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 ISN = 29357

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UNCLASSIFIED

CLASSIFICATION

PROJECT EVALUATION SUMMARY (PES) - PART I

Report Symbol U-447

1. PROJECT TITLE Mineral Studies with Ruminant Animals			2. PROJECT NUMBER 931-0600	3. MISSION/AID/W OFFICE ATD/W
5. KEY PROJECT IMPLEMENTATION DATES			4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) 83-4	
A. First PRO-AG or Equivalent FY 74	B. Final Obligation Expected FY 74	C. Final Input Delivery FY 84	<input checked="" type="checkbox"/> Mid-term Management Review <input type="checkbox"/> REGULAR EVALUATION <input type="checkbox"/> SPECIAL EVALUATION	
6. ESTIMATED PROJECT FUNDING			7. PERIOD COVERED BY EVALUATION	
A. Total \$ 1,784,972			From (month/yr.) June, 1981	
B. U.S. \$ _____			To (month/yr.) Sept., 1982	
			Date of Evaluation Review Sept. 28, 1982	

B. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., airgram, SPAR, PIO, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
1. Contractor to develop examples of cost benefits from mineral supplementation with results of research completed in developing countries.	J. Conrad L. McDowell C. Haines	Jan., 1983
2. Cooperative activities or a training component developed which is acceptable by the Escuela Agricola Panamericana (Honduras) to utilize readily available resources there.	J. Conrad L. McDowell	Feb., 1983
3. More emphasis on African countries by contractor during pending visit to International Research Center in Ethiopia (ILCA) and the countries of Mali, Kenya and Sudan. (Contractor invited to ILCA.)	L. McDowell	Apr., 1983
4. At present, the contractor satisfies numerous requests for guidance with mineral programs from former collaborators and for assistance in securing research tools, laboratory reagents and completing certain analyses which are impossible in host country facilities. Significance of these contract supported activities to developing countries needs emphasis in future reports.	J. Conrad L. McDowell C. Ammerman J. Loosli G. Ellis	Continuous
5. Project accomplishments from 1974 through November 1983 need to be summarized in the terminal report. Summary to include graduate students supported, projects completed and in progress, published reports generated by project, and assistance rendered to developing country laboratories.	C. Haines J. Conrad J. Loosli L. McDowell	May, 1984
6. Completion of contract funding.	C. Haines	Nov., 1983

8. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS			10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT	
<input type="checkbox"/> Project Paper	<input type="checkbox"/> Implementation Plan e.g., CPI Network	<input type="checkbox"/> Other (Specify) _____	A. <input checked="" type="checkbox"/> Continue Project Without Change	
<input type="checkbox"/> Financial Plan	<input type="checkbox"/> PIO/T	_____	B. <input type="checkbox"/> Change Project Design and/or	
<input type="checkbox"/> Logical Framework	<input type="checkbox"/> PIO/C	<input type="checkbox"/> Other (Specify) _____	<input type="checkbox"/> Change Implementation Plan	
<input type="checkbox"/> Project Agreement	<input type="checkbox"/> PIO/P	_____	C. <input type="checkbox"/> Discontinue Project	

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)		12. Mission/AID/W Office Director Approval	
S&T/AGR/AP:CHaines <i>CH</i> Date: 12/15/82		Signature <i>Anson R. Bertrand</i>	
JYohe <i>JY</i> Date: 2-23/84		Typed Name Anson R. Bertrand	
S&T/AGR:Mozynski <i>MZ</i> Date: 3/8/83		Date 4/18/85	
S&T/PO:FCampbell <i>FC</i> Date: 4/15/83			

PROJECT EVALUATION SUMMARY (PES) - PART II

13. SUMMARY.

Personal contacts have been made through visits and correspondence with collaborating scientists in fourteen Latin American, four Southeast Asian and five African countries. The countries presently included in the Mineral Research Program are as follows:

Latin America - Bolivia, Brazil, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Panama, Peru, Uruguay, and Venezuela.

Southeast Asia - Indonesia, Malaysia, Philippines, and Thailand.

Africa - Kenya, Malawi, Senegal, Sudan and Zaire.

A list of research personnel, country by country contacts, and research institutions are presented in the appendix. Linkages and collaborations with other A.I.D. contacts and national and international institutions have also been made. Many of these linkages have been strengthened by the contractor's ability to improve laboratory facilities and in the procurement of difficult to obtain reagents and materials for collaborators.

Experiments designed to pinpoint mineral deficiencies and toxicities for specific regions are in progress in all participating countries. Research data from participating countries is further confirming the incidence of

phosphorus deficiencies. As an example, 29 recent theses have been completed in Costa Rica within the Department of Animal Science at the University of Costa Rica. In one thesis, 100% of all farms had deficient phosphorus concentrations in forages while 50% of the cattle blood samples contained less than 4 mg phosphorus. Similar conclusions were reported in all of the other theses. During the past several years, mineral research data from Bolivia, Brazil, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Malaysia, Philippines and Venezuela have indicated borderline to severe copper deficiencies in grazing cattle. Extensive analyses from vast areas of Colombia have indicated widespread copper deficiencies in this country. Incidences of sodium, cobalt, zinc, manganese, magnesium and other mineral deficiencies are highly variable and are noted in individual country discussions. Iodine deficiency is a problem in many countries, with research on injectable iodine being carried out in Malaysia and Peru. New research data are being generated through experiments in all cooperating countries which are designed to determine the mineral deficiencies and toxicities and the mineral relationships between levels in soils, plants and grazing ruminants.

Since the program was initiated in late 1974, the mineral status of some of the major ruminant livestock producing regions of Latin America have been established. Also, the limitation of minerals for grazing livestock in Africa and Southeast Asia has become apparent. With approximately one and one-half

years remaining, there is insufficient time to accomplish all of the desired goals for mineral research in many of the participating countries. Nevertheless, efforts are being made to gradually reduce support for participating countries and to summarize research results.

14. EVALUATION METHODOLOGY.

The evaluation consisted of a presentation of project progress to date by scientists from the University of Florida to the S&T/AGR representative and the A.I.D. Project Manager. All questions raised with respect to experimental design, implementation, and progress were answered by the University of Florida staff to the satisfaction of both the S&T/AGR representative and the A.I.D. Project Manager. Major points investigated, during the review, are listed in the attached Review Scope of Work.

15. EXTERNAL FACTORS.

As indicated in the Project Paper and other project documents, numerous mineral deficiencies, imbalance and toxicities are severely inhibiting the ruminant livestock industry in Latin America and in other developing tropical countries. All minerals for grazing ruminants have been infrequently and sporadically studied. In cattle, the most prevalent mineral element deficiency throughout the world is phosphorus. The most devastating economic result of phosphorus deficiency is reproductive failure, with phosphorus supplementation dramatically increasing fertility levels in grazing cattle in

many parts of the world. This phenomenon is illustrated in the majority of the individual country summaries presented in this report. Other studies also illustrate a beneficial growth response from phosphorus supplementation. Next to phosphorus, the most widely deficient minerals are cobalt and copper, but the extent of these deficiencies has not been as well defined because of inadequate research. Calcium deficiencies appear to be rare except in dairy cattle during peak lactation periods. Inadequacies of magnesium, sodium, iodine, selenium and zinc, and toxicities of molybdenum, selenium and fluorine have been encountered in widely diverse areas of many developing countries but have not been sufficiently studied. It is within these problem conditions that the Mineral Studies with Ruminant Animal Project was designed and is being implemented.

16. INPUTS.

The Mineral Studies with Ruminant Animals Project commenced as scheduled in PIO/T Number 931-17-130-514-73 and work under the project continues in an expeditious manner. As a research effort, the project's principle inputs are the technical services of the University of Florida's scientific staff; which as indicated in the review, has been supplied in a timely, professional, and conscientious way. The total A.I.D. support utilized through 6/30/82 was \$1,384,455.22 and authorized expenditures between 7/1/82 and 9/30/82 were estimated at \$15,535.00. A funding level of \$400,000.00 has been authorized for the final year of the contract (10/1/82-9/30/83).

Specific contributions of participating country institutions and individuals compared to AID/Florida inputs are estimated to be a 15 to 20:1 ratio. The Florida scientists are assisting with difficult laboratory analyses and are contributing professional expertise for design, implementation and conduct of research, as well as interpretation of the collected data. The contractor has also furnished difficult-to-obtain chemicals, laboratory supplies and expendable supplies for collection, preservation and analyses of samples to host country collaborators. The University of Florida has provided short-term laboratory training in mineral research techniques to many foreign technicians. During the past 2 and 1/2 years, 8 technicians have participated in this program representing the countries of Brazil, Dominican Republic, El Salvador, Mexico, Panama, The Philippines, Uruguay and Venezuela. A laboratory manual, developed through project funds and printed in English, Spanish and Portuguese, has been widely distributed throughout Latin America.

17. OUTPUTS.

The supplementation of phosphorus has been shown to dramatically improve reproductivity performance (i.e., Bolivia, Brazil, Colombia, Malaysia, Panama, Peru, The Philippines and Uruguay). A study in Brazil resulted in a 77% calf crop when bonemeal was fed compared to 55% for the controls. Trials in the Colombian llanos demonstrated that the pregnancy rate was increased from 50% for the controls up to 84% when completed minerals were fed. Benefit-to-cost ratios have been at least 2:1 when phosphorus has been supplied to cattle with low reproductive rates. During the past two years, attempts have been made to

encourage additional mineral supplementation trials in a number of tropical countries to demonstrate the effect of phosphorus on production under conditions existing in these countries. Therefore, mineral supplementation trials are now underway in Bolivia, Brazil, Colombia, Ecuador, Peru, Uruguay, Malaysia, The Philippines, Indonesia and Venezuela.

The largest mineral supplementation trial to-date involved 1870 cattle in the Beni region of Bolivia. For the first year end results, phosphorus-supplemented weaned animals gained 97 kg versus 77 kg by non-supplemented calves. For the recently completed third year results, cattle receiving phosphorus had a 12.5% higher calving percentage and gained 21 kg more than controls. From Goias, Brazil, cattle receiving common salt gained only 53 g/animal/day versus 90, 137 and 112 g for animals receiving phosphorus, phosphorus + cobalt + copper + iodine, and phosphorus + cobalt + copper + iodine + zinc + iron + manganese, respectively.

Visits to cooperating institutions, 1 or 2 times annually, are necessary for stimulating mineral research. The program in Latin America initially started with 5 countries and continually expanded to 14. Programs in the Dominican Republic, Honduras, Panama and Mexico have been initiated during the last two years. In late 1977, visits were made to interested researchers in Indonesia, Malaysia and the Philippines. Thailand was first visited in November of 1978. Since late 1978, contacts were established in Malawi, with Sudan, Senegal, Kenya and Zaire becoming active in the program in early 1981.

The Florida program has provided a great deal of literature to all personnel, including the use of computer facilities of personnel of certain countries. One of the principal goals of the program is to stimulate mineral research within the participating countries. To accomplish this objective, laboratories have been assisted by purchase of chemicals, consumable supplies and occasionally, small equipment. This project has made and is continuing to make excellent progress towards increasing cooperating laboratories' capability to carry out mineral analyses. In 1976, a manual on "Methods of Mineral Analysis for Plant and Animal Tissues" was distributed to all cooperating laboratories in one of three languages - English, Spanish or Portuguese. Approximately 1500 copies of this publication was distributed. This Manual standardized procedures for sample collection, identification and analyses. The second edition of this publication was published in English and Spanish in 1979 and a revised Portuguese edition became available in 1980. The Florida Nutrition Laboratory has aided overseas laboratories by performing some of the more difficult analyses, including cobalt, selenium, molybdenum and sulfur.

During the past 2 and 1/2 years, as part of building up laboratory capabilities, three-month laboratory training programs have been provided at Florida to 8 laboratory technicians from Uruguay, Brazil, Dominican Republic, El Salvador, Mexico, Panama, Philippines and Venezuela. To further assist laboratories and standardize procedures, project personnel have visited all cooperating laboratories to discuss and demonstrate laboratory techniques. One or more laboratories in each country are currently conducting the majority

of mineral analyses, except cobalt, molybdenum, selenium and sulfur. Several different experimental designs have been prepared and discussed with cooperating country personnel. From these, a satisfactory experimental design has been developed for each of their experimental situations. All phases of this project have been conducted in complete cooperation with indigenous and international research organizations.

The "Latin American Symposium on Mineral Research with Grazing Ruminants" was held in Belo Horizonte, Brazil in 1976. This Symposium was jointly sponsored by Brazilian universities, research organizations and the AID/Florida project. Each of the 250 participants in the Symposium, from 10 countries, received a copy of the proceedings in Portuguese. Brazilians presented 11 papers, University of Florida personnel 12 papers, and invited speakers, 4 papers. The Symposium was a major effort to stimulate research and update the available information on mineral deficiencies and toxicities in Latin America. At the University of Florida, these proceedings were translated into both English and Spanish and an extensive photographic section was added to these editions. A total of 3500 copies of the proceedings were printed in Spanish and English and were available for distributed in 1979.

A large quantity of material related to mineral research has been sent to collaborating institutions and other interested groups. This has included reviews related to mineral research as well as theses on mineral research carried out in Latin America.

Graduate student programs are an important aspect to the Mineral Research Program. Often students do the course work at Florida and return to their native countries for the purpose of organizing research and collecting data. When these students leave Florida, they are well prepared to continue in the mineral research area in their own countries. Currently there are 11 graduate student programs (5 Ph.D.s and 6 M.S.s) in the mineral research area.

18. PURPOSE.

The approved project purpose is to determine the mineral status of ruminants in developing countries and to develop efficient mineral supplementation regimes for ruminants. In keeping with this purpose, the research methodology permits rapid determination of the mineral status of ruminant livestock populations under study. An accurate review of the mineral status in a specific region will permit the recommendation of the mineral supplements for correcting deficiencies and/or toxicities. Mineral status varies with soil type, forage species, age and physiological function of the animal.

The ultimate objective of the project is to have livestock producers use nutritionally formulated mineral supplements to correct mineral imbalances. Results of the research to date have been presented at ALPA (Latin American Society of Animal Production), American Society of Animal Science, Latin American Livestock and Poultry Conference, Symposium on Mineral Research in Latin America, Pfizer Central American Conference, International Workshop on Feeding Systems (APHCA), CINTA Symposium, Thailand Mineral Conference, Fourth

International Symposium on Trace Elements, Chapingo Nutrition Conference, Colombian Animal Production Association, International Congress of Nutrition, World Conference on Animal Production, Symposium on Feed Composition, Animal Nutrient Requirements, World Conference on Animal Feeding, Brazilian Society of Animal Production, and International Minerals Conference as well as at numerous national livestock meetings. Popular articles are being written regarding the value of using mineral supplements. The outputs described in number 17, page 5 are consistent with the approved project purpose and the reviewers were able to document significant progress toward the achievement of the approved purpose.

19. GOAL/SUBGOAL.

As stated in the log frame that accompanied the Research Project Statement for the Mineral Studies with Ruminant Animals Project, the approved goal is "to efficiently increase productivity of all ruminants in the developing countries". With a project goal varying only slightly from the approved project purpose, it is fair to conclude that those comments made relevant to the achievement of the project purpose would also be appropriate to the project's goal.

20. BENEFICIARIES.

The two direct beneficiaries of this project are the owners of grazing ruminants, that respond to mineral supplementation, and the scientists of the LDC agencies who receive valuable training and laboratory equipment for application to future research programs. In the first situation, the livestock owner will experience improved production, via growth and reproduction rate increases. The second class of beneficiary - the more qualified scientists - should demand better financial arrangements and higher positions than his colleagues.

The livestock owner who's animals are extremely deficient in mineral intake will realize larger returns per dollar involved in mineral supplements than owners who's animals have marginal deficiencies. Therefore, emphasis has been on the most dramatic situations for promotional purposes. In the more severe situations, weight gains have been doubled and birth rates were increased from 50% to 75% with mineral supplementation. Economic returns were estimated at a return of two for every one unit spent on minerals.

Other beneficiaries should be buyers of animal products because increased production should help to curb inflation in the market. Increased salable products should allow farm families more money for essential goods. Manufacturers of mineral supplements and suppliers could also derive some financial gains.

21. UNPLANNED EFFECTS.

At the time of the evaluation the project had not encountered any unanticipated social, health, environmental, technical, or economic constraints that would necessitate any modification in the project's design or implementation plan.

22. LESSONS LEARNED.

There are several aspects of the Mineral Studies with Ruminant Animals Project implemented to date that taken as a whole, would serve as a model for other projects researching development constraints. The University of Florida's highly competent staff of scientists were successful in the development of an appropriate experimental design for the project. Following that, a work plan was drawn up and all indications are that every reasonable effort has been made to adhere to it. Most impressive of all has been the ability of project management to enter into collaborative complementary interactions with scientists from other institutions in many of the developing countries. This cooperation has manifested itself in the sharing of equipment, knowledge and facilities and to a very large degree has been responsible for the progress made under this project. The smoothness of operations within the program can attest to the dedication and sincerity of the contractor and the understandings and respect developed between donor and host country representatives. An example of this associationship is that it is agreed that, "data generated within each country is the property of that country."

23. SPECIAL COMMENTS OR REMARKS.

The contractor appears to have overlooked the possibilities of collaborating activities with faculty and staff of the Escuela Agricola Panamericana (EAP) in Honduras. The EAP has well established resources in animals, facilities and personnel. Staff include professional acquaintances and the students make excellent prospects for "spin off" benefit. Students who might become involved in livestock mineral studies will return to their homes in different Latin American countries and/or first proceed to institutions of higher degrees upon graduation from EAP. This seems like a perfect situation for the contractor to superimpose mineral programs on established resources with very little output.

Copies of correspondence to Dr. Lee McDowell were overwhelming evidence that former collaborators are still seeking guidance in present research activities from the contractor. These letters asked for opinions on research design, analyses needed for verifying results, type of publication most appropriate for reporting research results, and preliminary drafts of articles in English, Spanish and/or Portuguese for editing. Numerous requests have also been received by the contractor for assistance in obtaining tools for recurring bone, blood and/or liver samples from live animals and in the procurement of certain chemicals reagents for laboratories. Copies of literature on mineral research is supplied to appropriate scientists throughout the world and a laboratory procedure manual, developed by the contractor, is widely used in developing country laboratories. Many of these items are hand delivered by the

contractor which assures safe delivery in developing countries and accounts for the excess baggage allowances or travel requests. In some cases, the requestees are former graduate students who have been elevated to high governmental positions and are thus influential individuals within their countries. (The contractor has also frequently supplied copies of general reports and completed these to the A.I.D Project Manager which have been distributed to A.I.D. Missions in related environments.)

Reports that the project has been responsible for dramatic improvements in livestock production with the herds of cooperators suggested a need to measure these improvements. To date, the improved performance of the livestock groups due to correct mineral intakes, has been expressed as increases in growth rates, reproduction rates, survival rates, etc. The research data accumulated should now be used to emphasize the monetary value of minerals through cost-benefit projections by using local prices for livestock, minerals and other cost factors. The contractor will proceed to develop cost-benefit relationships for several different livestock raising conditions from project results. These values have to be the most effective tool (incentive) for encouraging livestock producers to use correct mineral supplements. It is suggested that this information be included in the project terminal report.

The intensity of correspondence between the contractor and scientists in developing countries has to be a strong indicator that the contractor has developed lasting, sincere relationships through these mineral research activities. However, it is not always possible to assign a dollar value to

professional respect from citizens of developing countries for U.S. scientists. It is also obvious that A.I.D. has received valuable recognition for supporting the contractor's programs. This review helped to identify these extra dividends of good will which are impossible to convert to dollars today - but tomorrow accountants may try to "balance the books." The reviewers strongly suspect that they witnessed a "solid ripple" which will probably develop into a "big splash" in the future, while studying the progress of this A.I.D. project and feel that it is regrettable that the project will terminate in 15 months time.

Attachments:

- a) Review Scope of Work (13 pages)
- b) Contractor's Progress Report - June 1979-1982 (289 pages)
- c) List of Collaborators (3 pages)

PARTIAL LIST OF COLLABORATORS IN DEVELOPING COUNTRIESBOLIVIA

- | | |
|----------------------|--|
| 1. Edmundo Espinoza | Instituto Boliviano de Tecnologia Agropecuaria |
| 2. Bernardo Bauer | Private ranch in the Beni region |
| 3. Hugo Perez. S | CIAT Unit in Santa Cruz |
| 4. Andres Parra L | Facultad de Veterinaria y Zootecnia |
| 5. Winston Suarez A. | AGRIPAC Boliviana Cia Ltda |

BRAZIL

- | | |
|-------------------------|---------------------------------------|
| 1. Paulo de T. Alvim | Centro de Pesquisas do cacau (CEPLAC) |
| 2. Adilson Serrao | CPATU/EMBRAPA |
| 3. J. A. Carneiro Viana | Escola de Veterinaria de UFMG |
| 4. Jorge Lopes | Faculdade de Agronomia UFRGS |
| 5. Marcelo Mendes | Instituto de Zootecnia UFRRJ |

COLOMBIA

- | | |
|---------------------|---|
| 1. Alejandro Uribe | Universidad National-Facultad Veterinaria |
| 2. Jaime Garcia | Departamento Tecnico Jaramillo |
| 3. Max Laredo | Programa Nacional de Nutricion Animal |
| 4. Rodrigo Pastrana | Programa Ovino Tibaitata |
| 5. Carlos Lascano | Centro Inter.de Agricultura Tropical |

COSTA RICA

- | | |
|--------------------|----------------------------|
| 1. Hernan Fonseca | Universidade de Costa Rica |
| 2. Carlos Jimenez | Universidade de Costa Rica |
| 3. Rolando Quesada | Pfizer, S.A. |
| 4. Miguel Grillo | Escuela C. A. de Ganaderia |
| 5. Bryon Hopwood | Escuela C. A. de Ganaderia |

DOMINICAN REPUBLIC

- | | |
|----------------------|---------------------------------------|
| 1. Mario Fernandez | CENIP |
| 2. Manuel Sosa | Direccion General de Ganaderia |
| 3. Ramon Cisneros | Secretaria de Agricultura |
| 4. Gregorio Lagombra | Estacion Experimental Ganado de Carne |
| 5. Emilio Olivo | CIMPA |

ECUADOR

- | | |
|----------------------|---|
| 1. Mario Lalama | INIAP |
| 2. Angel Anzules | INIAP |
| 3. Telmo Oleas | Estacion Experimental de Santa Catalina |
| 4. Fausto Rivers | " " " " " |
| 5. Patricio Grijalva | " " " " " |

EL SALVADOR

- | | |
|----------------------|------------------------------------|
| 1. Juan Menendez | Direccion General de Ganaderia |
| 2. Ferdinando Peria | " " " " |
| 3. Ivan Behman | Proyecto Desarrollo Ganadero (FAO) |
| 4. Roberto Guillermo | Universidad de El Salvador |
| 5. Margoth Palma | " " " " |

GUATEMALA

- | | |
|--------------------|------------|
| 1. Marco Cabezas | FANCAP |
| 2. Roberto Jarquin | INCAP |
| 3. Luis Mejia | " |
| 4. Carlos Tejada | Granjanara |

HONDURAS

- | | |
|---------------------|--------------------------------------|
| 1. Antonio Flores | Centro de Investigacion y Desarrollo |
| 2. German Contreras | Centro de Investigacion y Desarrollo |
| 3. Jorge Roman | Escuela Agricola Panamericana |
| 4. Aurelio Revilla | " " " |
| 5. Carlos Bascha | " " " |

INDONESIA

- | | |
|--------------------------|-------------------------------|
| 1. Soekanto Lebdosoehojo | Gadjah Mada University |
| 2. Sukadji Runawihardjo | " " " |
| 3. Mohammed Ridwan | Pasar Jum' at Research Centre |
| 4. Toha Sutardi | Institut Pertanian Bogor |
| 5. Juju Wahya | Institut Pertanian Bogor |

MALAWI

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|-------------------|------------------------------|
| 1. Joshua Mtimuni | Bunda College of Agriculture |
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MALAYSIA

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|--------------------|-------------------------------|
| 1. Wan Muda | ICI (Malaysia) Sdn. Bernad |
| 2. Sunny Siang | ICI (Malaysia) Sdn. Bernad |
| 3. Carlos Devendra | MARDI |
| 4. Syed Baker | MARDI |
| 5. Syed Jalaludin | Universiti Pertanian Malaysia |

MEXICO

- | | |
|----------------------|---|
| 1. Humberto Troncoso | U.N.A.M. |
| 2. Ismael Escamilla | U.N.A.M. |
| 3. Fidel Castillo | Instituto Nat. de Investigaciones Pecuarias |
| 4. Jorge Trinidad | INSTITUTO Nat. de Investigaciones Pecuarias |
| 5. Fernando Herrera | Universidad de Yucatan |

PANAMA

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|-------------------|-------|
| 1. Roberto Quiroz | IDIAP |
| 2. Santiago Rios | " |
| 3. Rodrigo Tarte | " |

PERU

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|-----------------------|---------------------------------------|
| 1. Oswaldo del Valle | IVITA |
| 2. Mariano Echevarria | IVITA |
| 3. Juan Kalinowski | Universidad Nacional Agraria |
| 4. Luis Valera | Universidad Nat. Tecnica de Cajamarca |
| 5. Jose Mendoza | Universidad Nat. Tecnica de Cajamarca |

PHILIPPINES

- | | |
|---------------------|-----------------------------------|
| 1. Vicente Momongon | University of the Philippines |
| 2. Perla Lopez | University of the Philippines |
| 3. Alfonso Eusebio | PCARR |
| 4. Carlos Mata | Sarangani Cattle Co. |
| 5. S. K. Ranjhan | Caribou Research & Develop Center |

THAILAND

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|---------------------------|----------------------------|
| 1. Boonlue Phuagphong | Kasetsart University |
| 2. Charan Chantalkhana | Kasetsart University |
| 3. Metha Vannapath | Khon Kaen Univeristy |
| 4. Suphon Ruttanapon | The East Asiatic Co. Ltd. |
| 5. Charnvit Chiaravannont | Pfizer International Corp. |

URUGUAY

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|----------------------|--|
| 1. Thomas Kachele | Catedra de Nutricion Animal |
| 2. Teresita Alonso | Centro de Investigaciones Veterinarias |
| 3. Cesar Corengia | Universidad de la Republica |
| 4. Mario Allegri | Ministerio de Ganaderia y Agricultura |
| 5. Artigas Lacabanne | Servicios Veterinarios Zonales |

VENEZUELA

- | | |
|--------------------|---|
| 1. Fausto Capote | Universidad de Zulia |
| 2. Eliecer Velasco | C. A. INVEGA |
| 3. Jose VELASQUEZ | Carretera Salida-El Tigre |
| 4. Alexis Moya | Centro Nat.de Investigaciones Agropecuarias |
| 5. Jose Perdomo | Universidad Central de Venezuela |

ZAIPE

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| 1. Kiatoko Mangeye | I.F.A. at Yangambi |
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SCOPE OF WORK FOR PROJECT REVIEW

- A. PROJECT TITLE: Mineral Studies with Ruminant Animals
- Project Number: 931-0600
- Contract Number: AID/ta-c-1153
- B. NAME OF CONTRACTOR: Center for Tropical Agriculture
Institute for Food and Agricultural Science
University of Florida
Gainesville, Florida
- C. A.I.D. PROJECT MANAGER: Charles E. Haines
S&T/AGR/AP
Agency for International Development
Washington, D. C. 20523
- D. DATE AND PLACE OF REVIEW: September 27-28, 1982 in Gainesville,
Florida

E. RECENT PROJECT REVIEWS:

This project was initiated in 1974 and is funded to September 30, 1983. The last in-depth team evaluation was conducted in 1979 by an independent group. As a result of this review, the contract was extended for an additional three (3) years. In November 1980, an A.I.D. project manager's review was conducted which showed satisfactory progress by the contractor. In April and May, 1981, Dr. Douglas Butchart of S&T/AGR/AP, accompanied two of the contractor's representatives to Asia for the purpose of reviewing the project activities on site. The trip report, by Dr. Butchart, covers the observations on contract progress in Malaysia, Thailand, Indonesia and the Philippines through May 1981. The A.I.D. project manager reviewed the opinions of Dr. Butchart for impressions of project progress in Asia and received indications that progress was satisfactory.

F. RATIONALE FOR PRESENT REVIEW: A review of contract progress for 1982 has not been conducted to date, and it has been three years since a review was conducted at the home site of the contractor. The presently scheduled review date is the mid-contract period for these last three years of the program. Therefore, it seems appropriate to apply detailed attention to a review at this period because the contractor will have to begin phasing down the program. Thus, the A.I.D. project manager will be assisted in this review by Dr. Butchart who has had previous experience with the project.

The A.I.D. project manager and Dr. Butchart will: (1) review accomplishments since the last in-depth review in 1979; (2) evaluate the work plans and budget expenditures for the period September 30, 1982 to September 30, 1983; (3) determine the impact of research results on target populations; and (4) utilize the lessons learned by these contract operations for guidance in future contracts of this nature.

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G. ISSUES TO BE ADDRESSED IN
THIS REVIEW:

1. Previous management procedures for project operations in Latin America, Asia and Africa.
2. Performance of contractor towards meeting project outputs, purpose and goals.
 - a. Quality of training provided by contractor.
 - b. Linkage established with National, Regional and International Research Institutions.
 - c. Amount of support generated from host country agencies and private individuals.
3. Adequacy of project strategy, resources input, implementation of work plans, etc.
 - a. Sponsorship of workshops or field days.

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b. Support of host country facilities in the form of equipment, supplies, essential materials, training manuals, etc.

c. Collaboration with other A.I.D. contractors/grantees and A.I.D. missions.

4. Utilization of mineral research results from project activities by host countries. What use has been made by host country livestock producers?

a. Dissemination of results and related information throughout regions with similar conditions.

b. Assistance with publications and types of publications included.

c. Effectiveness of trained technicians in home country.

d. Detail of beneficial results from research trials for the small livestock producer in developing countries.

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5. Impact on usefulness of program results from host countries to industries and institutions in the U.S.

6. Budgetary systems, proportions of expenditures for various activities of project, etc., which sections of the project are the most expensive, where is A.I.D. getting the most return for investment, etc.?

7. Plans of contractor for project activities beyond termination of A.I.D. funding. Will some of the collaborators continue? If so, how will it be funded, etc.?

8. Were there unplanned beneficial responses to some to the project activities?

9. Review on implementation of final year's work program and how the contractor will phase down the project activities, if plans are to do so.

10. Annual Report from the contractor on project activities. Review of reports on trips supported with project funding.

11. The future of this type of project in developing countries. Where should emphasis be continued, expanded or decreased with a program of this type? Is focus on the correct species of livestock, the most influential institutions, the region with the greatest potential, etc.?

12. Unplanned issues and topics proposed by the contractor for consideration. Reports from project activities furnished to the A.I.D. project manager.

13. Discussion of a project terminal review scheduled for late 1983. What observations should be made, type of terminal report prepared by contractor, etc.?

H. PREPARATION OF REVIEW REPORT: Results of discussions and observations at the University of Florida, Gainesville with representatives of the project contractor will be summarized in an A.I.D. Project Review Summary. The review team should also have the benefit of reports supplied by the contractor on project accomplishments.

RESPONSES TO ISSUES LISTED FOR REVIEW (By Numbers)

1. The contractor encourages and helps host country collaborators in designing mineral research projects then the management of the project is the responsibility of the host country scientists. The contract has also sponsored the training of technicians and graduate students in livestock mineral research techniques. The actual research program is often done in the home country of the graduate students.

2. The contractor is providing quality training for both graduate degrees and short-term instruction. In a typical program, the student completes course work at the University of Florida and then returns to his/her country to collect samples of soil, plant and animal tissues from several farms within two or three selected regions. The student then returns to the University of Florida to analyze these samples and write a thesis on the study. Short-term instruction includes training on laboratory analyses or collecting and preserving samples, etc. Linkages have been established with scientists in National, Regional, and International institutions and these agencies are continuing to request assistance and provide support for minerals research projects. It appears that host country collaborators provide more than 75 percent of the support to actual research projects.

3. The Animal Science Department of the University of Florida sponsors an annual Latin American Livestock Short Course at Gainesville which is managed by their contract representative. The contract representatives also participates in field days in developing countries and supply a considerable amount of laboratory reagents, sampling tools and manuals to local scientists. Seminars and briefing sessions on the value of minerals are frequently presented to developing country audiences. The contractor has provided consulting services to the Small Ruminant CRSP nutrition subproject in Kenya and Indonesia.

4. Local livestock producer associations have requested seminars and guidance on mineral supplementation practices. Theses, articles and reports have been distributed throughout developing countries on the importance of minerals. Representatives of the contractor attend and present reports at National and International meetings in Latin America and Asia, annually. Copies of multitudes of letters from former students and present collaborators asking for technical guidance, verify the tremendous respect for the contractor's capability on this subject.

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5. The impact of the contractor's efforts is generating requests by host country representatives for mineral products from U.S. companies. In some cases, developing country commercial firms are ordering trace mineral mixtures from U.S. companies to fortify local supplies of common salt and/or bone meal. At other times, complete mineral mixtures are imported from the U.S.

6. The largest expenses charged to AID funding seem to be the travel of contract representatives, laboratory materials and the training of developing country scientists. The contractor representatives perform somewhat like traveling extension agents determining problem areas, encouraging the establishment of research trials, helping collaborators interpret experimental results and publicizing the value of the subject matter. The contractor receives more requests for direct assistance from numerous developing countries than are possible to satisfy.

7. The contractor is presently attempting to prepare for the continuation of certain portions of the program after the termination of this AID funding. Potential trainees are now being directed to other international organizations for support. Host government agencies and livestock groups are beginning to assist in the support of the visits by contract representatives.

8. The efforts of the contractor has produced accelerated interest in mineral nutrition which has greatly expanded the recognition of the University of Florida as an international leader in Animal Science programs. This has lead

to other members of the faculty being invited to assist in the subjects of breeding, nutrition, animal management, forages, meat quality, marketing and judging at national fairs. These additional activities have not been funded by this AID project but this project is somewhat responsible for these extra contacts.

9. The contractor will phase down the project activities to keep within the constraints of available funds with hopes of developing other sources of support for future activities.

10. Detailed trip reports have been recieved by the AID project manager which all indicate an active contract program. There is a great deal of variation between contract representatives in the promptness of trip report submission.

11. Major attention has been focused on the developing countries of Latin America and the program is firmly established there. Although it would seem desirable to continue supporting these ongoing programs, the contractor has neglected countries in Africa. The last project review recommended that the contractor place more emphasis on Africa and this same point is repeated.

12. The AID project manager has been "flooded" with copies of correspondence and issues generated by the contractor's activities. The contractor would like extended support of this program by AID, however this does not appear probable at this time.

13. The contractor should submit a terminal report for the project in early 1984. This report could relate the problems encountered, systems of operations, progress made by the program, and recommendations for future activities of this type. The report could also point out what attention is still needed to improve livestock production in developing countries.