No. 14

13

Texas A&M University

Texas Agricultural Experiment Station

San Angelo Research and Extension Center

San Angelo, Texas

Title: A Characterization of Fat-tail Sheep

Foreign location - to be determined

Collaborating foreign institution - to be determined

Period of project - 10 years

Budget: (Annual) Title XII - 35,500

TAES - 27,500

Name of principal investigators:

Dr. Maurice Shelton, Leader and Breeding and Reproduction

Dr. Gary Smith, Meats

Dr. M. C. Calhoun, Nutrition

Dr. J. W. Bassett, Fiber Technology

Dr. D. N. Ueckert, Grazing Habits

Mr. Phillip Thompson, Management

## Abstract

Under this project it is proposed that a small flock (50-100 head) of fat-tail (Karakul) type of sheep will be established and maintained at this and possibly one or more cooperating U.S. institutions. This flock will be used to maintain or to insure the maintenance of this type of animal in the United States for potential future commercial exploitation and also to insure their availability for study, demonstrations and research. Since this is no doubt the most important type of sheep in terms of its contribution in LDC, it appears important that an opportunity be provided for study of this type of animal at U.S. institutions. The same flock will also be used to investigate the relationship of the fat-tail to (a) yield and eating quality of meat, (b) the relationship of the fat-tail to adaptation to climatic and nutritional stress, (c) the relationship of the fat-tail to reproductive success and (d) the potential for increased production from crossbreeding and (e) the comparative grazing habits of this and other types of small ruminants.

The initial observations will be made in this country, but will be extended to cooperating foreign institutions as preliminary results indicate the desired approach and the necessary cooperating linkages can be arranged.

29

14. Texas A & M — Meat Production from Goats and Hair Sheep

Objective: Establish breeding flock of high potential S. R. stock in Texas and conduct some comparative studies

| | | |
|---|---|---|
| Total Score: | | 78/100 |
| a. | Program Significance | 20/30 |
| b. | Institutional Considerations | 18/25 |
| c. | Technical Approach | 16/25 |
| d. | Personnel | 16/20 |

Location: Not specified

Discussion:

1) Very necessary component of total program.
2) Should be combined with proposal 13.
3) Need system for disseminating semen or stock in US and world-wide.
4) Should establish linkage with other centers of genetic resource pooling in LDCs: Mexico, India, Kenya.
5) Testing may be limited in Texas due to inability to duplicate all LDC field conditions; most testing should be done in LDCs.

Rating: Outstanding.

14

Texas A&M University

Texas Agricultural Experiment Station

San Angelo Research and Extension Center

San Angelo, Texas

Title: Meat Production from Goats and Hair Sheep

Foreign location - To be determined

Collaborating foreign institution - To be determined

Period of project - 10 years

Budget (Annually) - Title XII - 85,000

TAES - 75,000

Name of prinicpal investigators:

Dr. Maurice Shelton, Leader

~~Geneticist, To be employed~~

Dr. Art Hoversland, Visiting Scientist (1st year only)

Dr. Gary Smith, Meats

Dr. C. W. Livingston, Jr., Disease

Dr. Darrell Ueckert, Diet Studies

Dr. Charles R. Long, Statistical

Mr. Phillip Thompson, Management


## Abstract

Under the project proposed here the genotypes of meat type goats and hair sheep in tropical or subtropical regions will be surveyed. Breeding programs will be initiated with both species in this country and this will be coordinated with efforts at selected centers in LDCs. Genetic parameter estimates and selection methodology will be studied concurrently with selection. The grazing habits of the two species will be compared. Disease and management problems encountered with the animals involved in the project will be closely monitored and their significance and potential control practices studied.


31

15. Texas A & M University — Disease Constraints to Sheep and Goat Production.

Objective: Develop practical and accurate serodiagnostic test for caseous lymphadenitis and an effective program for its control and prevention.

| | | |
|---|---|---|
| Total Score | | 69/100 |
| a. | Program Significance | 16/30 |
| b. | Institutional Considerations | 20/25 |
| c. | Technical Approach | 17/25 |
| d. | Personnel | 16/20 |

Location: Worldwide

Discussion:

Very specific, and only sheep are mentioned.

Excellent technically and is strong on personnel.

Does not mention state-of-the-art in LDC's.

This disease is not as important as parasites or other diseases LDC's.

This disease is a U.S. problem and does not need LDC involvement.

Most of the work would be done in the U.S.

Rating: Inappropriate. Not as serious a problem in LDC's as many other diseases. Primarily a U.S. problem.

Texas A&M University

Texas Agricultural Experiment Station

San Angelo Research and Extension Center

San Angelo, Texas

15

Arid

Title: Disease Constraints to Sheep and Goat Production

Foreign location - to be determined

Collaborating foreign institution - to be determined

Period of project - 5 years

Annual budget: Title XII - 75,000
TAES - 75,000

Name of principal investigators:

Dr. C. W. Livingston, Jr., San Angelo Research and Extension Center
Dr. L. C. Grumbles, Department of Veterinary Microbiology and Parasitology
Dr. Maurice Shelton, San Angelo Research and Extension Center
Dr. Charles Bridges, Department of Veterinary Pathology
Betty Gauer, San Angelo Research and Extension Center

## Abstract

Disease and parasites are frequent constraints to efficient production. Some of the more dramatic diseases such as trypanosomiasis, hoof and mouth, etc. are being investigated at current centers of excellence.

Caseous lymphadenitis is a major cause of economic loss to sheep and goat producers throughout much of the world. It is known to be a significant cause of loss in North and South America, Africa and Asia. Effective preventative, theraputic or control measures are not available. Control measures available at the present time are removal of visible affected animals from the flock, separation of young and old animals and shearing the younger animals separately and first. Experimental vaccines and serodiagnostic tests developed recently although not completely effective do show promise. If an accurate serodiagnostic test could be applied under field conditions and the animal showing positive reactions removed early in the stage of the disease condition, the losses from caseous lymphadenitis could be greatly reduced both in the packing plant and in producers flock. The first step in this project is to use various serodiagnostic tests in attempts to detect infection in our own known-infected-flock. The effectiveness of each serodiagnostic test will be evaluated by necropsy and examination of tested sheep and goats. Promising vaccines will be evaluated in animals known to be from flocks infected with C. pseudotuberculosis. A uniform challenge procedure will be developed.

16. Texas A & M University — Comparative Efficiency of Ruminants

Objective: Use cattle, sheep, and goats to test comparative efficiency under difficult conditions.

| | | |
|---|---|---|
| Total Score: | | 70/100 |
| a. | Program Significance | 17/30 |
| b. | Institutional Considerations | 19/25 |
| c. | Technical Approach | 18/25 |
| d. | Personnel | 16/20 |

Location: Not specified

Discussion:

1. Very useful for providing ballpark figure for comparing species on efficiency of various feeds.
2. High applicability for Arid/semi-arid in long run.
3. Could be combined with other Texas A & M proposals (13 & 14).
4. Very needed if math models are included as part of total program.
5. Extremely capable staff; adequate budget and contribution by university.
6. Continuation of Texas A & M programs in grazing studies.
7. Might better be carried out in LDC, would mean more if research carried out in low quality forage areas (LDC). Adequate data clearly available for high quality forage.
8. Too sophisticated as proposed, if carried out in LDC.

Rating: Marginal (as written, but need for comparative studies under field conditions in LDC's.)

16



Texas A&M University

Texas Agricultural Experiment Station

San Angelo Research and Extension Center

San Angelo, Texas

Title: Comparative Efficiency of Ruminants

Foreign Location: To be determined

Collaborating Foreign Institution: To be determined

Period of Project: 5 years

Budget: Title XII - 80,000
TAES - 82,250 (1 Year Basis)

Name of Principal Investigators:

Dr. M.C. Calhoun, Principle Investigator

Dr. J.M. Shelton

Dr. J.E. Huston

Dr. J.W. Bassett

Dr. T.C. Cartwright

Dr. C.R. Long

## Abstract

Information on the comparative efficiency of different species and genotypes of ruminants is essential in determining the ruminant production system(s) which will best use local resources and/or imported feedstuffs to increase production of animal protein and fiber in developing countries. At present, only limited information is available. This project is designed to provide basic information on the relative ability of sheep, goats and cattle to digest diets of wide ranging potential digestibility and with imposed environmental constraints e.g., high temperatures and with limiting feed and/or water. Genotypes available for comparison in Texas include Rambouillet, Barbado and Karakul sheep, Angora, Spanish and Dairy goats and European (Bos taurus) and Indian (Bos indicus) cattle. Both beef and dairy breeds of european cattle will be used. The total energetic efficiency of breeding units of various species and genotypes of ruminants will be measured with animals maintained in confinement. And an attempt will be made to separate the partial efficiencies related to maintenance, milk production, body weight change and fiber production. Efficiency evaluations will be extended to grazing animals and their use of various forage types.

18. Colorado State University — Research on the Diseases of Sheep and Goats Affecting Their Productive Efficiency

Objective: Determine herd health disease problem in Highland area of Latin America.

| | | |
|---|---|---|
| Total Score: | | 73/100 |
| a. | Program Significance | 21/30 |
| b. | Institutional Considerations | 19/25 |
| c. | Technical Approach | 16/25 |
| d. | Personnel | 17/20 |

Location: Highlands (Latin America)

Discussion:

(1) Important objectives

(2) Good technical approach.

(3) If project is successful can be applied to other countries in LA.

(4) Poor provision for integrating into other components of production.

(5) Recommend that Highland areas have separate focus in total CRSP.

Rating: Outstanding.

## ABSTRACT

The productive efficiency of any livestock operation is directly dependent upon the health of the individuals constituting that unit. To improve animal health in a developing country, a group of investigators with a diversity of expertise and research activities have been assembled who can identify and develop means to help alleviate disease problems present in the sheep and goat population of the target area. The results of current research activities at Colorado State University (CSU) on pneumonia of sheep and goats, immunopathogenesis of contagious ecthyma in sheep, research on the seasonal effectiveness of anthelmentics, transplacental viral infections and congenital anomolies of environmental origin contributing to reproductive wastage, and research in diagnostic techniques are applicable wherever sheep and goats are produced.

Peru has been selected from the list of target countries because of a similarity of terrain and high altitude with that of Colorado. The Instituto Veterinario de Investigaciones Tropicales y de Altura (Lima, Peru has been selected as a potential collaborating institution since a staff member of that Institution received postdoctoral training at CSU. The collaborative research will be designed to answer questions relevant to increasing the productive efficiency of the sheep and goat industry of the highlands of Peru.

# COLORADO STATE UNIVERSITY

## RESEARCH ON THE DISEASES OF SHEEP AND GOATS AFFECTING THEIR PRODUCTIVE EFFICIENCY

## HIGHLANDS AREA OF SOUTH AMERICA (PERU)

The Instituto Veterinario de Investigaciones Tropicales y de Altura (Lima, Peru)

The Project will be for 5 years

| | Budget | | | | |
|---|---|---|---|---|---|
| | 1979 | 1980 | 1981 | 1982 | 1983 |
| Title XII Funds | 180,620 | 168,860 | 176,260 | 192,460 | 202,960 |
| CSU Overhead | 86,016 | 87,091 | 98,304 | 105,216 | 113,280 |

Principal Investigators: LLOYD LAUERMAN and CLEON V. KIMBERLING

Other Key Personnel:
Rue Jensen
R. E. Pierson
L. Pearson
R. Rubin
J. Cheney
J. DeMartini
S. Young
A. McChesney
J. Kipping

19. Colorado State University — Optimal Combinations of Herbivores for Arid and Semiarid Grazinglands of the Acacia Totilis Zone.

Objective: Develop mathematical model to optimize mixed grazing

| | | |
|---|---|---|
| Total Score: | | 71/100 |
| a. | Program Significance | 20/30 |
| b. | Institutional Considerations | 19/25 |
| c. | Technical Approach | 16/25 |
| d. | Personnel | 16/20 |

Location: Arid/Semi-arid

Discussion:

(1) Sound background of PI.

(2) Question of applicability of modelling LDC production systems.

(3) Not designed for poor small holders.

(4) Good coverage--considers multiplicity of animals--not just sheep and goats.

(5) Data may not be consistently available--there is instability of data banks in LDC's.

(6) Similar modelling work in U.S. has not had many direct applications.

(7) Such models (in general) would be useful for planning.

(8) Does provide for direct collection of data--CSU would have control over data quality.

(9) Serious weakness--organizational requirements for obtaining data are unrealistic.

(10) The methodology may be inappropriate: once confined, grazing animal diets change, making findings invalid.

Rating: Marginal.

| | |
|---|---|
| U. S. Institution: | Colorado State University |
| Project Title: | Optimal combinations of herbivores for arid and semiarid grazinglands of the *Acacia tortilis* zone |
| Foreign Institutions: | UNESCO, ILCA |
| Project Duration: | 5 Years |
| Budget: | Year 1 $211,800<br>Year 2 177,300<br>Year 3 188,300<br>Year 4 198,800<br>Year 5 208,000<br>Total $984,200 |
| Principal Investigator: | George M. Van Dyne |


## ABSTRACT

Field studies will be undertaken in northern Kenya to provide data on the chemical and botanical composition of the diets of sheep, goats, cattle, camels, and donkeys. Data will be collected under different intensities of grazing at different seasons of the year. Measurements will also be made of the kind and amount of vegetation available. These data will be exchanged for information on quantity of intake and digestibility collected in UNESCO studies. The overall information will be used in mathematical analyses (i) to predict the chemical composition of the plants and plant parts grazed, and (ii) the optimal combinations of animal species to maximize vegetation use and animal production subject to maintaining the grazingland vegetation resource. The results will be presented to governmental and intergovernmental research and development agencies in arid and semiarid regions of this and related ecological zones. Laboratory, computer studies, and project summarization will be done at Colorado State University.

20. Colorado State University — Potentials for Small Ruminant Production in Latin American and Lesotho.

Objectives: Use integrated social science approach to identify socioeconomic constraints to small ruminant production.

| | | |
|---|---|---|
| Total Score | | 76/100 |
| a. | Program Significance | 22/30 |
| b. | Institutional Considerations | 19/25 |
| c. | Technical Approach | 19/25 |
| d. | Personnel | 16/20 |

Location: Highlands (Latin American & Africa)

Discussion:

Problem has not received adequate attention among other proposals.

Has two serious flaws:
(1) Low contribution in budget
(2) Inadequate attention to small holder (focuses on extensive range production)

Has significant sociocultural component and includes political constraints (land tenure).

Socio-political orientation should be an important aspect of consortium program - however, should be well integrated in overall program.

ILCA is doing similar project in Ethiopis - good background available and should be utilized.

Needs more small-holder orientation and attendant focus on local marketing; needs some structural involvement of livestock/agricultural experts.

Rating: Outstanding.

INSTITUTION: Colorado State University, College of Humanities and Social Science

TITLE: Potentials for Small Ruminant Production in the Highland Regions

LOCATION: Highland regions of Latin America and Lesotho

COLLABORATION: To be determined

DURATION: Five years

BUDGET:

| Fiscal year | 1979 | 1980 | 1981 | 1982 | 1983 |
|---|---|---|---|---|---|
| Title XII | 315,716 | 300,206 | 299,208 | 311,155 | 323,761 |
| University | 130,585 | 123,504 | 122,940 | 129,702 | 136,837 |

INVESTIGATORS: Melvin D. Skold (principal investigator), C. Kerry Gee, Albert G. Madsen, Rex D. Rehnberg, Edward Sparling, Wayne Clegern, John Straayer, Manuel Alers-Montalvo, Joseph Sardo

ABSTRACT: This project proposes to conduct a systematic evaluation of the constraints to small ruminant production and the potentials to increased production from reducing the effects of the constraints. The analyses are from a social science perspective, including economics, history, political science, and sociology, and are designed to identify the long-standing customs and traditions associated with small ruminant production as a means to isolating those barriers which must be overcome or which cannot be overcome. For those limitations such as poor range conditions, animal health problems, and inferior management practices of producers, an economic evaluation of the potentials offered by the reduction of each limitation will be made. The economic evaluation will be used to estimate the relative priorities for approaching the identified limitations. Further, the potentials for independent removal of one or two limitations, in the absence of a comprehensive program considering all limitations, will be analyzed. The same analytical model will be used to evaluate the relative severity of identified limitations. The potentials for small ruminants to improve the distribution of income, satisfy consumer demand, and contribute to the removal of diet deficiencie will be considered within the same framework.

4/2

21. Colorado State University — The Role of Small Ruminants in Natural Resource Management Systems.

Objective: Inventory natural resources in a highland area, study ecosystems problems connected with small ruminant development, and develop long range land management plans.

| | | |
|---|---|---|
| Total Score | | 67/100 |
| a. | Program Significance | 21/30 |
| b. | Institutional Considerations | 17/25 |
| c. | Technical Approach | 16/25 |
| d. | Personnel | 13/20 |

Area: Highlands--Latin America and Lesotho

Discussion:

Modest in terms of funds.

Emphasizes multi-purpose use of highlands as in U.S., but this may be a luxury for LDC's.

Stress tenuous relationship with trout-rearing project in Peru.

Overly optimistic for watershed studies in rangeland because of erratic rain.

More relevant to U.S.

Need to look at affects of overgrazing on things rather than watershed and recreation.

Site specific nature of work might reduce possibility of transferring the knowledge gained.

Rating: Inappropriate. Very vague. Might be relevant to Utah State proposal.

INSTITUTION: Colorado State University, College of Forestry and Natural Resources

TITLE: The Role of Small Ruminants in Natural Resource Management Systems

LOCATION: Highland regions of Latin America and Lesotho

COLLABORATION: To be determined

DURATION: Five years

BUDGET:

| Fiscal year | 1979 | 1980 | 1981 | 1982 | 1983 |
|---|---|---|---|---|---|
| Title XII | 60,000 | 130,000 | 130,000 | 130,000 | 130,000 |
| University (CSU contribution--indirect costs computed at 56.6% of salaries) | 22,640 | 50,940 | 50,940 | 50,940 | 50,940 |

INVESTIGATORS: Julius G. Nagy (principal investigator), Eugene Decker, W. David Striffler.

ABSTRACT: The purpose of this study is to inventory present natural resources in highland areas where several species of ruminants interact and where sheep and/or goats are capable or potentially capable of improving the economy of the locality and/or nation. In addition it will study specific problems (watershed, forest, range, wildlife, recreation) connected with small ruminant development within selected ecosystems in cooperation with experts of the target country(s). Long range, ecologically and economically sound land management plans will be developed to optimize small ruminant management without permanently damaging the natural resources. Lasting success of the small ruminant project, regardless of country, will depend on thorough researching of not only problems connected directly with small ruminant animals but also how these animals are and will affect their natural ecosystems. Many examples could be listed from past experiences where an excellent but narrowly focused project accomplished its limited goal but created severe ecological problems. Interdisciplinary teams from the College of Forestry and Natural Resources (Colorado State University) would add valuable services to the overall project. For example, interdisciplinary studies may show that a mix of domestic and wild ruminants will produce more benefits (meat, hides, recreation, tourism) than domestic species alone.

22. Colorado State University — Lactobacillus Culture and Shelf Life and Safety of Meats.

Objective: Evaluate the ability of Lactobacillus acidophilus fermentation products to extend the shelf life of meat.

| | | |
|---|---|---|
| Total Score | | 57/100 |
| a. | Program Significance | 17/30 |
| b. | Institutional Considerations | 14/25 |
| c. | Technical Approach | 16/25 |
| d. | Personnel | 10/25 |

Location: Not specified

Discussion:

Smoking is an effective, primitive way of preserving meats.

African swine disease does not affect sheep and goats.

Sun drying and fermentation get rid of foot and mouth diseases.

Objective may not be very relevant because only 40% of meat is chilled in African countries. People prefer hot meat.

Social behavior and marketing practices would have to be changed.

Not appropriate to small farmer because it requires refrigeration.

Rating: Inappropriate. Could be investigated in U.S. Not applicable to current cultural practices in LDC's.

# TITLE XII PROJECT PROPOSAL

A. TITLE: Lactobacillus Culture and Shelf Live and Safety of Meats

B. PERFORMING ORGANIZATION: Department of Animal Sciences
College of Agricultural Sciences
Colorado State University
Fort Collins, Colorado 80523

C. PERIOD OF PROJECT: Five years

D. BUDGET (Annual):

| Title XII Funds | Private Funds | CSU Contribution |
|---|---|---|
| $24,332 | $3,000 | $8,477 |

E. PRINCIPAL INVESTIGATOR: Byron F. Miller, PhD

F. ABSTRACT:

Meat is very susceptible to decomposition, especially without refrigeration. It can be a means of transmission of disease organisms from the animal population to the consumer. The use of fermentation products show promise of increasing the shelf life of meat products and controlling potential pathogens under in vitro conditions. This project will explore the practical application of using fermentation products from Lactobacillus cultures in meat products to extend shelf life and increase the safety of these foods. Aliquots of various meat products (cured and fresh) will be treated with fermentation products, then challenged with potential pathogen cultures. Aerobic and anaerobic plate counts will be made to determine the survival of the pathogens and the growth of spoilage organisms after various storage periods. These results will indicate the effectiveness of fermentation products for improving shelf life and safety of meat products. The aliquots will be observed for changes in appearance, odor, texture and overall quality.

23. Colorado State University — Predetermining the Reproductive Potential of Rams

Objective: Develop means to evaluate level of fertility and breeding ability of rams.

| | | |
|---|---|---|
| Total Score | | 57/100 |
| a. | Program Significance | 13/30 |
| b. | Institutional Considerations | 16/25 |
| c. | Technical Approach | 15/25 |
| d. | Personnel | 13/20 |

Location: Latin America (no ecozone specified)

Discussion:

Extremely low priority topic for LDC's.

Proposal is to develop basic techniques of use in U.S. - not develop technology transfer to LDC.

Not aimed at small holder.

Might be considered as one of many components in establishing breeding ranches.

Rating: Inappropriate.

23



# TITLE XII PROJECT PROPOSAL

A. TITLE: Predetermining the Reproductive Potential of Rams

B. PERFORMING ORGANIZATION: Department of Animal Sciences
College of Agricultural Sciences
Colorado State University
Fort Collins, Colorado 80523

C. FOREIGN LOCATION: Latin America

D. PERIOD OF PROJECT: Five years

E. BUDGET:

| Year | Title XII | Other |
|---|---|---|
| FY 79 | $102,718 | $32,546 |
| FY 80 | 113,917 | 36,422 |
| FY 81 | 102,526 | 40,920 |
| FY 82 | 112,952 | 43,023 |
| FY 83 | 120,102 | 45,241 |

F. INVESTIGATORS: J. E. Pexton (Principal Investigator)
P. J. Chenoweth
V. B. Swanson ✓

G. ~~ABSTRACT:~~

Development of a means to evaluate and predetermine the level of fertility and breeding ability by a ram has much potential in any sheep program. Rams will be evaluated with respect to scrotal circumference, semen traits, libido and service capacity. Each ram will then be placed with a group of females that will exhibit estrus over a short period of time. During that period each ram will be observed continuously. Total activity (mounts, services, behavior) will be recorded as to which ewe was involved and at what time. Performance (activity, pregnancy rates, lambing rates) and evaluation data will then be analyzed for the development of a means to index rams as to their reproductive potential. A similar approach will be used to evaluate the relative efficiency of multi- vs. single-ram mating programs. A major portion of these investigations will be conducted with domestic sheep to develop a foundation of information which will then be tested with sheep in the foreign country. Based on investigations with bulls and preliminary trials with rams it appears that these types of investigations will provide information applicable to most sheep operations with increased production and efficiency.

4/8

24. Colorado State University — Analysis and Synthesis of Sheep and Goat Production on Grazinglands.

Objective: Obtain information on the area extent, average plant productivity, sheep and goat, and variability and trends in yields of the grazinglands of the world; model these data with climate as the main explanatory variable.

| | | |
|---|---|---|
| Total Score | | 62/100 |
| a. | Program Significance | 15/30 |
| b. | Institutional Considerations | 17/25 |
| c. | Technical Approach | 16/25 |
| d. | Personnel | 14/20 |

Area: Worldwide

Discussion:

PI is foremost modeled of grazinglands in world.

Wants to predict grazing capacity on basis of climatic condition.

Would use published information.

Very familiar with animal production and resources.

There are other constraints than just climate to sheep and goat production.

Results will not help small farmer.

Modeling compiles data, but needs other projects to collect them.

No Colorado State contribution.

No other staff members are mentioned.

You need to know the ultimate capacity of the production system in order to avoid pouring money down the rathole.

Rating: Inappropriate. Exceeds bounds of this project.

24

| | |
|---|---|
| U. S. Institution: | Colorado State University |
| Project Title: | Analysis and synthesis of sheep and goat production on grazinglands |
| Foreign Institutions: | FAO, UNEP, WMO, ILCA, UNESCO and various national government agencies |
| Project Duration: | 5 years |

All over World wide

| Budget: | | |
|---|---|---|
| | Year 1 | $107,200 |
| | Year 2 | 169,100 |
| | Year 3 | 184,400 |
| | Year 4 | 199,900 |
| | Year 5 | 184,600 |
| | Total | $845,200 |

Principal Investigator: George M. Van Dyne

## ABSTRACT

Meat products are an important part of the diet of people in many nations of the world. Ruminants, through their fermentation systems, can convert forage from the world's grazinglands into food for man who otherwise would be unable to use such lands for food production. Yet little has been summarized about the magnitude of forage production on grazinglands and its conversion into animal products, particularly for sheep and goats. We know that it is variable over time and space, but we need to develop models to predict grazingland production as a function of climatic information. With such models we can predict production rates for various areas of the world, and assign probability estimates to our predictions under average and projected climatic conditions. The information to be derived in this study will be distributed to national agencies and international organizations. It will be useful in planning for adequate food availability for human populations. A general work plan, a description of major reports and publications to be derived, and a budget are provided along with information on qualifications of the principal investigator.

25. Colorado State University — Evaluation of Small Ruminant Programs in Iran and Afghanistan.

Objective: Summarize previous experience with small ruminant development programs for the use of governments planning to develop new or expanded programs of sheep and goat production.

| | |
|---|---|
| Total Score | 73/100 |
| a. Program Significance | 23/30 |
| b. Institutional Considerations | 18/25 |
| c. Technical Approach | 16/26 |
| d. Personnel | 16/20 |

Area: Arid and Semi-arid, Iran and Afghanistan

Discussion:

PI is a very hard working person.

Problem is coming up with valid data, especially in Kabul.

Objective is desirable, but more work is needed on approach.

They are considering important factors.

Evaluation of range resources will be difficult because no range specialists or biologist are on the project team.

Evaluation is important because we need a guide to future.

It could be done more quickly over a larger area than just Iran or Afthanistan.

AID has other resources for doing evaluations.

Four years is greatly excessive for an evaluation.

Rating: Marginal. Topic is important. Staffing is deficient in biology. Area needs to be broadened. Could be tied in with proposal 20.

25

Colorado State University

Evaluation of Small Ruminant Development Programs in Iran and Afghanistan

Iran and Afghanistan

Ministry of Agriculture and Pahlavi University and University of Kabul

Four years Title XII funds $217,280.00 Other Support $77,796

Gerald M. Ward, Principal Investigator
Vern B. Swanson
Thomas Sutherland
James Oxley
Melvin Skold
Julius Nagy
Manuel Alers-Montalvo

## ABSTRACT

The objective is to summarize previous experience with small ruminant development programs for the use of governments planning to develop new or ~~expanded programs of sheep and goat production~~ as a means of improving the welfare of people dependent upon these animals. Development plans developed more than a decade ago in Iran and Afghanistan will be reviewed for design, implementation and success of limitations. The Iranian government especially has appropriated considerable financial, scientific and field expertise to promotion of better sheep and goat management. Likewise, large scale reforestration programs on grazing lands have been instituted. Iranian and Afghan results will be compared. Results of these development plans will be summarized and the results analyzed and interpreted with reference to the needs of governments formulating new plans.

52

26. Colorado State University Small Ruminants as Food Sources

Objective: Evaluate the role of small ruminant products in the diet of the target population, determine the nutritional composition of these products as related to storage and preparation, and dehydrate them by means of portable solon dryers.

| | | |
|---|---|---|
| Total Score | | 64/100 |
| a. | Program Significance | 18/30 |
| b. | Institutional Considerations | 17/25 |
| c. | Technical Approach | 15/25 |
| d. | Personnel | 14/20 |

Location: Columbia

Discussion:

Four components: (1) Nutrition status of population; (2) Analyze nutritional content of food; (3) Run sanitation workshops; (4) Introduce solar dehydrators.

Use existing nutrition surveys.

Should be hooked to market as well as subsistence consumption.

They have linkage with Columbia.

Columbia is not a target country for sheep and goats.

Not a critical problem in LDC's.

Solar dryer is not much of an improvement over air drying - only works when the sun shines.

There are other efforts to stimulate cheese making.

Nutrition component has little to do directly with sheep and goats.

There should be some marketing orientation so there will be incentive to increase output.

FAO has been doing nutrition surveys in every nation in Asia. It has done a lot of work on food processing.

Rating: Marginal. Not specific to sheep and goats. Food technology is an area that deserves attention.

26

(1) U.S. Institution:

Colorado State University
Department of Food Sci. and Nutrition
Fort Collins, Colorado 80523

(2) Project Title:

Small Ruminants as Food Sources

(3) Primary Foreign Location:

Columbia, South America

(4) Collaborating Foreign Institution:

Instituto de Investigaciones Technologicas (IIT)

(5) Project Length:

5 years

(6) Total Annual Budget:

| | Year | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Title XII Funds | 25,500 | 15,500 | 11,500 | 12,500 | 13,000 |
| Other Support | 5,660 | 2,260 | 2,260 | 1,130 | 3,400 |

(7) Principal Investigator:

Dr. Joseph A. Maga, Colorado State University
Key Personnel: Dr. Teresa Salazar de Buckle, IIT, Bogota, Columbia.

54

## ABSTRACT

The availability and quality of small ruminant foods is a key factor in the improvement of the well being of target group individuals. The nutritional status of the target group will be initially evaluated as well as the role of small ruminant foods in their diet as influenced by method of preparation. These foods will be analyzed for nutritional content in an effort to pinpoint items or preparation techniques that result in minimum or maximum nutrient retention. The quality of existing foods can be significantly improved by providing sanitation workshops to key personnel. As an aid in food preservation, the use of simple, portable solar collectors, which have the capability of dehydrating foods, will be introduced. Also, new ruminant food items, some of which will be fortified with indegenous crops, will be formulated to have organoleptic properties similar to existing foods. These will be introduced to improve the nutritional status of the target groups. The effectiveness of the overall program will be evaluated by continuously assessing nutritional status as compared to initial nutritional assessment. Adequate training of key personnel within the target groups will assure that the improvement program will continue after project completion.


55

27. Midwest Universities Consortium for International Activities, Inc. — A Collaborative Regional Research Program in International Animal Agriculture.

Objective: Establish a comprehensive, multidisciplinary program to achieve the goal of improved animal production to meet human needs in the LDC's.

| | | |
|---|---|---|
| Total Score | | 74/100 |
| a. | Program Significance | 21/30 |
| b. | Institutional Considerations | 21/25 |
| c. | Technical Approach | 16/25 |
| d. | Personnel | 16/20 |

Area: Southeast Asia

Discussion:

There are about 20 people per sheep and goat in Indonesia but good possibilities exist for increased numbers due to the forage potential.

Need sociocultural project first to see if they drink milk.

Very few goat and sheep in Thailand and Malaysia, but more in Philippines.

Cost is greatly excessive based on the number of animals presently there.

Good people, but not focused, on the problems of sheep and goats.

Australian Development Bureau is doing work on small ruminants in Indonesia.

APHCA is working on the problem.

Rating: Inappropriate. Unfocused. Does not address small ruminants.

# INTAAG

## A COLLABORATIVE REGIONAL RESEARCH PROGRAM IN INTERNATIONAL ANIMAL AGRICULTURE

Sponsored By

Midwest Universities Consortium for International Activities, Inc.

In Collaboration With

INDONESIA
Bogor Agricultural Institute
Gadjah Mada University
Udayana University

MALAYSIA
Agricultural University of Malaysia

THE PHILIPPINES
University of the Philippines at Los Banos

THAILAND
Chiang Mai University
Kasetsart University
Khon Kaen University

---

A Five-Year Program

Total Annual Budget
Title XII $2.5 million
Other $2.1 million

---

John T. Murdock
Executive Director MUCIA
1003 WARF Building
610 North Walnut Street
University of Wisconsin
Madison, Wisconsin 53706
608 263-1950

M. Grossman or K. E. Harshbarger
Department of Dairy Science
University of Illinois
at Urbana-Champaign
Urbana, Illinois 61810
217 333-3462/2626

# INTAAG: A PROGRAM IN INTERNATIONAL ANIMAL AGRICULTURE

## ABSTRACT

The Midwest Universities Consortium for International Activities (MUCIA) proposes a regional program in international animal agriculture in Southeast Asia, INTAAG. The goal of INTAAG is to increase the quantity and quality of the livestock production systems used for food and non-food purposes. Animals, especially ruminant livestock, provide protein of exceptional quality in the form of meat and milk. Such livestock are also a significant source of non-edible items such as skins, wool, organic fertilizer, fuel and draft power. Improved systems of animal production will also contribute to: (1) opportunities for small farmers to improve their economic status, (2) improvement in the nutritional and economic status of the people, and (3) greater overall agricultural and economic development. Improved production, processing, and distribution of food and non-food items would provide increased employment and sustenance directly and indirectly to small farmers and rural people.

INTAAG is a collaborative research/education program related to the problems of small farmers (those with very limited inputs of labor, land, and economic resources) and livestock holders. The Program will use research groups and educational institutions in the U. S., to develop programs in the agriculturally developing countries of Indonesia, Malaysia, the Philippines, and Thailand. The focus will be on ruminant animals (especially goats, but also sheep, cattle, and buffaloes) because of their efficient utilization of available resources.

In November, 1976, MUCIA sponsored a conference to discuss a program in international animal agriculture. Following the conference, an on-site survey was conducted for a month during the summer of 1977. The team visited all the four countries to discuss the program in detail with university administrators and faculty members, USAID officials concerned with livestock, and local government representatives. Each university expressed a strong interest in participating in the program. The results played a key role in the formulation of this proposal.

28. Tuskegee Institute — A Program to Assess the Feasibility of Goat Production in Small-Holder Systems in Tropical Savannahs: sociocultural factors

Objective: Study sociocultural factors and develop extension strategies for small holders in Ivory Coast

| | | |
|---|---|---|
| Total Score | | 68/100 |
| a. | Program Significance | 24/30 |
| b. | Institutional Considerations | 16/25 |
| c. | Technical Approach | 15/25 |
| d. | Personnel | 13/20 |

Location: Humid Tropics (Ivory Coast)

Discussion:

Use objective for total project.

Weak description of approach - what is the relation of Phase 1 to 2 and 3?

Staff commitments not clear - how much time?

Results to specific to Ivory Coast - cannot insure applicability to other areas and systems.

Concern with dissemination (extension) good - should be part of CRSP.

Institution has good experience in area of application.

Rating: Marginal as proposed. May be considered for component in program if integrated into appropriate dissemination program for CRSP.

28

A PROPOSAL

Submitted to

THE RESEARCH TRIANGLE

for Research on

# A PROGRAM TO ASSESS THE FEASIBILITY OF GOAT PRODUCTION IN SMALL-HOLDER SYSTEMS IN TROPICAL SAVANNAHS

A (Socio-Cultural Factors)

By

CARVER RESEARCH FOUNDATION
and
DEPARTMENT OF AGRICULTURAL SCIENCES
School of Applied Sciences
TUSKEGEE INSTITUTE
Tuskegee Institute, Alabama

Submitted by:

DORIS M. OLIVERA,
Principal Investigator

CARVER RESEARCH FOUNDATION

M. A. MALONEY, JR.

L. H. FOSTER, President

B. D. MAYBERRY

PROPOSED FOR A PERIOD OF FIVE YEARS
IN THE IVORY COAST

TOTAL BUDGET:

| | |
|---|---|
| Title XII Funds: | $3,698,400 |
| Tuskegee Institute: | 606,440 |

60

## Abstract

This multidisciplinary program will include research and development in the areas of Animal Breeding and Reproduction, Animal Nutrition, Forage Production, Environmental Physiology, and Socio-Cultural Economics and Extension.

The work will be done in three phases -- over a period of five years. Phase I will take no more than 12 - 15 months and will be to establish linkages, collect data in all areas, determine locations for the research, and constructing research facilities where needed.

During Phase II actual research will be conducted in the LDC to obtain hard data on aspects not easily followed in the real farm setting.

The most important part of this work is that done in Phase III, Evaluation. All areas of investigation will be evaluated with economic considerations in mind. Throughout the project economic considerations will be taken into account -- cost/benefit. All production must lead to an increase in the overall income of the producer or it will not be encouraged.

29. Tuskegee Institute — A Program to Assess the Feasibility of Goat Production in Small-Holder Systems in Tropical Sanvannashs: Health and Reproduction.

Objective: Collect baseline data on health of local goats with their reproductive performance, and determine traits to be emphasized for selection.

| | | |
|---|---|---|
| Total Score | | 70/100 |
| a. | Program Significance | 24/30 |
| b. | Institutional Considerations | 16/25 |
| c. | Technical Approach | 17/25 |
| d. | Personnel | 13/20 |

Location: Humid Tropics

Discussion:

Project is to determine status of local goats.

Poorly defined objectives which aim for everything.

Investigators have little experience in high-level research and proposal demonstrates lack of understanding.

No provision for research, it is just survey and extension.

No research plan.

Rating: Inappropriate. Not a research project.

29

A PROPOSAL

Submitted to

THE RESEARCH TRIANGLE

for Research on

# A PROGRAM TO ASSESS THE FEASIBILITY OF GOAT PRODUCTION IN SMALL-HOLDER SYSTEMS IN TROPICAL SAVANNAHS

B (Health and Reproduction)

By

CARVER RESEARCH FOUNDATION
and
DEPARTMENT OF AGRICULTURAL SCIENCES
School of Applied Sciences
TUSKEGEE INSTITUTE
Tuskegee Institute, Alabama

Submitted by:

DORIS M. OLIVERA,
Principal Investigator

CARVER RESEARCH FOUNDATION

M. A. MALONEY, JR.

L. H. FOSTER, President

B. D. MAYBERRY

PROPOSED FOR A PERIOD OF FIVE YEARS
IN THE IVORY COAST

TOTAL BUDGET:

| | |
|---|---|
| Title XII Funds: | $3,698,400 |
| Tuskegee Institute: | 606,440 |

## Abstract

This multidisciplinary program will include research and development in the areas of Animal Breeding and Reproduction, Animal Nutrition, Forage Production, Environmental Physiology, and Socio-Cultural Economics and Extension.

The work will be done in three phases -- over a period of five years. Phase I will take no more than 12 - 15 months and will be to establish linkages, collect data in all areas, determine locations for the research, and constructing research facilities where needed.

During Phase II actual research will be conducted in the LDC to obtain hard data on aspects not easily followed in the real farm setting.

The most important part of this work is that done in Phase III, Evaluation. All areas of investigation will be evaluated with economic considerations in mind. Throughout the project economic considerations will be taken into account -- cost/benefit. All production must lead to an increase in the overall income of the producer or it will not be encouraged.

30. Tuskegee Institute — A Program to Assess the Feasibility of Goat Production in Small-Holder Systems in Tropical Savannahs: Environmental Physiology

Objective: Study goat shed design and study water deprivation.

| | | |
|---|---|---|
| Total Score | | 60/100 |
| a. | Program Significance | 20/30 |
| b. | Institutional Considerations | 16/25 |
| c. | Technical Approach | 13/25 |
| d. | Personnel | 11/20 |

Location: Humid Tropics

Discussion:

Overall program philosophy quite good: should be included in CRSP.

Poor treatment of the water deprivation issue.

Goat shed design is a very low priority topic.

Proposed team does not show demonstrated capability to do water deprivation work.

Water deprivation is not a high priority researchable issue.

Rating: Inappropriate.

30

A PROPOSAL

Submitted to

THE RESEARCH TRIANGLE

for Research on

# A PROGRAM TO ASSESS THE FEASIBILITY OF GOAT PRODUCTION IN SMALL-HOLDER SYSTEMS IN TROPICAL SAVANNAHS

c (Environmental Physiology

By

CARVER RESEARCH FOUNDATION
and
DEPARTMENT OF AGRICULTURAL SCIENCES
School of Applied Sciences
TUSKEGEE INSTITUTE
Tuskegee Institute, Alabama

Submitted by:

DORIS M. OLIVERA,
Principal Investigator

CARVER RESEARCH FOUNDATION

M. A. MALONEY, JR.

L. H. FOSTER, President

B. D. MAYBERRY

PROPOSED FOR A PERIOD OF FIVE YEARS
IN THE IVORY COAST

TOTAL BUDGET:

| | |
|---|---|
| Title XII Funds: | $3,698,400 |
| Tuskegee Institute: | 606,440 |

} 5 projects

## Abstract

This multidisciplinary program will include research and development in the areas of Animal Breeding and Reproduction, Animal Nutrition, Forage Production, Environmental Physiology, and Socio-Cultural Economics and Extension.

The work will be done in three phases -- over a period of five years. Phase I will take no more than 12 - 15 months and will be to establish linkages, collect data in all areas, determine locations for the research, and constructing research facilities where needed.

During Phase II actual research will be conducted in the LDC to obtain hard data on aspects not easily followed in the real farm setting.

The most important part of this work is that done in Phase III, Evaluation. All areas of investigation will be evaluated with economic considerations in mind. Throughout the project economic considerations will be taken into account -- cost/benefit. All production must lead to an increase in the overall income of the producer or it will not be encouraged.

31. Tuskegee Institute — A Program to Assess the Feasibility of Goat Production in Small-Holder Systems in Tropical Savannahs: Utilization of Crop Residues.

Objective: Determine nutritional value of agricultural by-products and forages and evaluate their use in a feeding program for goats.

| | | |
|---|---|---|
| Total Score | | 63/100 |
| a. | Program Significance | 23/30 |
| b. | Institutional Considerations | 15/25 |
| c. | Technical Approach | 15/25 |
| d. | Personnel | 10/20 |

Location: Humid savannah/Ivory Coast

Discussion:

Overall PI has little research experience.

Training of task leader is not listed.

Subject is very relevant, but the technical approach is weak.

Personnel and institutional considerations are weak.

Lacks depth and specificity.

Subject fits a country development program better than a research program.

International experience is in vocational education, not research.

Rating: Inappropriate. Do not have background in technical ability, personnel and institutional strength to carry out project alone.

31

A PROPOSAL

Submitted to

THE RESEARCH TRIANGLE

for Research on

# A PROGRAM TO ASSESS THE FEASIBILITY OF GOAT PRODUCTION IN SMALL-HOLDER SYSTEMS IN TROPICAL SAVANNAHS

b (Utilization of Crop Residues)

By

CARVER RESEARCH FOUNDATION
and
DEPARTMENT OF AGRICULTURAL SCIENCES
School of Applied Sciences
TUSKEGEE INSTITUTE
Tuskegee Institute, Alabama

Submitted by:

DORIS M. OLIVERA,
Principal Investigator

CARVER RESEARCH FOUNDATION

M. A. MALONEY, JR.

L. H. FOSTER, President

B. D. MAYBERRY

PROPOSED FOR A PERIOD OF FIVE YEARS
IN THE IVORY COAST

TOTAL BUDGET:

| | |
|---|---|
| Title XII Funds: | $3,690,400 |
| Tuskegee Institute | 606.440 |

} 5 proposals

6-9

## Abstract

This multidisciplinary program will include research and development in the areas of Animal Breeding and Reproduction, Animal Nutrition, Forage Production, Environmental Physiology, and Socio-Cultural Economics and Extension.

The work will be done in three phases -- over a period of five years. Phase I will take no more than 12 - 15 months and will be to establish linkages, collect data in all areas, determine locations for the research, and constructing research facilities where needed.

During Phase II actual research will be conducted in the LDC to obtain hard data on aspects not easily followed in the real farm setting.

The most important part of this work is that done in Phase III, Evaluation. All areas of investigation will be evaluated with economic considerations in mind. Throughout the project economic considerations will be taken into account -- cost/benefit. All production must lead to an increase in the overall income of the producer or it will not be encouraged.

32. Tuskegee Institute — A Program to Assess the Feasibility of Goat Production in Small-Holder Systems in Tropical Savannahs: Forage Production.

Objective: Improve the production of forage crops in the Ivory Coast.

| | | |
|---|---|---|
| Total Score | | 59/100 |
| a. | Program Significance | 22/30 |
| b. | Institutional Considerations | 14/25 |
| c. | Technical Approach | 13/25 |
| d. | Personnel | 10/20 |

Area: Tropical Savannah/Tsetse fly, Ivory Coast

Discussion:

Foreign language training budgeted is unrealistically high.

Ivory Coast is developing Savannah for N'dama cattle, not for goats.

Not appropriate for goat production in Ivory Coast, where they are scavengers.

PI is plant physiologist, not agronomist.

Experiment is very elementary and can be done by local people.

Did not define forages, restricted unnecessarily.

Need to see how small ruminants fit into farming systems in forests.

PI has not worked with animals and has no research training.

There is outstanding work being done in Ivory Coast on Guinea grass and root profiles.

Rating: Inappropriate. Goats do not fit into national development plan. Proposal is more appropriate as a country specific implementation project than as a research project.

32

A PROPOSAL

Submitted to

THE RESEARCH TRIANGLE

for Research on

# A PROGRAM TO ASSESS THE FEASIBILITY OF GOAT PRODUCTION IN SMALL-HOLDER SYSTEMS IN TROPICAL SAVANNAHS

E (Forage Production)

By

CARVER RESEARCH FOUNDATION
and
DEPARTMENT OF AGRICULTURAL SCIENCES
School of Applied Sciences
TUSKEGEE INSTITUTE
Tuskegee Institute, Alabama

Submitted by:

DORIS M. OLIVERA,
Principal Investigator

CARVER RESEARCH FOUNDATION

M. A. MALONEY, JR.

L. H. FOSTER, President

B. D. MAYBERRY

PROPOSED FOR A PERIOD OF FIVE YEARS
IN THE IVORY COAST

TOTAL BUDGET:

Title XII Funds: $3,698,400
Tuskegee Institute 606,440

5 proposals

72

## Abstract

This multidisciplinary program will include research and development in the areas of Animal Breeding and Reproduction, Animal Nutrition, Forage Production, Environmental Physiology, and Socio-Cultural Economics and Extension.

The work will be done in three phases -- over a period of five years. Phase I will take no more than 12 - 15 months and will be to establish linkages, collect data in all areas, determine locations for the research, and constructing research facilities where needed.

During Phase II actual research will be conducted in the LDC to obtain hard data on aspects not easily followed in the real farm setting.

The most important part of this work is that done in Phase III, Evaluation. All areas of investigation will be evaluated with economic considerations in mind. Throughout the project economic considerations will be taken into account -- cost/benefit. All production must lead to an increase in the overall income of the producer or it will not be encouraged.

33. University of Minnesota — Establishing a Scientifically Sound Data Base on the Genetics and Breeding, Nutrition and Feeding and Reproductive Physiology of Sheep and Goats in Northwest Africa

Objective: Establish breeding program with Vet Institute in Morocco and develop feeding system for small ruminants in Northwest Africa (mainly Morocco).

| | | |
|---|---|---|
| Total Score | | 75/100 |
| a. | Program Significance | 22/30 |
| b. | Institutional Considerations | 19/25 |
| c. | Technical Approach | 17/25 |
| d. | Personnel | 17/20 |

Location:

Discussion:

May be more appropriate to JCAD given the single country focus.

Procedures may be unnecessarily complicated given the breeding objectives.

Applicability is quite far off (all breeding programs require quite a bit of development time).

Research design is technically sound.

Very low contribution of university of budget.

Low time commitment of PI.

Rating: Good/Marginal. Recommend for JCAD.

Cover Sheet and Abstract of Proposal on Small Ruminants.

1. The U.S. eligible institution: The College of Agriculture of the University of Minnesota at St. Paul, Minnesota.
2. The name of the project: Establishing a Scientifically Sound Data Base on the Genetics and Breeding, Nutrition and Feeding and Reproductive Physiology of Sheep and Goats in Northwest Africa.
3. The foreign research will be done mainly in Morocco, but part of the work of assessing what sheep and goats actually eat will be done in countries such as Mauritania, Mali and Niger.
4. Collaborating foreign institution: The Hasan II Institute of Agriculture and Veterinary Medicine in Rabat, Morocco, and other institutes and agencies as necessary.
5. Duration of project: It is anticipated that the project will require 10 years.
6. Total annual budget $ 1,250,000 (1st year $1,887,912)

   Title XII $ 1,100,000 ← Other Funds $ 150,000
7. Key personnel:

   20% R. W. Touchberry; Principal Investigator, Animal Genetics and Breeding.

   30% W. J. Boylan; Sheep Genetics and Breeding.

   15% R. D. Goodrich; Ruminant Nutrition.

   15% E. F. Graham; Reproductive Physiology and Artificial Insemination.

   20% R. M. Jordan; Sheep Management and Feeding.

   100% J. B. Williams; Management of Sheep and Goats.

Abstract:

To have a viable system for producing sheep and goats in Northwest Africa and other parts of the world it is essential to have scientifically sound information on the genetics and breeding, nutrition and feeding and reproductive physiology of sheep and goats. It is proposed to evaluate breeds and breed crosses for such traits as reproductive performance, viability, growth rate, milk production and carcass quality. To do this the breeds considered to have the greatest genetic potential for Northwest Africa will be obtained in sufficient numbers to make a diallel cross among native breeds and in addition, crosses of the native breeds of ewe with rams from carefully chosen imported breeds. Breed groups obtained from these crosses should lead to the establishment of highly productive sheep and goats for Northwest Africa. Males from these highly productive synthetic lines would be used in an A.I. program to genetically improve the sheep and goats in settled and transhumant herds. Scientifically sound feeding recommendations will be developed and taken to settled and transhumant herders. These recommendations will be based on information obtained from surveys on the eating habits of goats and sheep, from chemical analyses of feedstuffs and from feeding trials with sheep and goats.

34. Utah State University — Increasing Small Ruminant Production in Arid and Semi-Arid Regions Through Genetic Improvement and Rangeland Development.

Objective: Improve genetic capability of local breeds of small ruminants and develop management systems for optimizing the use of forage production on rangelands.

| | | |
|---|---|---|
| Total Score | | 82/100 |
| a. | Program Significance | 24/30 |
| b. | Institutional Consideration | 20/25 |
| c. | Technical Approach | 21/25 |
| d. | Personnel | 17/20 |

Area: Arid, Semi-arid, Highland Pakistan

Discussion:

Wise program to improve breeds.

Only serious weakness is cost and long period of time.

Highly qualified people with good experience.

No subsahara component; needs to be tied in with Africa; AID is putting range management people in Mali, Kenya, Botswana.

Need to look at all methods of range improvement.

Don't separate sheep from goats. There are many more goats in Pakistan, but there are sheep in other areas.

Need to relate nutrition to reproductive traits.

There is a new FAO study on range resources.

It canns for a field team and an implementation program.

Better to have at more than one location in LDC's to insure applicability.

They provide a lot of matching funds.

Good probability of success.

Rating: Outstanding. Need to reduce cost and expand geographic coverage.

34

# Cover Sheet and Abstract

## A Proposal for a Title XII Collaborative Research Support Program on Small Ruminants

Eligible U.S. Institution: Utah State University, Logan

Sub-contractor Eligible Institution: California State Polytechnic University, Pomona

Title of Proposed Project: Increasing small ruminant production in arid and semi-arid regions through genetic improvement and rangeland development.

Suggested Foreign Location: Pakistan (or other countries such as Afghanistan, Morocco, Peru, Bolivia).

Foreign Collaborating Institution: University of Agriculture, Lyallpur, Pakistan

Period of Project: 10-15 years

Total Annual Budget (first year): Title XII funds - $1,050,000; Other support - $1,085,000. (Does not include budget for Sub-contractor Eligible Institution.)

Principal Investigators and Other Key Personnel: Principal investigator - Warren C. Foote; Co-principal investigators - Darrell H. Matthews, John C. Malechek, William F. Farnsworth; Key personnel - Jay W. Call, ~~Philip J. Urness, J. Juan Spillett,~~ Thomas D. Bunch, Brien E. Norton, Rex L. Hurst, Jon Moris, Nyle J. Matthews, Norris J. Stenquist.

Abstract: Small ruminants are natural, renewable resources which can be used to increase food and fiber production in LDC's. The vast rangeland areas provide renewable feed resources which small ruminants have a unique capacity to convert to products for human use. This proposal has four objectives each representing an interrelated project using these resources to improve the well being of people in the LDC's. The fourth objective is presented as a separate cooperative proposal by California State Polytechnic University - Pomona. The first objective of this proposal is to increase the genetic producing ability beginning with selection among and within indigenous genotypes coupled with crossbreeding and new genotype development in local environments. Appropriate management programs will be developed to assure genetic expression. A second objective is to develop management technology for improving the rangeland forage base upon which these animals feed. A third objective is to develop methods to implement these programs, within the limits of local socio-economic constraints to be provided through training, demonstration and extension for use by the local producers. The achievement of these objectives will make available the means for initial and continuing improved production from small ruminants using primarily local resources.

78

35. University of Vermont — Mineral Supplementation of Forage Rations for Small Ruminants

Objectives: Develop methods to supplement minerals (phosphorous) in grazing.

| | |
|---|---|
| Total Score: | 52/100 |
| a. Program Significance | 15/30 |
| b. Institutional Considerations | 13/25 |
| c. Technical Approach | 13/25 |
| d. Personnel | 11/20 |

Location: Not specified

Discussion:

(1) Minerals are a general problem area.

(2) Technical approach to the problem is inadequate.

(3) Vermont is not the location to do the work - no LDC connection.

(4) No demonstrated capability to apply to LDC's.

Rating: Inappropriate.

35

VERMONT AGRICULTURAL EXPERIMENT STATION
Burlington, Vermont

Department of Animal Sciences

I Title: Mineral supplementation of forage rations for small ruminants.

II Justification: Grazing ruminants have survived and prospered over the ages on forage alone. This does not mean that optimum reproduction and growth for man's utilization were obtained. One common limiting factor in forage rations is mineral nutrients. The potential list includes Sodium Chloride Phosphorus, Magnesium, Selenium, Copper, Cobalt, Iodine, Zinc and Manganese. The alleviation of mineral deficiencies in grazing animals presents special problems as no mixed feed or controlled feeding is employed. If minerals are consumed it must be on a voluntary basis.

III Previous work and present outlook: The primary method of feeding minerals to grazing animals in the past has been to offer mineral preparations free choice. Early investigators observed phosphorus deficient cows chewing bones and reported that bone meal offered free choice was consumed in sufficient quantities to alleviate the phosphorus deficiency. (1) From these findings and from the general observation that sodium chloride deficiency was easily alleviated by providing a salt lick, there developed the idea that specific appetites for minerals were common and deficient animals had the ability to detect specific minerals and consume them when needed.

Experimental results at this station (2) have cast serious doubts on this idea. Mature ruminants with severe phosphorus deficiency were unable to solve their problem when offered phosphorus containing mineral supplements including bone meal, dicalcium phosphate and monosodium phosphate. In some instances they preferred sandy soil. Results from calcium

80

deficiency experiments were similar with an occasional animal consuming large excesses while most animals consumed very little. These results are supported by those of Coppock et al. (3) working with cattle and Pamp et al (4) working with sheep. Larsen et. al (5) however, reported that free choice mineral consumption was related to lactation demand and was associated with mineral content of forage in a large dairy herd.

Specific appetites in mammalian systems have been established for sodium (6), protein (7), thiamin (8) and water (9), and it would appear that energy is probably the major single factor controlling feed intake (10) once the bulk of the ration is reduced to allow for accomodation in the GI tract (11). Nerve responses to different required mineral elements in experiments with isolated neurons have been recorded (12). Although these experiments were not conclusive in the functional nutrient receptor question, the classical concepts of taste components (sweet, sour, salt and bitter) leave little room for specific ion recognition and response. It is also unlikely that mineral nutrients could produce olfactory stimuli. A recent report from experiments using rats (13) indicates the existence of sensing mechanisms in the upper GI tract which are capable of influencing appetite for specific substances. Calcium deficient rats have been shown to have a specific appetite for calcium containing rations with $CaSO_4$ and $Ca_3(PO_4)_2$ being more effective than $CaCO_3$ (14). Chickens have the ability to alter their intake of oyster shell or calcite to meet the requirement for egg shell production. This response is partially a learned response and depends on group feeding for it to be a success (15).

Adam (16) found that potassium deficient rats had preference for novel diets regardless of the potassium content. If a K deficient novel diet was offered and K was added to the standard ration, the novel diet was preferred,

81

maintaining the deficiency. If, however, the K was added to the novel diet, the novel diet would be consumed and the deficiency alleviated. One of the first phosphorus deficiency symptoms is a general depraved appetite or pica (1). The exact relationship between specific appetites, general pica, and learned response is unclear at the present time.

Objectives: 1. To determine the factors stimulating and controlling voluntary intake of mineral materials.

2. To determine the most practical methods for mineral supplementation of grazing animals.

Procedures:

General Approach

Areas of investigation will be divided into two parts, one to be carried out in the U.S. and the second in a suitable foreign country.

First: Factors which control voluntary intake of mineral materials. Basic investigations will be carried out to add to the available knowledge for practical application.

Second: Practical methods must be developed to supplement grazing animals in specific areas with a given set of management practices and available mineral materials. As phosphorus is the mineral most commonly deficient in the ration of grazing aniamls it will be used as a model. Other minerals critical in specific situations could be investigated as well using similar techniques.

Basic Studies

Current evidence indicates that there is no true specific appetite for phosphorus. Thus intake must be motivated by learned response, pica,

combination of phosphorus compounds with palatable materials, or transient feelings of positive gastric sensation following ingestion of phosphorus supplements.

Mature lactating ewes will be the favored experimental animal as the increased requirements for lactation allow for the development of the deficiency in a relatively short time. The ewes will be fed beet pulp, 0.09% phosphorus, grass hay, 0.15-0.19% phosphorus, and vitamin and mineral supplements as required. The ration will contain approximately 0.12% phosphorus or about 60% of the established (17) requirement. The development of the deficiency will be evaluated using blood phosphorus concentrations and the development of pica. Phosphorus deficient sheep will than be offered phosphorus supplement mixed with sodium chloride or small amounts of molasses to encourage consumption. The intake stimulating substance will be gradually removed to determine if a learned appetite to the phosphorus supplement (monsodium phosphate) has been developed.

The free choice phosphorus supplements will be offered in group feeding situations as group feeding has been found necessary in chickens for the development of learned response to free choice offerings of calcium supplements.

Following the development of maximum free choice phosphorus mineral consumption in group situations, individual consumption will be determined. This is necessary as previous results indicate (18) a wide variation in voluntary consumption of mineral material from zero to many times the requirement.

Phosphorus deficient ewes, will be placed in standard metabolism units immediately following weaning, and will be fed the phosphorus deficient ration. Phosphorus supplement will be offered and the success of the free choice intake in meeting the ewes needs will be evaluated on the basis of the phosphorus balance.

36. University of Hawaii. Manoa — Tropical Small Ruminant Management Training and Research Center

Objective: Develop and operate training program for small ruminant production.

| | | |
|---|---|---|
| Total Score | | 62/100 |
| a. | Program Significance | 20/30 |
| b. | Institutional Considerations | 15/25 |
| c. | Technical Approach | 14/25 |
| d. | Personnel | 13/20 |

Location: Hawaii

Discussion:

Country oriented project, rather than research project.

Volcanic soils in Hawaii are not typical of most tropical soil.

Climate and feed supply are not similar to Africa, etc.

There are no facilities for sheep and goats and they do not have any small ruminants.

Rating: Inappropriate. Not a research project. No institutional background in small ruminants.

Institution: College of Tropical Agriculture
University of Hawaii
Honolulu, Hawaii 96822

Project Title: Tropical Small Ruminant Management Training and Research Center

Abbreviated Title: Tropical Small Ruminant Center

Project Duration: 5 years

Annual Budget:

| | |
|---|---|
| A. Title XII Funds ..... | $250,000 |
| B. Other Support ..... | |
| State of Hawaii Support ..... | 50,000 |

Personnel: James C. Nolan, Jr., Principal Investigator
Charles M. Campbell
Steven E. Olbrich
Richard W. Stanley

Abstract:

We at the University of Hawaii recognize sheep and goats as important animals for small land holders especially in developing tropical and semi-tropical countries. Sheep and goats are uniquely qualified to make major contributions to productive agriculture in many developing countries by effectively utilizing lands in many ecological zones that are suited to grazing but unsuited to cropping, and by utilizing forages, crop residues and other feeds in small diversified farming systems.

We recognize that the efficient production of sheep and goats and their products requires a comprehensive "package" or system of management for small land holders. The major categories of the system would include (a) feed supplies and animal nutrition (b) animal husbandry and management (c) disease control and prevention (d) animal improvement (e) breeding and breeding systems and (f) marketing.

The climatic conditions and soil type in Hawaii are similar to other tropical and sub-tropical areas making Hawaii an ideal location for a tropically oriented training and research center with good transferability to developing countries.

37. Ohio State University — Small Ruminant Production and Product Utilization in Northwestern India

Objectives: 1) Improve the efficiency of small ruminant production systems on small farms; 2) improve the efficiency of processing and utilization of small ruminant products; and 3) determine potential of small ruminants for improving nutritive status of people.

| | | |
|---|---|---|
| Total Score | | 75/100 |
| a. | Program Significance | 24/30 |
| b. | Institutional Considerations | 21/25 |
| c. | Technical Approach | 17/25 |
| d. | Personnel | 13/20 |

Location: Northwestern India

Discussion:

Lacks specificity in emphasis, but is very specific in geographic area (mostly goats are in the area).

Strong institutional relationships exist.

Could incorporate flock health concept.

Indian scientists have capability to carry out work.

There is a need for system approach to small holder goat project (landless agricultural labor). The flock health concept could be incorporated in such a systems approach.

It might be better to do systems package in Bangladesh.

It might be good to study different production systems in India, taking advantage of their expertise (one system is the landless goat owner).

Systems approach allows for multidisciplinary attack and can be tied into models with application.

Summary - 1) do systems analysis of Indian experience.
2) baseline studies in Bangladesh.

There is strong health effort by ODM in Bangladesh.

Rating: Good. Health component is strongest. Need in India is for systems study. The need is more urgent in Bangladesh.

37

THE OHIO STATE UNIVERSITY

(The Ohio Agricultural Research and Development Center,
Ohio Cooperative Extension Service,
OSU College of Agriculture and Home Economics, and the
College of Veterinary Medicine)

A Collaborative Research Program Proposal under Title XII

Topic: SMALL RUMINANT ANIMAL PRODUCTION AND PRODUCT UTILIZATION IN NORTHWESTERN INDIA

A 10-year program, 1979-1988

Budget, Preliminary Estimate, First 5 years.

| | |
|---|---|
| Total, about | $600,000 per year |
| Title XII, about | 500,000 per year |
| OSU, about | 100,000 per year |

## ABSTRACT

The Ohio State University is proposing a collaborative research program on small ruminant animal production and product utilization in northwestern India. The collaborators in India will be the agricultural universities in northwestern India, and the research institutions, state and national, in that area.

Linkages with these institutions were developed between 1955 and the present time. Many of the scientists and professionals with these Indian institutions have taken their graduate work at The Ohio State University. With collaborative research, it is believed that the production and utilization of small ruminants in India could be increased with greater efficiency and with higher incomes for some of the lowest income people of India. It would be of mutual value to both Ohio/U.S., and India.

This should be a long term program with a very practical approach toward solving the problems of the development and utilization of small ruminants.

87

38. Ohio State University — Small Ruminant Animal Production and Product Utilization in Northeast Brazil, Carribean, and Central America

Objectives: Total CRSP Proposal: Work in eight areas - coverage of complete production factors.

| | | |
|---|---|---|
| Total Score: | | 71/100 |
| a. | Program Significance | 22/30 |
| b. | Institutional Considerations | 20/25 |
| c. | Technical Approach | 15/25 |
| d. | Personnel | 14/20 |

Location: Humid Tropics (Latin America)

Discussion:

(1) No specific investigators proposed by subject area.

(2) No detail on what work would be done.

(3) Brazil is not a high priority LDC.

(4) No LDC collaborators specified, but list provided.

(5) OSU has good track record.

(6) Have not listed top OSU experts as PI's.

(7) Have wealth of experience but not sufficiently incorporated in proposal as written.

(8) Focus on hair sheep - promising potential but little explored in other proposals.

Rating: Marginal/good

37

THE OHIO STATE UNIVERSITY

(The Ohio Agricultural Research and Development Center,
Ohio Cooperative Extension Service,
OSU College of Agriculture and Home Economics, and the
College of Veterinary Medicine.)

A Collaborative Research Program Proposal under Title XII

Topic: SMALL RUMINANT ANIMAL PRODUCTION AND PRODUCT UTILIZATION IN NORTHEASTERN BRAZIL, CARIBBEAN, AND CENTRAL AMERICA.

A 10-year Program, 1979-1988

Budget, Preliminary Estimate, First 5 years.

| | |
|---|---|
| Total about | $600,000 per year |
| Title XII, about | 500,000 per year |
| OSU, about | 100,000 per year |

## ABSTRACT

The Ohio State University is proposing a collaborative research program on small ruminant animal production and product utilization in northeastern Brazil, Caribbean, and Central America. The collaborators in these Latin American areas will be the Colleges of Agriculture and the Research Institutions, state and national.

The Ohio State University is acquainted with some of the institutions and scientists in these Latin American areas, and have indications that strong interests for collaboration exist. However, the first phase of the program would be to develop further the linkages, evaluate the status of the small ruminant animal development, and plan the projects around priority problems.

The potential for improvement of efficiency of production, of greater utilization of small ruminants and improvement of incomes of low income farmers is great in these Latin American areas. Collaborative Research in these areas would relate closely to ongoing research in Ohio, especially in the area of breeding and genetics and would be mutually beneficial to both Ohio/U.S. and the Latin American areas.

This should be a long term program with a very practical approach toward solving the problems of the development and utilization of small ruminants.

89

39. Oregon State University — Development of Vaccines Against Fasciola hepatica and Gastrointestinal Nematodes.

Objective: Isolate, purify and characterize antigens of the liver fluke and evaluate the protective quality of the antigens for use as vaccines.

| | | |
|---|---|---|
| Total Score: | | 70/100 |
| a. | Program Significance | 21/30 |
| b. | Institutional Considerations | 16/25 |
| c. | Technical Approach | 17/25 |
| d. | Personnel | 16/20 |

Location: Warm tropics, Peru, Columbia, Egypt

Discussion:

Liver fluke is major constraint to small ruminant production.

Considered to be good approach.

Development of antigens to parasites in artificial hosts is not a preferred approach.

Sophisticated approach proposed is prohibitively expensive in LDC's, considering the current state of the art.

Work can be done more cheaply here.

Similar diseases exist here.

We need 10 more years of basic research.

Rating: Inappropriate. Lack of State-of-Art. Inapplicable in LDC's. Could be done better in U.S.A. at this time.

39

1. U.S. Institution: School of Veterinary Medicine
Oregon State University
Corvallis, OR 97331

2. Project Name: Development of Vaccines Against Fasciola hepatica and Gastrointestinal Nematodes.

3 & 4. Name and Location of Collaborating Foreign Institions:

University of San Marcos, Lima, Peru
University of Columbia, Bogota, Columbia
Cairo University, Cairo, Egypt

5. Project Length: five years.

6. Total Annual Budget:

| Year | Title XII to Foreign Institution | To OSU | Total Title XII to OSU and Foreign Institution | Contribution by OSU |
|---|---|---|---|---|
| 1979 | --- | $52,000 | $52,000 | $18,000 |
| 1980 | $25,000 | 55,500 | 80,500 | 19,260 |
| 1981 | 19,500 | 60,000 | 79,500 | 20,600 |
| 1982 | 17,000 | 57,500 | 74,500 | 22,000 |
| 1983 | 20,500 | 61,000 | 81,500 | 24,000 |

7. Principal Investigator: Gary L. Zimmerman, D.V.M., M.S., Ph.D.,
Assistant Professor
Veterinary Parasitologist

Other Key Personnel: E. E. Wedman, D.V.M., M.P.H., Ph.D.,
Dean, School of Veterinary Medicine
Oregon State University

J. A. Schmitz, D.V.M., Ph.D.,
Assistant to the Dean for Research and Service
School of Veterinary Medicine
Oregon State University

A. M. Craig, Ph.D.,
Research Associate

Research Assistant (un-named, to be hired, M.S. degree in parasitologist, immunology, or biology)

Laboratory Technician II (un-named, to be hired, B. S. degree in biology)

91

## ABSTRACT

Helminth parasites (particularly liver flukes and gastrointestinal nematodes) cause tremendous world-wide losses of animals, animal growth potential and animal products. Anthelmintic compounds as anti-parasite drugs are generally effective against mature or adult parasites, whereas the most severe damages are caused by the immature parasites. Our research will focus on prevention of parasitism (prior to severe damage) by immunization rather than treatment with anthelmintics after initial damage has occurred. We will isolate, purify and analyze antigens of the common liver fluke, Fasciola hepatica, and gastrointestinal nematodes of small ruminants. These antigens will then be evaluated as to their protective quality in preventing parasitic infections from causing even initial damage. Thus, our predicted results are the production of vaccines to prevent parasite damage and avoid development of drug resistance as occurs with the use of parasiticides. This will result in a significant increase in small ruminant production by reducing damage caused by parasitism. Fascioliasis and gastrointestinal nematodiasis are ubiquitous problems shared by nearly all countries, especially developing countries. Although our proposal is to collaborate with specific foreign institutions, the above forms of parasitism are seen world-wide and methods of prevention can have global significance.

40. Florida A & M University — Increasing Goat Production in Jamaica through Breeding and Forage Production

Objective: Assess the nutritional and breeding problems of goats in Jamaica; improve the production and preservation of forages; improve the productivity of dairy goats through breeding.

| | | |
|---|---|---|
| Total Score: | | 57/100 |
| a. | Program Significance | 21/30 |
| b. | Institutional Considerations | 12/25 |
| c. | Technical Approach | 14/25 |
| d. | Personnel | 10/25 |

Discussion:

Calls for survey rather than research.

No university contribution is proposed.

Personnel and facilities are too limited.

Weak background in breeding and genetics.

Jamaica may be a good location because of the large number of goats.

Have good grass production but preservation would be good idea.

School does not make a commitment.

Three parts of project do not fit--nutrition and breeding are thrown together with extension.

Forage preservation is not a research project.

Rating: Inappropriate. Could be off-shoot of another project on N.E. Brazil and Carribbean. Not adequate on technical and personnel grounds.

1. TITLE XII PROGRAM: Small Ruminant Nutrition

2. ELIGIBLE INSTITUTION: Florida Agricultural and Mechanical University
Tallahassee, Florida 32307

3. TITLE OF PROPOSED PROJECT: Increasing Goat Production in Jamaica Through Breeding and Forage Preservation

4. FOREIGH LOCATION : Jamaica

5. COLLABORATING FOREIGN INSTITUTION: Direct Working Relationships will be Established after Initial Survey and Contact with Jamaican Institution

6. PERIOD OF PROJECT IN YEARS: Five Years for Nutritional Phase: Eight Years for Breeding Phase

7. TOTAL APPROXIMATED ANNUAL BUDGET TITLE XII FUNDS: $92,000. Ave.
UNIVERSITY SUPPORT:
See Budget page.

8. NAMES OF THE PRINCIPAL INVESTIGATOR AND/OR KEY PERSONNEL:
Lee E. Evans -Principal Investigator
Nathaniel Saylor- Assistant

Lee E. Evans

9. Clifton F. Savoy,
Title XII Programs Director
Florida A&M University

Clifton F. Savoy

10. Abstract:

Economical methods of increasing food production throughout the world are needed. This proposal is designed to increase goats production in Jamaica through breeding and forage preservation. Availability of feed throughout the year is a factor affecting goat production. This study deals with ways of preserving forages during the most productive season to be utilized during the least productive season. Consideration will be given to type of crops, harvesting, processing, storage and providing a balanced ration. Economic factors in terms of cost of equipment and storage facilities are of vital concern. A five-year period is suggested for this part of the project.

A breeding program will be designed to improve the quality of Animal needed for increased production. This will consist of crossing animals having specific desirable traits with other animals of different desirable traits. An intensive selection program will be carried out to secure the best animals. Eight years is suggested for this part of the project.

As information is received it will be distributed to goat producers. Governmental agencies and educational institutions of Jamaica will be utilized to facilitate the distribution of the results of this project.

9/1

41. North Carolina State University — Intensive Management Systems for Small Ruminants

Objectives: Determine effects of cell-wall fiber components of forages and plant by-products on digestibility, intake and productivity of goats and sheep.

| | | |
|---|---|---|
| Total Score: | | 80/100 |
| a. | Program Significance | 23/30 |
| b. | Institutional Considerations | 21/25 |
| c. | Technical Approach | 20/25 |
| d. | Personnel | 16/20 |

Location: Densely settled, South America, Southeast Asia

Discussion:

Strong training development.

Could be done in Caribbean location as well as in Andean country.

PI is very experienced in LDC's.

Utilization of lignin in cellulosic material is very important to ruminant nutrition.

This factor relates to selection of forage materials.

Feed additives component is not as strong as the forage utilization part.

Animal breeding does not fit as well but could be tied in with other activities. This PI is considered very highly, especially in sheep husbandry.

Not very much would be done in LDC.

Fits pattern of Title XII

Rating: Good plus (conditional). Separate nutritional component and focus attention on it. Explore possibility to tie in breeding with other projects. Be more specific about LDC activities.

41

# SMALL RUMINANT RESEARCH PROPOSAL FOR TITLE XII FUNDING

Submitting Institution: NORTH CAROLINA STATE UNIVERSITY, Raleigh, N. C. 27650

Project title: Improved Intensive Management Systems for Small Ruminants in Highland, Densely Populated Rural, and Urban Fringe Areas of the Tropics (Short title: INTENSIVE MANAGEMENT SYSTEMS FOR SMALL RUMINANTS)

Foreign Locations: Andean Region of South America (Primary)
Southeast Asia, East Africa (Secondary)

Collaborating Foreign Institution(s): To be identified (see text discussion)

Duration of Project: Five years

Total Budget:

| | Title XII Funds | Other Support |
|---|---|---|
| FY 1979 | $ 90,000 | $122,500 |
| 1980 | 184,000 | 131,500 |
| 1981 | 204,500 | 139,500 |
| 1982 | 218,000 | 142,500 |
| 1983 | 172,000 | 145,500 |
| 5-year total | $868,500 | $681,500 |

Principal Investigators: Warren J. Croom, Assistant Professor of Animal Science
Lemuel Goode, Professor of Animal Science
William L. Johnson, Associate Professor of Animal Science

## ABSTRACT

Research: This proposal gives concentrated focus to three interrelated research topics: (1) the effect of dietary fiber components on digestibility, intake and animal productivity; (2) the use of feed additives to increase the efficiency of rumen conversions; and (3) intensive evaluation of the Barbados Blackbelly breed and its crosses for adaptation to tropical conditions. These three projects were chosen because of their central importance to the ongoing Animal Science program in North Carolina, their complementarity to each other, and their significance within a total systems approach for intensive management in the tropics. The complementarity of domestic and foreign objectives is expected to contribute to a maximized probability of success for both. Training: A strong component of scientist training and development is envisioned. Participating degree candidates will conduct thesis research at overseas sites whenever feasible. Postdoctoral positions will be used for updating or redirection of staff from collaborating institutions. Traineeships will concentrate in the above three focal research areas but will also be available in the related disciplines that are needed to achieve a balanced, total management competence at the collaborating institution. Application: To ensure applicability of results and to achieve the goal of helping small farmers, one or more pilot management projects will be established within the geographic area served by each overseas collaborating institution. A visiting scientist from North Carolina State University will be provided through this project to help coordinate the pilot management program as well as other overseas components of the project.

42. University of Delaware — Dairy Goat Project International

Objectives: Make available translations of foreign research to the English literature; hold international conference on dairy goats; establish chair in goat production.

Total Score: 57/100

| | | |
|---|---|---|
| a. | Program Significance | 15/30 |
| b. | Institutional Considerations | 15/25 |
| c. | Technical Approach | 14/25 |
| d. | Personnel | 13/20 |

Location: Panama, Costa Rica

Discussion:

Request for funds to stage symposium and support chair of dairy goat science.

There is merit in a symposium because it would cut across all areas of world, both temperate and tropical.

Little scientific information is available about the dairy goat, such as whether it is more efficient than the dairy cow, and if so, why.

UN might be better sponsor of a symposium than AID.

AID funds cannot support a chair.

There is a planned third conference on goat health.

Rating: Inappropriate. Symposium might be taken up by consortium. Consideration of symposium is premature at this time, but it merits consideration at some later appropriate time.

42

UNIVERSITY OF DELAWARE
NEWARK, DELAWARE
19711

COLLEGE OF AGRICULTURAL SCIENCES
DEPARTMENT OF ANIMAL SCIENCE AND
AGRICULTURAL BIOCHEMISTRY
028 AGRICULTURAL HALL
PHONE: 302-738-2524

January 30, 1978

PROPOSAL FOR TITLE XII COLLABORATIVE RESEARCH SUPPORT: (according to format of Research Triangle Institute Report, RM 23U-1527, Dec. 30, 1977).

1) U.S. INSTITUTION: University of Delaware, College of Agricultural Sciences, Agricultural Experiment Station & Cooperative Extension Service, Newark, Delaware, 19711.

2) TITLE OF PROJECT: Dairy Goat Project International.

3) & 4) FOREIGN LOCATIONS AND NAMES: a) University of Panama, Faculty of Agriculture, Panama City, Panama.

b) University of Costa Rica, Faculty of Agriculture, San Jose, Costa Rica.

c) University of Tehran, Faculty of Agriculture, Karaj, Iran.

5) DURATION: 5 years, renewal after review for 5 more years.

6) BUDGET: Matching contributions between University of Delaware, Title XII funds and other funds, e.g. PL 480 funds. Initial committment of University of Delaware funds has been secured as of 1/10/78 per memo from University of Delaware Title XII Coordinator Dr. M. C. Pleass on direction of University Provost Dr. L. L. Campbell.

a) International Multilingual Symposium on Dairy Goat Production $42,000.-

b) International Chair of Dairy Goat Science $80,000.- each year for the duration of the project, not including inflation allowances.

98

The relative contributions to be made toward this budget by the various parties involved will be clarified as the response to the proposal becomes evident. However, it is clear that the chairperson will often bring sabbatical funds and that both the Agricultural Experiment Station and the University of Delaware are prepared to provide support in appropriate measure.

7) PRINCIPAL AND OTHER U.S. COOPERATORS: George F. W. Haenlein, Ph.D. dairy science, principal proposer and coordinator,

Cooperators:

R. L. Salsbury, Ph.D., in vitro ruminant nutrition,

R. E. Fowler, Ph.D., sheep and livestock science,

W. C. Liebhardt, Ph.D., corn and sorghum production,

M. R. Teel, Ph.D., mineral nutrition of plants,

L. J. Cotnoir, M.S., soil science,

J. G. Elterich, Ph.D., production economics,

E. P. Catts, Ph.D., entomology and parasitology,

W. F. Ritter, Ph.D., engineering of waste management,

G. F. Somers, Ph.D., biology of halophytic feed plants,

M. N. Islam, Ph.D., food science,

E. H. Schabinger, B.S., extension education,

C. D. Passmore, B.S., farm production,

R. H. Stoneback, D.V.M., goat veterinarian, private goat breeder and national goat judge.

8) ABSTRACT:

The proposal intends to (1) make available translations of foreign research, some for the first time to the English literature and (2) provide training

and research at the University of Delaware for foreign scholars and extension personnel interested in dairy goats so that it may benefit goat production upon return to their home country, specifically Panama, Costa Rica and Iran; including a scholar exchange with these countries. Dairy goat research data are sparse in the English scientific literature, especially concerning nutritional requirements of goats, while a fair amount can be found in German, French, Norwegian, Italian, Spanish, Indian and Turkish publications which when published through the proceedings of an International Multilingual Symposium on Dairy Goat Production should substantially aid U.S. efforts in trying to help foreign countries improve their dairy goat production systems for the benefit of rural development, the small farmer and urban poor. Scholar exchange, research in dairy goat nutrition, particularly ~~mineral nutrition~~, and training in cooperative extension work should help establish a viable dairy goat production system in Panama and Costa Rica where it is presently non-existent, and improve dairy goat production in Iran, in order to provide for their people more adequate levels of nutritionally important animal protein which presently are only at 20 to 50% of those of developed countries.

43. Montana State University — Range and Livestock Management to Improve Sheep and Goat Production

Objectives: Develop grazing management systems and identify locally adopted breeds to improve productivity of extensive systems.

| | | |
|---|---|---|
| Total Score: | | 74/100 |
| a. | Program Significance | 22/30 |
| b. | Institutional Considerations | 18/25 |
| c. | Technical Approach | 18/25 |
| d. | Personnel | 16/20 |

Location: Not specified - Arid/semi-arid or Highlands area likely.

Discussion:

(1) Does incorporate both grazing land management and breeding.

(2) No specific site selected.

(3) Questionable amount of experience of PI in target area.

(4) Breeding component methods good but range management approach problematic.

(5) Good approach in establishing LDC-centered work plan.

(6) Long lead time (planning stage) required in forage component.

(7) Questions about benefits of project relative to costs.

(8) One of better projects from ILCA's perspective (fits into systems approach).

(9) Question of finding appropriate location for long-term project.

Rating: Good/marginal, grazing component - marginal; breeding component - good.

43

Project Proposal Under Title XII

Collaborative Research Support Program on Small Ruminants

INSTITUTION: Montana State University, Bozeman, Montana

TITLE: Range and Livestock Management to Improve Sheep and Goat Production

FOREIGN LOCATION: Not determined

COLLABORATING FOREIGN INSTITUTION: Not determined

DURATION OF PROJECT: Ten years

AVERAGE ANNUAL BUDGET
FIRST FIVE YEARS:

| | | |
|---|---|---|
| Title XII | - | $ 830,000 |
| Other | - | 242,000 |
| Total | - | $1,072,000 |

PRINCIPAL INVESTIGATOR: R. L. Blackwell

OTHER KEY PERSONNEL: G. F. Payne, O. O. Thomas, P. J. Burfening, D. D. Kress and J. E. Taylor

ABSTRACT: The range resource is generally depleted in many arid/semi-arid regions of the world. Changing social patterns and improper grazing management have contributed to this condition. There is urgent need to determine and demonstrate through research how grazing management systems with small ruminants can restore ranges to a highly productive condition and thus improve and stabilize the food producing potential from these vast regions. It is important also to identify locally adapted breeds of sheep and goats and show how to improve their productivity by capitalizing upon the great genetic variation through better selection procedures and by crossbreeding. The stress of nutrient deficiencies during certain seasons needs to be studied in order to determine how best to supplement the natural range forage during periods of nutritional stress. Carrying capacity of the experimental range areas should be doubled in ten years and the forage base stabilized. Productivity per animal unit should be increased by 20 to 40 percent. Productivity per unit of land area as great as 140 percent through management of land and animals could be expected.

44. California State Polytechnic University — Artificial Insemination and Sire Selection in in Goat and Sheep Improvement

Objectives: Develop techniques of SR semen preservation and transfer and serve as dissemination bank.

| | | |
|---|---|---|
| Total Score: | | 70/100 |
| a. | Program Significance | 18/30 |
| b. | Institutional Considerations | 20/25 |
| c. | Technical Approach | 18/25 |
| d. | Personnel | 14/20 |

Location: Worldwide

Discussion:

1) Good objective.

2) Part of work plan unnecessary - technology already developed in Australia, Russia, Great Britain - no need for duplication of development.

3) Proposer could serve as semen bank and distribution center for frozen dairy goat semen (now and for other S.R.s as preservation techniques are perfected.

4) Should be integrated with breeding program (see proposals No. 14/13).

Rating: Good - recommend setting up semen bank and distribution center affiliated with breeding projects.

le U.S. Institution: California State Polytechnic University, Pomona, California in operation with the International Sheep and Goat Institute, Utah State University, gan, Utah as a subcontractor with their proposal entitled "Increasing small ruminant oduction in arid and semi-arid regions through genetic improvement and rangeland velopment".

of Proposed Project: Artificial insemination and sire selection in goat and sheep provement.

sted Foreign Location: Countries where Utah State University has projects (Pakistan, fghanistan, Morocco, Bolivia, and Peru).

gn Collaborating Institution: University of Agriculture, Lyallur, Pakistan

d of Project: Five to 15 years.

Annual Budget (first year): US/AID request $155,000 (Cal Poly University contribution 134,000). (This budget is not included as a part of Utah State's proposal)

~~ipal Investigators and Other Key Personnel:~~ Principal investigator - E. A. Nelson; ther key personnel - M. J. Burrill and A. C. Christensen.

act: Acclimatized, genetically improved, progeny tested males can significantly increase roduction from small ruminants in the L.D.C.'s. The utilization of these males would nclude: replacement of genetically inferior males in local herds; germ plasm from uperior males would be available to local or regional breeding services through the mportation of semen from overseas for the development of high producing female replace-ents to go into local herds; and as sources of semen for use at the local level. An fficient way to transfer germ plasm to the L.D.C.'s is through stored semen. This rogram necessitates developing improved techniques of goat and sheep semen collection, torage, transportation and insemination under conditions where the use of sophisticated quipment is at a minimum. Environmental factors including nutrition, disease and limatic conditions and their effect on semen quality will be studied. Genetic and ehavioral characteristics of males relative to the fertilizing and freezing quality of heir semen will be investigated. Performance and progeny testing procedures will be eveloped to identify and evaluate males with superior germ plasm.

46. University of Missouri — Dissemination of Information on Small Ruminant Research

Objectives: Establish a Reference Guide to disseminate results of CRSP to users.

| | | |
|---|---|---|
| Total Score: | | 72/100 |
| a. | Program Significance | 19/30 |
| b. | Institutional Considerations | 19/25 |
| c. | Technical Approach | 19/25 |
| d. | Personnel | 15/20 |

Location: Worldwide

Discussion:

1. Dissemination needed at three levels:
   a. Among researchers
   b. To LDC decisonmakers
   c. To LDC small holders
2. Proposer's approach (content) inappropriate for levels (b) and (c), and over elaborate Gov (a).
3. Dissemination should be component of management entity.

Rating: Inappropriate, as proposed. CRSP should include dissemination component, especially how to get the small holders and LDC decisonmakers.

# Proposal on Information Dissemination

## Small Ruminant Research Area

1. This effort will be conducted by the University of Missouri at locations where research projects are funded.

2. The name of the project is International Small Ruminant Research Reference Guide.

3. Foreign locations will be those designated by institutions which submit accepted research proposals.

4. Foreign institutions involved will also be those designated by institutions whose research proposals are accepted.

5. This proposal covers a four-year period.

6. The total four-year budget as proposed requests $394,500 from Title XII funds. Funding is not being sought from any other source.

7. The principal investigator is Richard L. Lee, agricultural editor and professor of extension education, University of Missouri, Columbia, Missouri.

## ABSTRACT

Results of small ruminant research will be of little value if not disseminated to other scientists and potential users. This proposal is concerned with that significant element -- dissemination of information. The primary objective of this proposal is to provide a relatively simple and inexpensive, yet effective, procedure for disseminating findings from small ruminant research through a comprehensive publications program. It is proposed that this program be called the International Small Ruminant Research Reference Guide. It will be modeled after the UMC Agricultural Guide, a successful agriculture reference in use at the University of Missouri for the past 15 years. The proposal is built around a four-year schedule. The publications dissemination system would be established during the first year. At the same time, and especially during the second and third years as well, publications -- guides -- would be prepared relating to research findings regarding small ruminants. The final year would be devoted to updating publications and in preparing a request for further funding or finding a host institution to continue information support for the research effort.

47. University of Missouri — Social Constraints to Small Ruminant Production in Three Eco-Zones

Objective: Document the role that social and cultural factors play in the overall system of small ruminant production.

| | | |
|---|---|---|
| Total Score: | | 75/100 |
| a. | Program Significance | 24/30 |
| b. | Institutional Considerations | 17/25 |
| c. | Technical Approach | 18/25 |
| d. | Personnel | 16/20 |

Location: All-Cameroon, Ecuador, Morocco or Egypt

Discussion:

This is viewed as a necessary component of a larger project; it is very field oriented.

Missouri group has been active and successful.

They would identify major social constraints.

There is no financial support from university.

One of the PI's just completed dissertation.

There is no one with an animal science background on project team.

Missing expertise on anthropology, nutrition, and animal science, and health.

Rating: Good. Need for animal science, anthropology and nutrition inputs. Cameroon has a tsetse-free zone that may make it attractive.

47

Institution: University of Missouri-Columbia
Department of Rural Sociology
Columbia, MO 65201

Title: Social Constraints to Small Ruminant Production in Three Eco-Zones

Location: Cameroon; Ecuador; Morocco or Egypt

Collaborating Institutions: Ecole Nationale Superieure d'Agriculture (Cameroun)
INIAP (Ecuador)
Institut Agronomique et Veterinaire Hassan II (Morocco)
Al-Azhar University (Egypt)

Duration of Project: 5 years

Buget: $1,538,946 (Title XII Funds)

Co-Principal Investigators: Michael F. Nolan and Jere Lee Gilles

Other Key Personnel: Andrew J. Sofranko, Rex R. Campbell and James Kliebenstein

Abstract:

By systematically studying societies in three of the ecozones delineated in the RFP, this project will develop the understanding of the social constraints to small ruminant production in those regions of the world. Our objectives embrace both the micro level and macro level. At the village or farm level we will examine such factors as the effects of social status, herd management practices, role of various family members in the production process and lend tenure arrangements. At the macro level we will explore the relationship between the producers and the larger society by looking at the credit system, marketing structure and government policy toward small farmers in general and small ruminants in particular. Our guiding perspective will be to place small ruminant production into a systems perspective. To that end we will identify the components of the system and delineate the linkages between them. Our research procedures will emphasize full participation with our collaborators and will involve placing observers in the field for an entire seasonal cycle. We anticipate our results will be useful to the production scientists working in similar countries and to governmental agencies attempting to formulate developmental strategies. To the latter we will present a number of alternative plans with the costs and benefits of each clearly spelled out and some recommendations on how one should proceed, given certain basic assumptions. Our concern throughout will be to suggest development strategies which will take into account the unique needs of small producers.

108

48. Missouri — Research Animal Resources for Developing Countries

Objectives: Technical assistance to LDCs to set up and manage laboratory animal systems for veterinary and medical research.

| | |
|---|---|
| Total Score: | 64/100 |
| a. Program Significance | 13/30 |
| b. Institutional Considerations | 19/25 |
| c. Technical Approach | 16/25 |
| d. Personnel | 16/20 |

Location: Kenya (no ecozone specified)

Discussion:

1) Only marginally related to improved S.R. productivity.
2) Generally low priority for LDCs.
3) Medical research component not relevant.
4) Constitutes service area rather than research - not tied directly to relevant CRSP research.

Rating: Inappropriate.

48

# RESEARCH ANIMAL RESOURCES FOR DEVELOPING COUNTRIES

## A PROPOSAL AND STATEMENT OF INTEREST

Prepared by

Joseph E. Wagner, D.V.M., M.P.H., Ph.D.
Professor, College of Veterinary Medicine, University of Missouri-Columbia

and

John E. Harkness, D.V.M., M.S., M.Ed.
Assistant Professor, College of Agriculture, Pennsylvania State University

## Introduction

This is a proposal for funding under Title XII legislation for the establishment of a cooperative program between specialists in Research Animal Science from the United States and agricultural and biomedical training, research, and extension institutions in developing areas or countries actively participating in U.S.A.I.D. projects. At this point we propose to initiate a specific program in Kenya.

The proper care and utilization of animals used in teaching and research underlie both basic and applied research in the agricultural and biomedial sciences. This proposal is based on the assumption that the speciality of Laboratory Animal Science could contribute significantly to educational and research efforts in Kenya and other countries. For over a decade the United States Department of Agriculture and the Department of Health, Education, and Welfare have had established guidelines regarding the facilitation of quality research through professionally supervised animal resources programs. Similar programs, begun on a small scale, could be established in other countries to the benefit of both the host country and the United States.

The use of small animals (rodents, rabbits, small ruminants) in agricultural and biomedical research is an efficient mechanism for studying in a controlled enviroment the nutritional requirements, physiology, environmental adaptation mechanisms, diseases, and pharmacologic responses of large numbers of inexpensive, easily housed, fecund, shortlived, and defined animal subjects prior to similar studies in large and expensive food and fiber producing animals and in man. Research discoveries, promising and unpromising, made in animal models greatly increase the efficiency of subsequent investigations in larger animals, man, and, with animals used as nutritional assays, plants.

Laboratory animal veterinarians and animal care technicians from the United States, in cooperation with host country personnel, would establish or expand research animal care programs and facilities to meet the needs of increasing research and teaching endeavors in developing countries.

## Area Expertise in the United States

Veterinarians with training and experience in the care and use of research animals comprise the second largest speciality board (over 230 members) recognized by the American Veterinary Medical Association. Approximately 600 veterinarians and thousands of technical support personnel are engaged full-time in research animal care in this

49. University of Missouri — A Program for Promotion of Cuniculiculture in Developing Countries

Objective: Establish cuniculiculture in the developing countries.

| | | |
|---|---|---|
| Total Score: | | 64/100 |
| a. | Program Significance | 17/30 |
| b. | Institutional Considerations | 17/25 |
| c. | Technical Approach | 16/25 |
| d. | Personnel | 14/20 |

Location: Kenya

Discussion:

Rabbits are not considered as small ruminants for purpose of this project.

No Missouri input.

It is a large industry in Eastern Europe and Canada.

Rating: Inappropriate. Might be considered in a specific AID country program, but not in Title XII.

Name of U.S. Eligible Institution

49

University of Missouri, Columbia, Missouri 65201

Title

A Program for Promotion of Cuniculiculture (Rabbit Raising) In Developing Countries

Foreign Location and Foreign Collaborating Institutions

Undecided - to be established in early years of program (possibly ILRAD, Nairobi Kenya). See Proposal.

Period of Project

5 Years (additional years expected but dependent upon updated proposals to be developed in the course of the program proposed herein.

Total Annual Budget

| | Title XII Funds* | Other Funds |
|---|---|---|
| Year 1 | $ 106,000 | @$20,000 (NIH and Univ. of MO) |
| Year 2 | $ 218,000 | @$20,000 (NIH and Univ. of MO) |
| Year 3 | $ 299,000 | @$20,000 (NIH and Univ. of MO) |
| Year 4 | $ 327,000 | @$25,000 (NIH and Univ. of MO) |
| Year 5 | $ 347,000 | @$25,000 (NIH and Univ. of MO) |

Co-Principal Investigators


| | |
|---|---|
| Joseph E. Wagner, D.V.M., M.P.H., Ph.D. | 25% FTE |
| John L. Lenz, B.S., M.A., D.V.M. | 50% FTE |


Abstract:


The rabbit (wild or domesticated) has become a widely accepted source of high quality food for man in many countries especially Europe and the U.S. Herein we propose, for Title XII funding, a long term project with many features of the Collaborative Support Program on Small Ruminants. (Indeed the rabbit may be considered a small ruminant with its ruminant-type digestion.) We propose to utilize the nucleus of cuniculiculture (rabbit raising) expertise at the University of Missouri-Columbia and establish links at collaborating institutions in developing countries. Production research, foreign demonstration projects through which short courses are offered and genetic lines distributed, and multiple translations of liberally illustrated how-to-do-it brochures comprise the major features of this proposal.

Small size, fecundity, hardiness, ease of hutch rearing, urban acceptability, high quality meat, short gestation period, short- (8 week) birth to butchering period, year round breeding, use of family labor, and many other features make the domesticated rabbit an ideal companion to the family milk goat as a source of human nutrition in developing countries.


*See Attached Budget Breakdown

51. University of Missouri — Desert Ruminant Environmental and Forage Management in the Sahara.

Objective: Obtain data on environmental and nutritional constraints that limit the development of efficient production systems in arid regions.

| | | |
|---|---|---|
| Total Score: | | 70/100 |
| a. | Program Significance | 20/30 |
| b. | Institutional Considerations | 17/25 |
| c. | Technical Approach | 18/25 |
| d. | Personnel | 15/20 |

Location: Arid/Semi-arid--Egypt

Discussion:

Outstanding laboratory on climatic adaptation.

Involves irrigated crop production and large ruminants as well as small ruminants; purpose is to provide year round forage.

Ratio of small ruminants to people is low in Egypt.

Technically good with existing linkages.

PI will give up department chairmanship.

No university contribution.

May fit in JCAD better than JRC.

Limited applicability to other LDC's.

Rating: Good minus. May be too broad in its focus. Only small ruminant aspect should be financed. The combination of irrigation and small ruminants does not have much potential for other areas.

51

(Small Ruminants)

1) University of Missouri, Columbia, Missouri 65201
College of Agriculture
Department of Dairy Husbandry and Animal Husbandry

2) Desert Ruminant Environmental and Forage Management in the Sahara

3) Egypt and Arid/Semi Arid Areas of Northern Africa

4) Atomic Energy Establishment (Egypt) with cooperation of Animal Production Research Institute (Egypt)

5) 5 years

6) $1,100,280

7) H. D. Johnson
Chairman, Dairy Department
Project Leader, Environmental Physiology

L. L. Wilson, Associate Professor
Animal Husbandry
Ruminant Nutrition

M. K. Yousef, Professor
Dessert Research Institute
University of Nevada, Las Vegas
(currently involved in an NSF Field Project in Egypt on "Adaptation of Sheep and Goats to the Sahara")

Key Resource Personnel: Listed in Appendix

Abstract:

Environmental and nutritional pressures on small ruminants in the arid regions of the world have until recently -- and in most places still do -- select for ability to remain alive rather than ability to produce. The general objective of this project is to delineate those environmental stressors limiting the development of efficient production systems in arid regions. Emphasis will be placed on cooperative investigations necessary for the development and establishment of animal - forage systems. Specific research objectives will be coordinated with and complementary to the developmental aspects of the desert reclamation programs in the Sahara and Sinai. Emphasis will be placed on collaborative research on environmental and nutritional constraints limiting productivity. Animal productivity levels, the physical and meteorological environment, socio-economic implications of management systems, forage adaptability and disease and health status will also be assessed. Component interactions will be identified and studied. Economic assessments of input/output relationships and social implications of production systems developed will be evaluated. It is envisioned that technology developed will not only be invaluable in planning future desert reclamation schemes but will also have immediate application in other systems of traditional agriculture, especially for the small farmer. In addition, research data will be evaluated to serve as a guide for future direction in the continuing search for means to enhance the world food supply.

114

52. University of Arizona — The Development of Diagnostic and Control Methods for Sheep and Goat Diseases in the Developing Countries of Africa.

Objective: Develop methods of immunizing ruminants against heartwater.

| | | |
|---|---|---|
| Total Score: | | 70/100 |
| a. | Program Significance | 18/30 |
| b. | Institutional Considerations | 18/25 |
| c. | Technical Approach | 18/25 |
| d. | Personnel | 16/20 |

Location: East Africa & Sahel

Discussion:

(1) Project justification is based on assumption that LDC herd improvement will be based on introduction of exotic breeds which are susceptible to heartwater - poor assumption.

(2) Cannot justify supporting projects focused on single diseases (out of so many).

(3) Focus on immunization rather than breed resistance - poor application in LDC's.

(4) Proposed collaborating Institution (EAVRO) no longer exists.

Rating: Inappropriate as separate project; may be included in herd health project.

52

PROJECT I.

1. U. S. Institution: The University of Arizona
   Agricultural Experiment Station
   Department of Veterinary Science

2. Project Title: "The Development of Diagnostic and Control Methods for Heartwater of Sheep and Goats"

3. Foreign Locations: Kenya; Mali.

4. Collaborating Foreign Institutions:
   1) East African Veterinary Research Organization, Muguga, Kenya
   2) Central Veterinary Laboratory, Banako, Mali

5. Duration of Project: 3 years

6. Total Annual Budget:

| | FY 79 | FY 80 | FY 81 | Total |
|---|---|---|---|---|
| Title XII Funds | $44,000 | $39,580 | $45,000 | $128,580 |
| Other Support | 7,000 | 7,420 | 8,000 | 22,420 |

7. Personnel: Principal Investigator - C. John Maré
   Co-Investigators - Dr. George Losos (Kenya)
   Mali Veterinary Personnel

Abstract:

The introduction of high-quality breeding stock into heartwater endemic areas is inevitable if upgrading of sheep and goat populations is to occur. This disease (Cowdria ruminantium infection) causes relatively low mortality in native ruminants, but can have devastating effects on highly-susceptible stock, mortality rates of over 90% being common. The capacity to effectively diagnose this disease needs to be developed and this knowledge widely disseminated. Methods of immunizing susceptible livestock prior to introduction will be developed, and the duration of immunity following immunization will be studied.

116

53. University of Arizona — The Role of Sheep in the Maintenance and Transmission of the Virus of Bovine Malignant Catarrhal Fever

Objective: Study role of sheep as carrier of B.M.C.F.

| | | |
|---|---|---|
| Total Score: | | 68/100 |
| a. | Program Significance | 17/30 |
| b. | Institutional Considerations | 17/25 |
| c. | Technical Approach | 18/25 |
| d. | Personnel | 16/20 |

Location: Kenya

Discussion:

(1) Low priority because of low morbidity (except in times of drought and stress).

(2) Trying to solve transmission problems (via sheep) not a specific problem of sheep and goats.

(3) Total university contribution very low.

(4) Questions about the qualifications of proposed team for proposed work.

(5) E.A.V.R.O. (proposal collaborating institution) no longer exists.

Rating: Inappropriate - may be included in herd health project.

53

PROJECT II.

1. U. S. Institution: The University of Arizona
   Agricultural Experiment Station
   Department of Veterinary Science

2. Project Title: "The Role of Sheep in the Maintenance and Transmission of the Virus of Bovine Malignant Catarrhal Fever."

3. Foreign Locations: Kenya

4. Collaborating Foreign Institutions:
   East African Veterinary Research Organization, Muguga, Kenya.

5. Duration of Project: 3 years

6. Total Annual Budget:

| | FY 79 | FY 80 | FY 81 | Total |
|---|---|---|---|---|
| Title XII Funds | $61,000 | $61,000 | $63,000 | $185,000 |
| Other Support | 10,000 | 11,000 | 12,000 | 33,000 |

7. Personnel: Principal Investigator - C. John Maré
   Co-Investigators - J. N. Shively
   T. H. Noon
   Dr. M. Kalunda (Kenya)

Abstract:

Malignant catarrhal fever, a fatal disease of cattle, is caused by at least two different viruses. One of these viruses is believed to be carried by apparently normal sheep, but this fact has not been well established either in Africa or in the United States.

These studies are designed to attempt to show whether sheep serve as carriers of the malignant catarrhal fever virus, or if not, what factors, intrinsic or extrinsic, cause excretion of the virus.

114

54. University of Arizona — Characterization, Diagnosis and Control of Mycoplasmal Diseases of African and American Goats and Sheep.

Objective: Develop an effective vaccine against the organism of contagious caprine pleuropneumonia after surveys and laboratory work.

| | | |
|---|---|---|
| Total Score: | | 75/100 |
| a. | Program Significance | 22/30 |
| b. | Institutional Consideration | 19/25 |
| c. | Technical Approach | 18/25 |
| d. | Personnel | 16/20 |

Location: West Africa, Nigeria, Mali, Kenya

Discussion:

Most serious goat disease in LDC's for which there is no answer.

University of Arizona in last year found that the organism causing CBPP caused respiratory disease in goats in U.S.

Only treatment is chemotherapy and it is only experimental and expensive.

People at Arizona are tops in U.S. in field and proposal complements current work in U.S.

They understand and are currently working with mycoplasmas.

Possibility of success for early application to small holder is uncertain.

Experimental design is good and practical.

There is an immunizing agent for bovine pleuropneumonia, which was wiped out in U.S. in 1892. This organism isolated from goats may be a cattle pathogen.

PI is good scientist but needs expertise in management practices in LDC's.

First PI, Maré, knows African scene very well.

Second co-investigator needs to spend more than 5% of time.

Very well-designed project.

Most lethal agent other than goat pox.

Payoff in LDC's may be less than that from a flock health project.

Rating: Outstanding. Could be tied in with a package approach to animal health, but also could be done independently at one of these locations. There is some concern that this disease is more of a problem in U.S. than in LDC's and should be supported entirely with domestic research funds.

54

PROJECT III.

1. U. S. Institution: The University of Arizona
   Agricultural Experiment Station
   Department of Veterinary Science

2. Project Title: "Characterization, Diagnosis and Control of Mycoplasmal Diseases of African and American Goats and Sheep"

3. Foreign Locations: Ibadan, Nigeria
   Bamako, Mali
   Muguga, Kenya

4. Collaborating Foreign Institutions:
   1) University of Ibadan, Ibadan, Nigeria
   2) Central Veterinary Laboratory, Banako, Mali
   3) East African Veterinary Research Organization, Muguga, Kenya

5. Duration of Project: Five years

6. Total Annual Budget:

| | FY 79 | FY 80 | FY 81 | FY 82 | FY 83 | Total |
|---|---|---|---|---|---|---|
| Title XII Funds | $80,600 | $80,000 | $81,000 | $91,600 | $58,000 | $391,200 |
| U. of Ariz.& Foreign Inst. | 14,300 | 15,730 | 17,300 | 19,030 | 20,830 | 87,190 |

7. Personnel:
   Principal Investigator - Jess L. Ayers
   Co-Investigators - C. John Mare
   E. J. Bicknell
   African Principal & Co-Investigator - To be determined

Abstract:

Contagious caprine pleuropneumonia (CCPP) is a devastating disease of goats scattered around the globe with an especially high incidence in Western and Eastern Africa. There is a bovine counterpart known as contagious bovine pleuropneumonia (CBPP). These diseases are caused by a group of microorganisms of the Order Mycoplasmatalae. Other diseases of this group have received less notoriety but are also important constraints to both sheep and goat productivity.

While the pleuropneumonias have been recognized for a long time, there are still very important gaps in our understanding of the diseases, as well as our ability to control them. Diagnosis is sufficiently complex that major contributions will be made by developing methods which can be utilized by professional and/or paraprofessional personnel in the very remote areas of Africa.

This project will: (1) Attempt to increase our basic knowledge of CCPP, (2) Survey, describe, reproduce and evaluate other mycoplasmal diseases of small ruminants, (3) Develop diagnostic methods for use in the field, and (4) Study methods to control the diseases by management as well as development of efficacious vaccines.

120

55. University of Arizona — Characterization, Diagnosis and Control of Caseous Lymphadenitis of African and American Goats and Sheep.

Objectives: Study prevalence of C.L. in African LDC's and determine control techniques.

| | | |
|---|---|---|
| Total Score: | | 70/100 |
| a. | Program Significance | 19/30 |
| b. | Institutional Considerations | 17/25 |
| c. | Technical Approach | 18/25 |
| d. | Personnel | 16/20 |

Location: Africa (mainly semi-arid areas)

Discussion:

(1) Importance of disease not established.

(2) Methodology to establish disease prevalence (hence, importance) not discussed.

(3) Low level of senior manpower committed.

(4) Integration with breeding (resistent breeds, etc.) not mentioned.

Rating: Inappropriate; but could be part of herd health.

55

PROJECT IV.

1. U. S. Institution: The University of Arizona
   Agricultural Experiment Station
   Department of Veterinary Science

2. Project Title: "Characterization, Diagnosis and Control of Caseous Lymphadenitis of African and American Goats & Sheep"

3. Foreign Locations: Nigeria, Mali, Upper Volta

4. Collaborating Foreign Institutions:
   1) University of Ibadan, Ibadan, Nigeria
   2) Central Veterinary Laboratory, Banako, Mali
   3) Contact via Univ. of Arizona's USAID project - Upper Volta Village Livestock Development Project, Ouagadougou/I.D., Dept. of State, Washington, D.C. 20520

5. Duration of Project: Four years

6. Total Annual Budget:

| | FY 79 | FY 80 | FY 81 | FY 82 | Total |
|---|---|---|---|---|---|
| Title XII Funds | $32,700 | $25,870 | $25,150 | $30,470 | $114,190 |
| Univ.of Ariz. & Foreign Institutions | 14,350 | 15,790 | 17,370 | 19,110 | 66,620 |
| Amount required if Project III is fully funded | 25,200 | 20,870 | 20,150 | 22,970 | 89,190 |

7. Personnel: Principal Investigator - Jess L. Ayers
   Co-Investigators - J. Glenn Songer, E. J. Bicknell
   African Principal & Co-Investigators - To be determined

Abstract:

Caseous lymphadenitis is an infectious disease of sheep and goats caused by Corynebacterium pseudotuberculosis and characterized by lymph node abscessation. It is found wherever sheep and goats are raised and has the potential to debilitate affected animals. It is the cause of massive condemnation of carcasses wherever inspection occurs and is a potential public health problem in the absence of inspection. Our understanding of the disease process is minimal. Essentially nothing is known of its transmission, and the survival of the causative organism in the environment has not been investigated. Immunity by the host to the organism is very poorly understood; however, modern methods of evaluating acquired cellular immunity may help in this regard. Control methods such as test and slaughter or vaccination are vitally needed as this disease is one that takes its greatest toll on the under- or malnourished animals. Such is the nutritional state of many African small ruminants throughout much of the year.

122

56. Texas Technical University — Improving Small Ruminant Nutrition, Management, and Production on Rangelands.

Objective: Increase the production of small ruminants through improvement of native rangelands by management and increased productivity of animals by improved animal husbandry and breeding practices.

| | | |
|---|---|---|
| Total Score: | | 68/100 |
| a. | Program Significance | 21/30 |
| b. | Institutional Considerations | 17/25 |
| c. | Technical Approach | 16/25 |
| d. | Personnel | 14/20 |

Location: Arid/Semi-Arid, Northern Sudan

Discussion:

Sheep and goats are very numerous in Sudan.

This is a very broad project that may exceed the resources of TTU.

Knowledgeable PI, but he will devote only ¼ time to the project.

Increased production would be primarily for export.

About 1/3 of research plan is development oriented, not research.

Somewhat complementary to Utah.

Good technical plan.

Calls for on-site project manager.

Graduate training is necessary to have continuity.

Rating: Good minus. Little contribution by University. Complementary to Utah--maybe collaborate. Not much time for PI. Want to change land tenure system which is a weakness.

56

U.S. Eligible Institution: Texas Tech University
Lubbock, Texas

Title of Project: Improving Small Ruminant Nutrition, Management and Production

Foreign Location: Sudan - Africa

Collaborators: The Animal Production Research Administration
Ministry of Agriculture
and
The University of Khartoum

Project Period: A Five Year Study - 1979-1983

Total Project Budget (Five Years):

Title XII - $1,728,200
Other Support - TTU - $333,592

Principal Investigators:

Dr. Donald F. Burzlaff

Co-Investigators:

Dr. Fred C. Bryant
Dr. Robert Albin
Dr. Frank Hudson

Abstract: Mis-management of rangeland and grazing animals of Sudan has led to wide-spread range deterioration, accelerated erosion and reduced productivity of the sheep and goats which are the only source of subsistence for many people of this country. Research will focus on improving the native rangelands through management and increasing productivity of the vast numbers of sheep and goats through improved animal husbandry and breeding practices. The proposed research plan considers current socio-economic problems and presents procedures for their solution through research, teaching and extension activities. The results will be applicable to sheep and goat production in any nation. They inevitably will improve the welfare of those dependent upon sheep and goats for their livelihood and decrease the burden of their day-to-day living.

124

57. Texas Technical University — Development of a Goat Milk Processing Industry in Sudan.

Objective: Provide educational materials, suggestions for development, and detailed procurement and processing procedures necessary for operating milk and milk products processing plants.

| | | |
|---|---|---|
| Total Score: | | 67/100 |
| a. | Program Significance | 20/30 |
| b. | Institutional Considerations | 17/25 |
| c. | Technical Approach | 16/25 |
| d. | Personnel | 14/20 |

Location: Sudan, Arid/Semi-arid

Discussion:

Objectives do not include a single element of research.

Intention is to modify U.S. industrial techniques.

Does not fit AID objectives.

More appropriate for UN agencies.

Good extension technique.

Rating: Inappropriate.

57

INSTITUTION: Food Technology Section
College of Agricultural Sciences
Texas Tech University, Lubbock, TX 79409

TITLE: Development of a Goat Milk Processing Industry in Sudan

FOREIGN LOCATION: Sudan

COLLABORATING FOREIGN INSTITUTION: To be determined

PROJECT PERIOD: Five years

TOTAL ANNUAL BUDGET: $130,780 (Average)

PRINCIPAL INVESTIGATOR: Milton L. Peeples, Professor
AND CO-INVESTIGATOR: Ronald D. Galyean, Assistant Professor

ABSTRACT:

The goat milk industry of Sudan should be developed to its potential of providing a variety of fresh, wholesome and enjoyable products to families at a reasonable cost, and it should serve as a national asset for increasing international trade. This project would provide educational materials, suggestions for development, and detailed procurement and processing procedures necessary for operating milk and milk products processing plants. The results would serve as a source of ideas for development of this industry in logical steps of increasing technology. Community processing plants using the milk produced by organized patrons, would become a vital part of the society and its improvement. Experiences of the United States and Mexican industry would be extended to accomplish the objectives. Institutional, extension and business organizations would be encouraged to allocate resource toward developing this economic potential, and extensive educational efforts would be made.

126

58. New Mexico State University — Increasing Sheep and Goat Production by Selective Mating and Improved Management.

Objective: Determine the feasibility of increasing production of native sheep and goats through selective mating, development of health and sanitation programs and posture management.

| | | |
|---|---|---|
| Total Score: | | 76/100 |
| a. | Program Significance | 22/30 |
| b. | Institutional Considerations | 20/25 |
| c. | Technical Approach | 18/25 |
| d. | Personnel | 16/20 |

Location: South or Central America

Discussion:

Complete package: breeding, pastures, health, and management.

Want to establish flocks in LDC.

No linkage established but have many former graduate students.

New Mexico has similar climate and ecological conditions to some LDC's.

No allowance made for control flock so you can't tell effects of genetics.

Separation is based on visual approval which cannot be done with cattle, and probably is very difficult with goats and sheep.

May miss some good animals in group 3.

Does not tie in with small producers.

Begins with native flocks, so that all work could be done abroad.

Limited gene pool may restrict results.

Do not have animal breeding or range management person.

Similar work has been done in Turkey and Sudan.

Rating: Good. Weak in breeding and range management personnel. The approach is not oriented toward the owners of small flocks.

58

PROPOSAL FOR TITLE XII RESEARCH

1. Institution: New Mexico State University
   Department of Animal and Range Sciences
   Las Cruces, New Mexico 88003

2. Title: Increasing Sheep and Goat Production by Selective Mating and Improved Management

3. Location: South or Central America

4. Foreign Institution: National University and/or Ministry of Agriculture

5. Duration: Five years

6. Budget: Title XII Funds $907,971
   New Mexico State University $385,830
   Other Support (Host Country) $254,187

7. Principal Investigator and Key Personnel:
   Dr. Jack L. Ruttle, Leader
   Dr. William D. McFadden
   Mr. James Sachse
   Dr. Arnold B. Nelson

## ABSTRACT

Increasing sheep and goat production in less developed countries offers tremendous opportunity to improve living conditions of the indigenous population of these countries. Sheep and goats can provide high quality protein in the form of meat, milk and cheese, provide fiber and skins for clothing and the manufacture of cash-producing articles. In addition, sheep and goats can utilize forage and feed stuffs not ordinarily consumed by other livestock or humans. The size and grazing habits of small ruminants also makes possible the use of land areas not suitable for cultivation or other income production. [The following project proposes research to determine the feasibility of increasing production of native sheep and goats through selective mating, development of health and sanitation programs and pasture management.] Expected results are increased production of high quality protein for human consumption, beter utilization of natural resources and increased income from sale of surplus products. Additional benefit is expected by creating interest in the use of modern agricultural practices to better living standards.

128

59. Michigan State University — Improvement of Human Nutrition Through Disease Control in Small Ruminants.

Objective: Multidisciplinary approach to control of the major chronic infectious, parasitic and nutritional diseases affecting small ruminants.

| | | |
|---|---|---|
| Total Score: | | 78/100 |
| a. | Program Significance | 24/30 |
| b. | Institutional Considerations | 19/25 |
| c. | Technical Approach | 18/25 |
| d. | Personnel | 17/20 |

Location: Highlands, Carribbean

Discussion:

3 phases.

PI plus 42 coinvestigators devoting 20% of their time.

Require funds to supplement their time.

Budget is huge.

MSU position is that overhead needs to be charged.

Lacks focus.

Lacks realism.

Shopping basket with many appendages.

University input is insignificant.

Lacks innovation, represents massive approach.

Rating: Inappropriate. Unfocused and far too expensive.

# COLLABORATIVE RESEARCH SUPPORT PROJECT

Name(s) of U.S. eligible institutions at which research will be performed; Michigan State University. Collaborative research to be developed with Ohio State University, Virginia Polytechnical Institute, Kansas State University and other U.S. educational institutions.

Name of Project: Improvement of human nutrition through disease control in small ruminants.

Foreign location at which the research will be performed: Target areas: (1) sparsely populated highland area. South America-Bolivia/Ecuador/ Colombia. (2) densely populated urban fringe. Carribean-Haiti/Jamaica/ Trinidad. Precise targets to be determined after field investigations.

Names of collaborating institutions: to be arranged. International centers, universities and governmental institutions in each of the targeted ecozones.

Project Period:
Ten years total. Five years initial period FY 1979-1983.

Total annual budget: Title XII funds $1,828,880 (average)
Other support 313,340

Names of investigators: Principal Investigator: Jeffrey F. Williams
B.V.Sc., Ph.D., M.R.C.V.S.

Co-investigators (for complete list of 42 co-investigators, see attachment Cover 1a).



130

## ABSTRACT

Uncontrolled diseases of sheep and goats in the LDC-target ecozones are a serious impediment to increased food production and improved human nutrition. This proposal represents a multi-disciplinary approach to control of the major chronic infectious, parasitic and nutritional diseases affecting small ruminants. The principal objectives will be to determine:

a) the prevalence of these diseases in the native domestic animal populations;

b) the agricultural practices and environmental and cultural characteristics which influence their occurrence and importance to human nutrition;

c) their respective impacts on production of milk, meat and fiber;

d) preventive and control strategies which are tailored to the subsistence role of sheep, goats and other small ruminants in the LDCs;

e) the true benefits derived from disease control in economic terms and in terms of measurable changes in human health, food habits and behavior.

Success in this collaborative project will be achieved through the integration of contemporary technologies in the animal and food sciences, animal health and human nutrition, for activities such as:

a) on-site baseline data collection,

b) controlled experimental studies,

c) development of animal disease and human nutrition surveillance systems which involve trained local personnel and local institutions,

d) development of smallholder-implemented disease prevention practices.

Our findings and conclusions will have application in a wide variety of smallholder systems in many countries, including the U.S.A.

60. University of California, Davis. Human Food Production Development of Small Ruminant Production

Objectives: Develop comprehensive systems model based on field experiments.

| | | |
|---|---|---|
| Total Score: | | 77/100 |
| a. | Program Significance | 22/30 |
| b. | Institutional Considerations | 20/25 |
| c. | Technical Approach | 19/25 |
| d. | Personnel | 16/20 |

Location: Sudan or Latin America Country

Discussion:

1. Good objective - set up a model to identify where resources should be placed.
2. Fits well with herd health (proposed by some institution).
3. There will probably be lack of data to implement model.
4. Proposal work does include social factors, but doesn't say what they will do about political variables.
5. The model would require a great deal of data to operate; probably cannot get validation data on their budget (although some data does exist in Sudan).
6. Should be associated with other projects in Sudan.

PI has good modeling expertise.

Rating: Good.

Proposal for Small Ruminants Project

RTI RM 23U-1527

1. Institution: University of California, Davis

2. Project Title: Human Food Production; Development of Small Ruminant Production

3,4. Location and Collaborating Institution: See Attachment A

5. Project period: 5 years

6. Budget:

Title XII funds: Year 1 : $106,992; Total (5 years) : 860,335

Other funds: Year 1 : $ 52,416; Total (5 years) : 275,839

(Details in Attachment B).

7. Personnel: Co-Principal Investigators:

R. L. Baldwin (.1) R. L. Baldwin

G. E. Bradford (.3) G. E. Bradford

A. C. Bywater, W. N. Garrett, L. J. Koong, D. W. Robinson, N. E. Smith and D. T. Torell (Animal Science); C. L. Pelissier (Extension); W. C. Weir (Nutrition); W. M. Longhurst (Agronomy and Range Science); C. J. Bahre and F. J. Simoons (Geography), L. E. Grivetti (Geography and Nutrition); and W. E. Johnston (Agricultural Economics). Total commitment two full-time equivalent faculty per year for 5 years.

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

Allen G. Marr
Dean, Research Development and Graduate Education
University of California
Davis, California 95616

## Abstract

The proposal is for a systems analysis of small ruminant production in either a North African or Latin American country (see Attachment A). The project would emphasize (a) evaluation of genetic material available, (b) development of supplemental feeding strategies to optimize production using local feedstuffs, (c) development of models to integrate available information on major factors affecting small ruminant production and utilization and to identify constraints to improved production, and (d) evaluation of methods of alleviating the effects of these constraints. Research we have done in a semi-arid environment has shown that improved nutrition for a critical one-month period at mating can dependably increase prolificacy of sheep by more than 20% (Appendix II-3) and that appropriate use of breed resources can result in a similar increase in output per breeding female without loss of adaptability (Appendix II-2). Improved allocative procedures and management of feed and other resources developed by the systems approach described have the potential for large increases in production efficiency dependent on current management. Given local desire to increase food production from small ruminants, the project proposed could lead to production improvements of 50-100% in many target countries.