PD-AAU-490 49687

Y FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: C (A = Add, C = Change, D = Delete)

Amendment Number: One

DOCUMENT CODE: 3

NTITY: d for Science and Technology

3. PROJECT NUMBER: 936-4178

OFFICE: ce of Agriculture 10

5. PROJECT TITLE (maximum 40 characters): Improved Animal Vaccines thru Biotech

JECT ASSISTANCE COMPLETION DATE (PACD): MM 09 DD 30 YY 93

7. ESTIMATED DATE OF OBLIGATION (Under 'B.' below, enter 1, 2, 3, or 4)

A. Initial FY 86 B. Quarter 4 C. Final FY 92

8. COSTS ($000 OR EQUIVALENT $1 =)

A. FUNDING SOURCE	FIRST FY B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total	$870		$870	$8,870		$8,870
(Grant)	(870)	( )	(870)	(5,870)	( )	(5,870)
(Loan)	( )	( )	( )	( )	( )	( )
Other U.S. 1. Missions, Regional						
Other U.S. 2. Bureaus & AID/W						
Host Country				3,000		3,000
Other Donor(s)						
TOTALS	870		870	8,870		8,870

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) ARDN	III I	078		$870		$5,000		$5,870	
(2)									
(3)									
(4)									
TOTALS				870		5,000		5,870	

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 119, 080, 041

11. SECONDARY PURPOSE CODE: 121

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code	R/AG	XII	R/ED			
B. Amount	$4,950	$4,500	$2,500			

13. PROJECT PURPOSE (maximum 480 characters)

To use the biotechnological skills of the U.S. scientific community in collaboration with LDC scientists to develop and test in containment new or improved vaccines for the control of rinderpest, anaplasmosis and babesiosis.

14. SCHEDULED EVALUATIONS

Interim MM 10 YY 89 MM 02 YY 91 Final MM 10 YY 92

15. SOURCE/ORIGIN OF GOODS AND SERVICES: [x] 000 [ ] 941 [ ] Local [ ] Other (Specify)

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a ____ page PP Amendment.)

The purpose of this amendment is to increase the authorized life of project cost by $5,000,000 to expand the purpose for the development and containment testing of new or improved vaccines for the control of anaplasmosis and babesiosis, extend the final year of obligation to FY 1992, and the PACD to 9/30/93, and provide for up to $3,000,000 for missions, regional bureaus, and other AID/W offices to fund related activities.

17. APPROVED BY

Signature: Duane Acker

Dr. Duane Acker

Title: Agency Director for S&T/FA

Date Signed: MM 05 DD 15 YY 87

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION

MM DD YY

PROJECT AUTHORIZATION AMENDMENT

ENTITY: Bureau for Science and Technology

PROJECT TITLE: Improved Animal Vaccines through Biotechnology
Amendment No. 1

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, the Improved Animal Vaccine through Biotechnology project which is centrally funded was authorized on June 27, 1986. The authorization is hereby amended as follows:

   - The centrally funded planned obligation level is increased by $5,000,000 in grant funds to $5,870,000 for developing and testing in containment facilities new or improved vaccines for the control of anaplasmosis and babesiosis;

   - Up to $3,000,000 of additional funding may be provided by missions, regional bureaus, and other AID/W offices during the extended period for adapted research, training, networking and technology transfer.

   - The authorized final year of obligation is extended to FY 1992; and

   - The authorized project assistance completion date is extended to September 30, 1993.

2. The authorization cited above remains in force except as hereby amended.

Duane Acker
Agency Director for Food and Agriculture
Bureau for Science and Technology

Date 5-5-87

Clearances:

S&T/AGR,	D. Bathrick		Date 4/27/87
S&T/AGR,	H. Hortik	for	Date 4/24/87
S&T/AGR,	E. Roche		Date 4/24/87
S&T/PO,	G. Gower		Date 5/1/87
GC/CP,	S. Tisa	TCR (TIM KIEGIEL)	Date 4/24/87

WANG:3374f:S&T/AGR/AP:MMozynski/ERoche:4/15/87

ACTION MEMORANDUM FOR THE AGENCY DIRECTOR FOR FOOD AND AGRICULTURE, BUREAU FOR SCIENCE AND TECHNOLOGY

FROM: S&T/AGR, David D. Bathrick

SUBJECT: Authorization Amendment of the Improved Animal Vaccine through Biotechnology Project (936-4178)

Problem: Your approval is required to amend the Improved Animal Vaccine through Biotechnology project to: 1) expand the purpose to include development of vaccines for control of two additional livestock diseases; 2) extend the authorized project assistance completion date (PACD) to September 30, 1993 and the final fiscal year of obligation to FY 1992; 3) increase the planned obligation level by $5,000,000 to $5,870,000 to be provided by S&T/AGR; and 4) add up to $3,000,000 of additional mission, regional bureau and other AID/W funds to be obligated by delivery orders issued against a companion basic ordering agreement (BOA).

Discussion: The project was originally authorized in [illegible] for three years to terminate August 31, 1989 with a life-of-project cost of $870,000. The project currently is implemented through a cooperative agreement (CA) with the University of California (Davis) to develop an effective infectious virus recombinant vaccine to eradicate rinderpest. We plan to award a five-year CA for $5,000,000 to develop vaccines for the control of anaplasmosis and babesiosis, but we need to amend the original authorization and update the project documentation in order to do so. The CA will be awarded pursuant to competitive procedures.

This amendment will increase the authorized life of project cost by $5,000,000; expand the purpose to include the development and containment testing of new or improved vaccines for the control of anaplasmosis and babesiosis; and extend the final year of obligation to FY 1992 and the PACD to September 30, 1993. It will also provide for up to $3,000,000 for missions, regional bureaus, and other AID/W offices to fund related activities under a companion BOA which will be fed directly back into the recipient's research agenda, design, curricula, and teaching materials to be developed under the CA.

S&T/AGR's contribution will provide for: 1) developing the vaccine(s) and testing in containment facilities on a limited number of animals; 2) disseminating the scientific findings to the LDCs; 3) training LDC scientists at the technical, graduate and postdoctoral level and providing in-service and on-the-job training to technicians and scientists; and 4) establishing a network of information exchange among participating scientists in both developed and developing countries.

The vaccines to be developed will provide a simple inexpensive way to provide immunity to livestock diseases which cause death and reduced productivity resulting in total losses worldwide of over $1.0 billion annually. These vaccines will not require syringes or refrigeration, but will be applied by scarring the skin and can even be produced on the farm by harvesting the scabs on recently vaccinated animals.

Special orders funded by the missions, regional bureaus, and other AID/W offices under the BOA will provide for operational and adaptive research in LDCs, training activities, and technical assistance.

The decision to fund the development of vaccine(s) for anaplasmosis and babesiosis is based primarily on the National Science Foundation panel's 1985 report on Vaccine Development for Tropical Animal Diseases. In that report, it was recommended that A.I.D. support research on hemoparasitic diseases such as anaplasmosis, babesiosis, heartwater and theileriosis (East Coast Fever). We selected anaplasmosis and babesiosis as the vaccine development is further along than for heartwater. (In addition, the Bureau for Africa is funding heartwater research.) The vaccine(s) for theileriosis is being developed by the International Laboratory for Research on Animal Diseases. The chances for the development of vaccines for anaplasmosis during the first year and babesiosis during the second year are very high according to scientists currently working in this field.

Large-scale field testing of the vaccine(s), which is necessary prior to utilization of the vaccine(s), is not included in this phase of the project. At the present time, a complete environmental assessment reviewed by USDA, Animal and Plant Health Inspection Service, is required before such field testing may be initiated. The issues and funding of field testing would have to be addressed if a follow-on project is developed.

Sector Council Endorsement: On April 1, 1987 the members of the Sector Council for Agriculture endorsed this amendment to the project paper; copy attached as Tab C.

Agency Policy: This project amendment is consistent with the Agency's current emphasis for the Section 103 account to increase incomes of the poor and expand the availability and consumption of food while maintaining and enhancing the natural resource base. The activities proposed to be carried out under the CA can strengthen national institutional capabilities

4

through education, policy dialogue, and human resources development. In addition, this project amendment has the potential of increasing the foreign exchange earnings from the sale of livestock products on the world market.

Justification to Congress: This action will require a congressional notification as the project was not included in FY 1987 CP. The notification is being prepared and will be forwarded shortly for your clearance.

Budget Considerations: The FY 1987 OYB has $350,000 to initiate the CA and the FY 1988 CP has $480,000; this is a total of $830,000 for the first year of the CA, assuming we are able to budget $480,000 in FY 1988. Years two through five are budgeted at $1.0 million per year. If the FY 1988 OYB for S&T/AGR is less than the FY 1988 CP of $31.0 million, activities will have to be prioritized and decisions made on budget allocations. The decision to proceed with a second phase of this project now is based on S&T/AGR's assessment of its relevance to development needs, technical feasibility, and likelihood of success in the relatively near-term. This is a high-priority research activity which promises pay-off to AID's investment. In approving this project amendment, the budgetary complications should not overshadow the scientific merit of the activity, its development priority, and the anticipated economic returns from the investment.

Environmental Considerations: The recipient of the cooperative agreement will be required to implement this research activity in accordance with:

- The National Institutes of Health Guidelines for Research Involving Recombinant DNA Molecules;
- Procedures issued by the USDA , EPA, or other appropriate Federal agency, regarding testing of genetically engineered organisms;
- A.I.D.'s environmental procedures; and
- Such other Federal guidelines and procedures as may apply during the course of the research.

Additionally, the recipient cannot commence testing in any foreign location until written approval for such testing is obtained from A.I.D. and the Government of the country where testing is planned. Testing shall be conducted in accord with all applicable regulations of that country.

In addition, however, and prior to commencement of any such testing, the cooperator shall make a judgment and communicate the same to A.I.D. as to whether the regulations, procedures or facilities of the country in question are adequate to ensure testing in an environmentally sound manner. In the event such judgment is that they are not, the cooperator and A.I.D. will consult and agree on the conditions to be applied to the testing which will have such environmental effect. Reports submitted under this activity to A.I.D. will address regulatory issues as above related to the activity.

The Environmental Threshold Determination and the Initial Environmental Examination are attached to the project paper (Appendix VI to Tab D) for your signature.

Recommendation: That you indicate your approval to proceed with the implementation of the CA and BOA by signing: 1) the revised Project Authorization (Tab A); 2) the Project Data Sheet (Tab B); and 3) the Environmental Threshold Determination and Initial Environmental Examination (Tab D, Appendix VI).

Attachments:

Tab A - Project Authorization
Tab B - Project Data Sheet
Tab C - Sector Council Endorsement
Tab D - Project Paper - Amendment No. 1
Environmental Threshold Determination and Initial Environmental Examination

Clearances:

S&T/AGR: Harvey Hortik _____ Date 4/24/87
Elizabeth Roche _____ Date 4/24/87
S&T/PO : Gerald Gower _____ Date 5/1/87
GC/RP : Stephen Tisa TCR _____ Date 4/27/87
(Tim Tiebler)

Drafted by: S&T/AGR/AP: MMozynski/ERoche: 4/17/87: WANG: 3374f

6

MEMORANDUM TO: S&T/FA, Dr. Duane Acker

FROM: S&T/AGR, David D. Bathrick

SUBJECT: Environmental Threshold Determination

REF: Improved Animal Vaccines Through Biotechnology - Phase II - Anaplasmosis and Babesiosis
Project Number 936-4178

I have concluded that this project involves controlled experimentation exclusively for the purpose of research and contained laboratory evaluation, in the form of testing on live animals in containment facilities both of which are carefully monitored. The categorical exclusion from environmental review set forth in Section 216.2 (c), (2), (ii) of AID's Environmental Procedures is applicable, therefore to this project. Nevertheless, S&T/AGR has conducted an Initial Environmental Examination of this project.

On the basis of the Environmental Threshold Determination, I recommend that you make the following determination:

_X_ 1. The proposed agency action is not a major Federal action which will have a significant effect on the human environment.

____ 2. The proposed agency action is a major Federal action which will have a significant effect on the human environment, and:

____ a. An Environmental Assessment is required; or

____ b. An Environmental Impact Statement is required.

The cost of and schedule for this requirement is fully described in the referenced document.

____ 3. Our environmental examination is not complete. We will submit the analysis no later than _____ with our recommendation for an environmental threshold decision.

Approved: L Quam Acker

Disapproved _____

Date: 5-5-87

Clearance:Environmental Officer Carroll Collier
Carroll Collier

CHMullenax: 8/25/86:Revised 10/31/86:Revised 3/12/87

Tab A
Project Authorization

Improved Animal Vaccine Through Biotechnology

Phase II

Anaplasmosis and Babesiosis

Project Number 936-4178

Tab A - Project Authorization

S&T/AGR: 4/17/87

Tab B
Project Data Sheet

Improved Animal Vaccine Through Biotechnology

Phase II

Anaplasmosis and Babesiosis

Project Number 936-4178

Tab B - Project Data Sheet

S&T/AGR:4/17/87

10

Tab C
Sector Council Endorsement

Improved Animal Vaccine Through Biotechnology

Phase II

Anaplasmosis and Babesiosis

Project Number 936-4178

Tab C - Sector Council Endorsement

S&T/AGR:4/17/87

RECORD OF SECTOR COUNCIL FOR AGRICULTURE DECISION

Sector Council Meeting: April 1, 1987

1. Project Office: S&T/AGR/AP Project Number: 936-4178

Project Title: Improved Animal Vaccine through Biotechnology
Phase II - Anaplasmosis and Babesiosis

Proposed Recipient of Cooperative Agreement: To be competitively selected

Proposed Project Period: Five years

Proposed Budget Period: FY 1987 - FY 1992 Budget: $5,728,000

2. The Regional Bureau and PPC members of the Sector Council, and their findings are specified below:

Office Symbol	Name	Signature	Date	Endorsed	Not Endorsed
AFR/DR/ARD	Kenneth Prussner		4/1/87	4-2-87	
ANE/TR/ARD	Malcolm Purvis		4/1/87	4-2-87	
LAC/DR/RD	Steve Wingert		4/1/87	4/2/87	
PPC/PDPR	Donald McClelland		4/1/87	4/2/87	
S&T/AGR	David Bathrick		4/1/87	4/3/87	

3. It is the decision of the Sector Council for Agriculture members that this project be:

✓ Endorsed _____ Not Endorsed

Signature Kenneth A. Prussner Date 4-2-87
Acting Chairman
Sector Council for Agriculture

4. Dissenting opinions are attached.

WANG:3362f:MMozynski:3/31/87

12

Mozynski

PROJECT PAPER AMENDMENT NO. 1

Improved Animal Vaccine Through Biotechnology

Phase II

Anaplasmosis and Babesiosis

Project Number 936-4178

10/31/86:Revised 4/15/87

12

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: C (A = Add, C = Change, D = Delete) — Amendment Number: One

DOCUMENT CODE: 3

2. COUNTRY/ENTITY: Bureau for Science and Technology

3. PROJECT NUMBER: 936-4178

4. BUREAU/OFFICE: Office of Agriculture — 10

5. PROJECT TITLE (maximum 40 characters): Improved Animal Vaccines thru Biotech

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 09 DD 30 YY 93

7. ESTIMATED DATE OF OBLIGATION (Under 'B.' below, enter 1, 2, 3, or 4)
A. Initial FY 86 B. Quarter 4 C. Final FY 92

8. COSTS ($000 OR EQUIVALENT $1 =)

A. FUNDING SOURCE	FIRST FY 86 B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total	$870		$870	$8,870		$8,870
(Grant)	(870)	( )	(870)	(5,870)	( )	(5,870)
	( )	( )	( )	( )	( )	( )
Other U.S. 1. Missions, Regional						
Other U.S. 2. Bureaus & AID/W				3,000		3,000
Host Country						
Other Donor(s)						
TOTALS	870		870	8,870		8,870

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) ARDN	III I	078		$870		$5,000		$5,870	
(2)									
(3)									
(4)									
TOTALS				870		5,000		5,870	

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 119 | 080 | 041

11. SECONDARY PURPOSE CODE: 121

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code	R/AG	XII	R/ED
B. Amount	$4,950	$4,500	$2,500

13. PROJECT PURPOSE (maximum 480 characters)

To use the biotechnological skills of the U.S. scientific community in collaboration with LDC scientists to develop and test in containment new or improved vaccines for the control of rinderpest, anaplasmosis and babesiosis.

14. SCHEDULED EVALUATIONS
Interim MM 10 YY 89 | MM 02 YY 91 | Final MM 10 YY 92

15. SOURCE/ORIGIN OF GOODS AND SERVICES: ☒ 000 ☐ 941 ☐ Local ☐ Other (Specify)

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of 1 page 2? Amendment)
The purpose of this amendment is to increase the authorized life of project cost by $5,000,000; to expand the purpose for the development and containment testing of new or improved vaccines for the control of anaplasmosis and babesiosis; and extend the final year of obligation to FY 1992.

17. APPROVED BY — Signature — Title — Date Signed MM DD YY

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION MM DD YY

Project Paper Amendment

Improved Animal Vaccines Through Biotechnology
Phase II: Anaplasmosis and Babesiosis
(S&T/AGR/AP Project No. 936-4178)

Table of Contents

Page

Acronym Listing i

Executive Summary 1

1.0 Long-Term Goal, Immediate Purpose and Specific Objectives 4
- 1.1 Long-term Goal 4
- 1.2 Immediate Purpose 4
- 1.3 Specific Objective 5

2.0 Background 6
- 2.1 Lack of Efficacy of Existing Vaccines 6
- 2.2 What is a Good Vaccine 7
- 2.3 How do Infections or Vaccines Produce Immunity to Disease? 8
- 2.4 The Role of the Vaccinia Virus in Improving Vaccines 8
- 2.5 Selective Control of Livestock Populations and Their Efficiency of Production 9
- 2.6 Development Assistance Background 10
  - 2.6.1 International Programs 10
  - 2.6.2 AID Funded Projects 11
    - Mission Funded Projects 11
    - Science Advisor's Grants 12
    - S&T/AGR's Projects 12
      - Rinderpest project 12
      - CRSP - Small Ruminants 12
      - New Activities 13
  - 2.6.3 Mission's Interest in Subproject 13

3.0 Justification 13
- 3.1 Economic Losses 13
- 3.2 Technological 16
- 3.3 Commercial 16

4.0 Project Components and Outputs 16
- 4.1 AID's Contribution Research 16
  - 4.1.1 Research 16
  - 4.1.2 Training 18
  - 4.1.3 Networking and Technology Transfer ... 18
- 4.2 Participating Institutions 19
  - 4.2.1 Recipient Institution of CA 20

15

Improved Animal Vaccines Through Biotechnology
Phase II: Anaplasmosis and Babesiosis

(S&T/AGR/AP Project No. 936-4178)

Page

5.0 Cost Estimate - Summary of Five-Year Budget 20
5.1 Summary of Obligations 21
- Table 1 - Summary 21
5.2 Distribution of Funding by Line Item 21
5.2.2 S&T/AGR Funding and Mission Buy-Ins .. 21
- Table 2 21
5.2.3 Other Contributions 22
- Table 3 22

5.3 Funding Distribution by Proj. Components 22
5.3.1 Summary - AID 22
- Table 4 22
5.3.2 S&T/AGR Contribution to the Project .. 23
- Table 5 23
5.3.2 Mission Buy-Ins 23
- Table 6 24

6.0 Person Months 24
Table 7 - Person Months 24
6.1 Technical Specialties Requested 25
6.2 Subcontracts and Consultants 25
6.2.1 Subcontracts with U.S. Institutions .. 26
6.2.2 LDC National and International Institutions 26
Table - Countries and/or AID Missions Known to Desire Collaboration with Project 27

7.0 Implementation Plan 28
7.1 Expansion of Recipient's Staff 28
7.2 Selection Criteria 29
Weighted Criteria for Selection of Recipient 30
7.3 Critical Performance Indicators 33
7.4 Project Manager's Responsibility 34
7.5 Advisory Panel of Experts 35
7.6 Criteria for Bilateral Buy-Ins 36

16

Improved Animal Vaccines Through Biotechnology
Phase II: Anaplasmosis and Babesiosis

(S&T/AGR/AP Project No. 936-4178)

8.0 Monitoring 37
8.1 Annual Work Plans 37
8.2 Reporting Requirements 38
8.2.1 Annual Technical Progress Reports 39
8.2.2 Travel Reports 39
8.2.3 Training Activities 39
8.2.4 Technical and Research Reports 40
8.2.5 Annual Activity Reports 40
8.2.6 Annual Expenditure Reports 40
8.2.7 Quarterly Reports 40
8.2.8 Compliance with Federal Guidelines and Regulatory Procedures 41

8.3 Reviews and Evaluations 41
8.3.1 Management Reviews 41
8.3.2 In Depth Evaluation 41

9.0 Future Considerations 42
9.1 Field Testing 42
9.2 Other Programs Associated with Vaccine(s) ... 43

10.0 Assessment of Environmental Risks 43
10.1 Modified-Live Anaplasma Species and Babesia Species 43
10.2 Antigen Production Using Genetically Altered Bacteria for the production of Subunit Vaccine 43
10.3 The Vaccinia Virus as a Living Vector 44
10.4 Risks in Containment Testing 44
10.5 Compliance with Federal Guidelines and Regulatory Procedures 45

17

Improved Animal Vaccines Through Biotechnology
Phase II: Anaplasmosis and Babesiosis

(S&T/AGR/AP Project No. 936-4178)

Appendices

I - Project Design Summary
A. - Logical Framework
B. - Detailed Line-Item Budget

II - Critical Performance Indicators and Chronogram

III - Literature Cited

IV - Summary of Mission Responses and cables

V - Economic Analysis
A. - Production and Dollar Losses Due to Stable Enzootic Anaplasmosis and Babesiosis in the Colombian LLanos
B. - Estimate of Annual Dollar Losses Due to Stable Anaplasmosis and Babesiosis in Cattle in the Tropical Zones of the Americas and of Africa

VI - Environmental Threshold Determination and Initial Environmental Examination

VII - Request for Applications (RFA)

VIII - Glossary of Terms

WANG 3042f:10/9/86:Revised:MMozynski:4/15/87

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

PHASE II - ANAPLASMOSIS AND BABESIOSIS

ACRONYM LISTING

AARD	Agency for Agricultural Research and Development - Indonesia's Ministry of Agriculture
AID	Agency for International Development
ADF	African Development Fund
APHIS	Animal and Plant Health Inspection Service
ARS	Agriculture Research Service
CCTA	Commission for Technical Assistance in Africa
CDC	Center for Disease Control
CEQ	Council on Environmental Quality (National Environmental Policy Act)
CF	Complement Fixing
CGIAR	Consultative Group for International Agricultural Research
CPSS	Central Program Strategy Statement
CRSP	Collaborative Research Support Program
DNA	Deoxyribonucleic Acid
EEC	European Economic Commission
IBAH	Inter-African Bureau of Animal Health
IBC	Institutional Biosafety Committee
ICIPE	International Centre of Insect Physiology and Ecology
IDA	International Development Association
ILCA	International Livestock Center for Africa
ILRAD	International Laboratory for Research of Animal Diseases
NIH	National Institutes of Health
NIH/RAC	National Institutes of Health, Recombinant DNA Advisory Committee
NSF	National Science Foundation

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

PHASE II - ANAPLASMOSIS AND BABESIOSIS

ACRONYM LISTING (continued)

OAU	Organization of African Unity
OPEC	Oil Producing and Exporting Countries
PCV	Packed Cell Volumes
PI	Principal Investigator
PLADC	Plum Island Animal Disease Center of the USDA/ARS
PP	Project Paper
SR-CRSP	Small Ruminants, Collaborative Research Support Program
ST/AGR	Office of Agriculture, Bureau for Science and Technology
UCD	University of California, Davis
UCD/SVM	UCD School of Veterinary Medicine
USDA	United States Department of Agriculture
USDA/ARS	USDA, Agricultural Research Service
VSV	Vesicular Stomatitis Virus
WHO	World Health Organization

DIMPEX 9/1/86: REVISED 10/23/86

Project Paper Amendment

Improved Animal Vaccines Through Biotechnology
Phase II: Anaplasmosis and Babesiosis

(S&T/AGR/AP Project No. 936-4178)

Executive Summary

The Office of Agriculture, Directorate for Food and Agriculture, Bureau for Science and Technology recommends that the Improved Animal Vaccines Through Biotechnology Project be amended to increase the currently approved level of $870,000 by up to $5,000,000 to a new total of $5,870,000. The $5,000,000 will be used to fund a five-year cooperative agreement to implement Phase II (a subproject) of this project. Phase II is directed to the development of genetically engineered vaccine(s) using vaccinia virus as a living vector against anaplasmosis and babesiosis. Such vaccines will, if possible, provide long-term, sterile immunity (the ability to prevent the carrier state of the disease) of livestock to these hemoparasitic diseases.

This amendment will provide funds for up to a five-year cooperative agreement for: 1) developing the vaccine(s) and for testing in containment facilities on a limited number of animals; 2) disseminating the scientific findings to the less developed countries (LDCs): 3) training LDC scientists at the technical, graduate and postdoctoral level and providing in-service and on-the-job training to technicians and scientists; and 4) establishing a network of information exchange among participating scientists in both developed and developing countries.

It is estimated that in addition to the $5.0 million to be provided by S&T/AGR another $3.6 million will be made available to achieve the goal and purpose of Phase II of this project by: 1) the recipient of the cooperative agreement ($2.095 million); 2) U.S. research subcontractors/subgrantees ($0.585 million); 3) LDC institutions collaborating with the recipient in the field testing and training ($0.565 million); and 4) international institutions performing research on animal diseases ($0.355 million). These funds will be in-kind contributions and will be provided in the areas in which the institutions/organizations are already working.

21

In addition, it is estimated that missions, regional bureaus and other AID/W offices will be requesting and funding assistance for training activities, technical assistance and operational and adaptive research. These requirements will be funded by the requesters under special orders (buy-ins) issued against a companion basic ordering agreement and are estimated at $3.0 million for the life of the project or $0.1 million for year one $0.3 million for year two, $0.7 million for year three, $0.9 million for year four, and $1.0 million for year five.

(Detailed budgets are shown in Section 5.0 on pages 21, 22, 23, and 24 below.

The decision to select anaplasmosis and babesiosis as a research activity was based primarily on the National Science Foundation panel's 1985 report on Vaccine Development for Tropical Animal Diseases. In that report, it was recommended that A.I.D. support research on hemoparasitic diseases such as anaplasmosis, babesiosis, heartwater and theileriosis (East Coast Fever). S&T/AGR selected anaplasmosis and babesiosis as the vaccine development is further along than heartwater. (In addition, the Bureau for Africa is funding heartwater research) The vaccine(s) for theileriosis is being developed by the International Laboratory for Research on Animal Diseases (ILRAD). The chances for success within the first year for anaplasmosis and the second year for babesiosis are very high. This hypothesis is supported by scientists currently working in this field.

The hemoparasites Anaplasma species and Babesia species cause significant livestock losses in 66 and 115 countries respectively. Total annual dollar losses, worldwide, due to livestock deaths from these two diseases are estimated at over $400 million. Total losses, including reduced productivity, are well over $1 billion per year. Annual losses in the United States due solely to anaplasmosis are estimated at between $60 million to $100 million. Production losses in areas where these diseases are enzootic (chronically present and active) are calculated to equal or exceed death losses in non-enzootic areas.

Existing vaccines are not as effective as would be desirable, especially in less developed countries which do not have adequate resources to manage vaccine delivery systems properly. A vaccine is needed for both anaplasmosis and babesiosis which will provide sterile immunity, even in stable enzootic areas, and prevent the production losses which occur when these hemoparasites recrudesce (change from an inactive stage to break out and become active again) and produce anemia in the host animal. There is evidence in the current research literature that, through genetic engineering, it may be possible to produce a vaccine for both anaplasmosis and babesiosis which will provide sterile immunity.

22

The purpose of this subproject is to develop and test such a vaccine(s). It would, ideally, be a vaccine(s) based on the expression in vaccinia virus of the genes for one or more antigens of Anaplasma and Babesia which are capable of inducing broad heterologous, long-term immunity in susceptible livestock.

It is expected that this subproject will capitalize, within 3 to 5 years, on prior AID investments in research on hemoparasitic diseases (over $4 million to date) and on recent advances in genetic engineering with the hope of developing vaccine(s) capable of producing long-lasting sterile immunity (preventing the carrier state) to anaplasmosis and babesiosis. If this ideal proves unattainable, then we would, at the least, hope for a vaccine(s) which would stimulate the production of antibodies sufficient in quality and quantity to prevent these hemoparasites from cycling at levels which produce significant anemia and the concomitant production losses in carrier animals.

This goal is in keeping with the recommendations made by both the USAID/Rockefeller Ad Hoc Task Force (1982) and the National Science Foundation Panel on Vaccine Development for Tropical Animal Diseases (1985). It also appears feasible technically given prior successes using vaccinia virus as a vector and that Palmer et al. (1986) have identified, isolated, and proven the immunological effectiveness of one of the anaplasma (Anaplasma marginale) immunogens.

This activity will contribute to the broad, long-term goal to increase the incomes of the poor and to expand the availability and increase the consumption of food -- while maintaining and enhancing the natural resource base, ensuring good economic returns to investments in livestock, and providing the technology to reduce livestock mortality and morbidity.

Additionally, this project conforms with the S&T CPSS, which outlines the role of S&T/AGR. Specifically, this project satisfied S&T/AGR's mandate to: 1) identify research "targets of opportunity" in agricultural research and technology development for the Agency; and 2) formulate and manage a portfolio of research programs to develop technologies to increase food production and the productivity of agricultural resources. The use of vaccinia virus to develop an improved vaccine for anaplasmosis and babesiosis is truly a research "target of opportunity". Vaccinia has been engineered to produce vaccines against a number of diseases. The existence of improved vaccine(s) for anaplasmosis and babesiosis would clearly increase food production and agricultural productivity.

Genetic engineering of animal vaccines warrants high priority for technology development and transfer. This technology will be transferred to the LDCs by the capacity building of LDC institutions which participate in the research and testing of the vaccine(s), the participation of scientists in the vaccine testing stage, the training of scientists at the technical, graduate and postdoctoral levels, and the participation in network activities.

The Office of Agriculture has considered the criteria outlined in the CPSS which must be addressed when considering a project which is predominantly research oriented. An NSF scientific panel was convened on the subject of high priority research areas in animal health; its recommendations have served as the guidelines for this project. This subproject: 1) addresses regional problems; 2) has the potential to increase incomes of the poor majority by reducing livestock mortality and morbidity; 3) is expected to payoff in the near term; 4) is related to other research programs; and 5) its performance for continued support will be measured by progress against the research plan.

1.0 Long-Term Goal, Immediate Purpose, and Specific Objective

1.1 Long-Term Goal

The broad, long-term goal of this subproject is to increase the incomes of the poor and to expand the availability and consumption of food -- while maintaining stability and efficiency of food production, ensuring good economic returns to investments in livestock, and providing the technology to reduce livestock mortality and morbidity due to anaplasmosis and babesiosis.

1.2 Immediate Purpose

The immediate purpose of this subproject is to use the biotechnological skills of the U.S. scientific community in collaboration with LDC scientists to develop and test new or improved vaccines for the control of anaplasmosis and babesiosis.

During the five-year life of this project, S&T/AGR will draw upon the technical resources of an organization(s) with special expertise in research, training, and technical assistance directed toward the development and application of animal vaccines which will be economical and effective in the LDCs in the control of anaplasmosis and babesiosis. The Recipient of the cooperative agreement will participate in, oversee, and monitor a complex program of research; train scientists at the graduate and postdoctoral levels, and provide technical in-service and

on-the-job training; disseminate the research findings; establish or strengthen an existing network of scientists and institutions working in animal vaccines; and provide general technical assistance to respond to AID missions' needs in the area of animal vaccines.

It is essential that the Recipient not only have technical expertise in the area of biotechnology as applied to the development of animal vaccines, but also have demonstrated experience in research implementation and management in LDCs. Such experience is essential to maximize the efficiency and effectiveness of the project, to ensure that important linkages between project activities are developed and maintained, and to ensure that research and program support activities are coordinated with other organizations which are funding and conducting similar activities.

1.3 Specific Objective

The specific objective of this subproject is to provide financial assistance over a five-year period to stimulate and support a U.S. institution's research and development activities in the development and testing of new or improved genetically engineered vaccines for the prevention of anaplasmosis and babesiosis in livestock primarily through the use of vaccinia virus as the gene vector (although other appropriate vectors could be considered also). Through this assistance, it is expected that the institution will expand its resource base in molecular biology and its research collaboration with other U.S., LDC, and international institutions to decrease the incidence of animal losses due to anaplasmosis and babesiosis. The assistance is intended to strengthen the resource base of the institution to:

- Accelerate the development of improved animal vaccines using biotechnology and testing (under contained facilities) of the vaccines developed;

- Provide technical advice and assistance to LDCs in performing epidemiologic surveys, the use of biotechnology, and the testing of products resulting from biotechnology;

- Undertake, or establish and supervise, early in the project (the second year is suggested) epidemiologic surveys as may be necessary in Latin America and the Caribbean, Africa, and Asia and Near East to determine the best geographic locations, ecological situations, and livestock populations

for the realization of trials (under contained conditions) which are anticipated during years four and five of the project. Such surveys should also seek economic data relative to losses due to anaplasmosis and babesiosis which will serve as a baseline for determining the economic impact of the use of improved vaccines in field trials which are anticipated as a future extension of this Phase of the project.

- During the course of the epidemiologic work, a subactivity should be established to determine the relationship, if any, in stable enzootic areas, between antibody titers in individual animals and the periodic occurrence of parasitemia and reduced packed cell volumes. The epidemoiological surveys should be undertaken in collaboration with LDC institutions and should serve, in addition, as the first phase for training personnel who might later assist with the field trials where these are undertaken.

- Provide academic training (graduate and post graduate levels) at the Recipient institution, and technical training at the recipient institution and in LDCs through hands-on experience; and

- Establish or strengthen and maintain an existing international network of scientists involved in molecular biology. A component, of such a network would be the production, selection, and distribution of publications and scientific journals to LDC scientists and institutions.

2.0 Background

The limiting effects that animal diseases have on agricultural production in the developing countries have long been recognized and the international community has made a number of efforts to overcome these diseases through the use of vaccines and tick control.

2.1 Lack of Efficacy of Existing Vaccines

In general, although a vaccine may be classified as good in a developed country, it may not function well in LDCs because of inadequate delivery systems such as lack of refrigeration. Specifically, the existing killed and modified-live vaccines against anaplasmosis (a rickettsial disease) and babesiosis, also termed babesiosis, (a protozoal disease) in cattle, usually prevent acute forms of these diseases. However, in areas such as the tropics where these disease organisms (hemoparasites) and the ticks and biting insects which spread (transmit) them are

permanently present and active (enzootic), the current vaccines do not prevent vaccinated animals from becoming what are known as "healthy carriers", i.e., despite having been vaccinated they do become infected with low levels of these hemoparasites. These low-level infections rarely, if ever, produce (and in fact help prevent) the acute disease and death.

Unfortunately, the "low level infection" is not consistently "low", given that the organisms (hemoparasites) periodically multiply in the host animal's (cow's) red blood cells (RBCs) and produce moderate to severe anemia. This anemic state, per se, limits an animal's ability to do work, and reduces milk and meat production, growth rates, and reproductive function (fertility). Furthermore, it makes carrier animals more susceptible to other stresses (e.g., poor nutrition) and to other diseases from which they recover more slowly than normal.

The economic losses resulting from these considerations are discussed in Section 3.0, page 13.

2.2 What is a Good Vaccine?

It should be understood from the outset that even when a vaccine is classified as good (i.e. immunologically potent or effective) in a developed country, it may not function well under the conditions existing in LDCs. The Plowright modified-live virus vaccine against rinderpest, which is produced in tissue culture, is a case in point. The vaccine per se produces excellent, long-term (7 years) immunity to rinderpest. However, the handling of the vaccine from the site of production until the moment it is injected into an animal is crucial to its efficacy. If the Plowright vaccine is not maintained continuously under refrigeration until injected into the recipient animal, the viruses die, the vaccine's potency is lost, and the immunity it produces is inadequate or nil.

Compared with the vaccines to be developed under this subproject, the Plowright vaccine, although effective, is expensive to produce and expensive to apply, requiring sterile injection with syringe and needle in addition to refrigeration. The infrastructure and economy of many LDCs cannot meet these requirements. Although the research proposed here includes the possible use of modified Anaplasma and Babesia organisms as antigens or the use of bacterial systems to elaborate antigens, the primary emphasis will be on the use of the vaccinia virus as a gene vector. This would obviate the drawbacks mentioned above. A vaccinia-based vaccine is applied to the recipient animal by simple scarification of the skin and, if necessary, can be produced on the farm simply by harvesting the scabs which

form on the skin of recently vaccinated animals. Such scabs contain high numbers of viable vaccinia viruses which are stable at temperatures, even in the tropics, for very long time periods (years). These dried scabs, when mixed with a dilute salt solution are the source of additional vaccine.

2.3 How do Infections or Vaccines Produce Immunity to Disease?

Resistance in *Homo sapiens* and other animal species to any given infectious disease depends upon the following immunological process:

- The immunity produced in an animal or person after exposure to a pathogenic (disease producing) organism depends in part upon the quantity of specific protein molecules (antigens) which the host recognizes as being different from its own proteins and the quantity of these proteins projecting from the cell surface of the pathogen. The immunity depends also upon the accessibility of these antigens to certain white blood cells of the host (the susceptible or infected) animal whose function it is to alert the immune system to the presence of foreign protein, and to stimulate, and sometimes participate in, the production of antibodies.

- These antibodies serve in one of several ways to reduce the effects of the pathogen and the toxins it may produce and to limit or prevent the multiplication or persistence of the pathogen in the host's body.

- It is often the case that presenting the antigen to the host animal's immune system in pure form (that is, as a molecule of protein detached from the pathogen), or as a more accessible (to white blood cells) part of some other organism, results in much better immunity than does the presence of the entire pathogenic organism. The isolation and transference of genes makes possible the selective production of antigens and is the essence of genetic engineering as applied to the improvement of vaccines.

2.4 The Role of the Vaccinia Virus in Improving Vaccines

The interest in the use of the vaccinia virus as a carrier of genes from pathogens and, thus, as a source of antigens from those pathogens, derives from the foregoing. Vaccinia virus can receive genes from other organisms without itself being appreciably altered. Further, because it is essentially non-pathogenic in its native state (and with the possibility of making it even more so by genetic manipulation), it can be introduced alive into the host animal. As it multiplies, it

produces quantities of the original pathogen's antigens adequate to provide immunity to the disease which the pathogen produces. In fact, the capacity of the vaccinia virus to receive foreign genes is great enough to permit the production of a single vaccine which immunizes against several diseases at once.

This has been demonstrated in the case of such human diseases as hepatitis, influenza, and herpes. Genes for the key antigens of these diseases all have been simultaneously incorporated into a single vaccinia virus and successfully expressed by the vaccinia vector (Perkus, et al. 1985).

The safety of using vaccinia in humans was demonstrated in the World Health Organization (WHO) smallpox eradication campaign which appears to have nearly eliminated that disease from the global human population. Its safety in animals and its value as a vector have, so far, been demonstrated in small-scale trials with vesicular stomatitis (Yilma et al., 1985; Mackett et al., 1985); rabies (Kieny et al., 1984; Wiktor et al., 1984); and porcine transmissible gastroenteritis (Hu et al., 1985).

These successful experiences, plus continuing advances in genetic engineering, further bolster the recommendation of the National Science Foundation Panel on Vaccine Development for Tropical Animal Diseases (1985) to exploit to the fullest the potential of vaccinia for improving the quality and facilitating the delivery of animal vaccines.

In summary, recent advances in genetic engineering have made it feasible, and desirable, to convert (without essentially altering its nature) this relatively innocuous organism, the vaccinia virus, into a living vehicle for introducing and elaborating in susceptible people or animals the antigens of a number of disease agents (pathogens) which, of themselves, are potentially more harmful and/or less antigenic.

For the interested reader, further technical information on biotechnology as it relates to this project can be found in the first part of the overall project paper, "Phase I - Rinderpest".

2.5 Selective Control of Livestock Populations and Their Efficiency of Production

It has been suggested also that we should not support measures (such as reducing death losses in livestock through the use of improved vaccines) which will augment livestock populations because, in so doing, we increase the risk of environmental degradation due to overstocking fragile rangelands.

We hold, to the contrary, that the existence of disease, a pathological state, in the environment is, by definition, bad. It creates uncertainty and uncontrollable constraints in situations where increasing livestock numbers would be desirable.

The logical approach is, therefore, to control or eliminate disease and then, if necessary, to take positive management measures to control livestock numbers rather than depend on the uncertain control provided by Nature's whims.

We do not argue that increasing livestock production or livestock numbers is desirable across the board. What we do argue is that, where livestock production is desirable, then unit productivity should be high enough to ensure good returns to the investment in livestock and the resource base used for livestock production.

Our aim is, therefore, to ensure that where increased overall production is indicated, there are as few constraints as possible to achieving that production efficiently.

The subproject (Phase II - Anaplasmosis and Babesiosis) described in this paper is expected to reach its purpose (a product of applied research) in the short term (3 to 5 years). It will do this by using the outputs of basic research and some elements of sophisticated technology to do mission-oriented research, i.e. research designed explicitly to resolve problems and remove constraints which impede the success or progress of mission and/or LDC efforts. Removal of such constraints will enhance agricultural productivity at a reasonable cost, thereby improving the economic well-being of agriculturalists and, by extension, of their countries.

2.6 Development Assistance Background

Discussed below are some examples of ongoing efforts in vaccine development. The proposed subproject will coordinate its efforts with these ongoing projects which will be included in network activities.

2.6.1 International Programs

- International Laboratory for Research of Animal Diseases (ILRAD) in Nairobi, Kenya was founded in 1973 with a mandate to develop effective control measures for livestock diseases which seriously limit food production. The research is specifically focussed on trypanosomiasis and East Coast Fever. Funding is provided by the Consultative Group for International Agricultural Research (CGIAR). The U.S. provides approximately 25 percent of the center's funding through AID. The program at ILRAD consists of basic research, training, and outreach programs.

Australian Center for International Research is funding a project in Sri Lanka entitled "Control of Tick Borne Diseases of Ruminants, with Particular Reference to Babesiosis and Anaplasmosis". The project is funded for three years with total support level of $588,000.

- International Centre of Insect Physiology and Ecology (ICIPE) in Nairobi, Kenya is an international center working on a tick vaccine to control the vector of East Coast Fever. Project title: Host Resistance/Integrated Tick Control Research. This project is funded by S&T/AGR at an annual level of $300,000 through August 1988.

2.6.2 AID Funded Projects

- Mission Funded Projects

  - Zimbabwe - A three year cooperative program was signed in June 1985 at a total support level of $2.0 million between the Veterinary Research Laboratory of Zimbabwe and the University of Florida. The purpose of the project is to develop a vaccine for heartwater disease. Efforts will be made to develop a traditional vaccine by first developing a highly sensitive and specific serological test and epidemiological models.

    India - A five-year $1.5 million project is in the process of being approved to develop vaccines for blood diseases in cattle. The project is part of the mission's Agricultural Research Umbrella and is an agreement with the International Center for Agricultural Research in India. Winrock International is the U.S. contractor.

    Niger - The mission is funding a rinderpest vaccine project collaboratively between Tufts University and Plum Island. Dr. Solad, the principal investigator, has indicated that the project is predominantly focused on improving the heat stability of the current rinderpest vaccine by the addition of different reagents. The project originally planned to develop a new vaccine through genetic engineering. They are not working on it presently and have not established a collaborative agreement with Plum Island. Plum Island has also indicated to the Tufts group that developing a rinderpest vaccine using vaccinia is a low priority.

- Science Advisor's Grants

These grants are distributed on a competitive basis to scientists from developing and developed countries for innovative research which is applicable to problems in the developing countries. These grants are for 2-3 years for a maximum of $150,000. Listed below are the titles of some relevant projects and the countries involved:

- Preparation of a Live Vaccine against Caprine Arthritis-Encephalities Virus - Israel.

- New approaches to the Control of Bovine Babesiosis - University of Missouri and Mexico.

- Development of Modified Live Vaccine against Bovine Babesiosis - University of Missouri.

- Control of Ticks and Tick Transmitted Diseases by Vaccination of the Host Animal - Dominican Republic.

- S&T/AGR's Projects

  - Rinderpest Subproject

    In FY 1986, S&T/AGR approved a three-year research activity as the first phase of this project at a cost of $870,000 to develop a vaccine using the vaccinia virus as a vector to control rinderpest. It is being implemented under a cooperative agreement with the University of California/Davis, School of Veterinary Medicine. Subcontracts will be signed with the Plum Island Animal Disease Center, California Biotechnology, Inc., and a research facility in a developing country; e.g., Kenya.

  - Collaborative Research Support Program

    The Small Ruminants CRSP was initiated in FY 1978 to develop institutions with a base of knowledge and manpower to improve management systems and increase production efficiency of small ruminants. The Management Entity is the University of California/Davis who has awarded subgrants to nine U.S. universities and Winrock International to conduct an integrated research program. Overseas research sites have been established in Peru, Brazil, Kenya, Indonesia and Morocco.

    In Kenya, the CRSP in collaboration with the the Ministry of Agriculture and Livestock Development developed a traditional vaccine for contagious caprine pleuropneumonia. Research is being performed at Washington State University to develop an engineered vaccine. A candidate antigen has been identified.

New Activities - If this project is approved, anthropological and social/economic literature reviews and/or studies will be carried out and funded from other sources.

2.6.3 Missions and LDCs Interest in Subproject

In July 1986, S&T/AGR sent a cable to all missions requesting expressions of interest in the development of vaccine(s) for anaplasmosis and babesiosis. Twenty-six missions responded to the cable and of that total, twenty indicated that the host governments and/or missions were interested. Seventeen missions indicated that projects are being funded in their countries by AID and/or other donors which might benefit from or provide benefit to this subproject. Seventeen missions indicated a desire for training in animal vaccine technology. Ten missions indicated that there are laboratories and/or containment facilities for testing the vaccines. The mission responses are summarized in the tables attached to Appendix IV which also includes copies of the outgoing cable and the incoming responses. A summary table is included on page 27 of this project paper and will be included in the Request for Application (RFA), Section III - Program Description (attached as Appendix VII) to assist those institutions submitting a proposal to identify possible LDC sites for collaboration.

3.0 Justification

3.1 Economic losses

There are few hard data in existence regarding the economic losses resulting from the presence of anaplasmosis and babesiosis. The limited data which do exist provide a basis for estimating these losses.

To begin with, both diseases have a worldwide distribution, anaplasmosis being reported in 66 countries and babesiosis in 115 countries (FAO-WHO-OIE, Animal Health Yearbook, 1984). Anaplasmosis alone is responsible for 50,000 to 100,000 cattle deaths annually just in the United States (Palmer, Barbet, Davis and McGuire, 1986). This probably represents an attack rate of at least one animal per every 1000 animals in the national herd (114 million head) because not all affected animals die. Given the high quality of animal health care practiced in the United States, a higher attack rate and case fatality rate could be expected in LDC herds, especially in the tropics where the disease is more widely disseminated and permanently active (enzootic).

Therefore, in a world cattle population of some 1.3 billion head (FAO-WHO-OIE, 1984) one could expect between one to two million deaths worldwide annually due to anaplasmosis alone. Deaths due to babesiosis could certainly double that figure. Thus, if a nominal value of $100.00 per animal is used as an average value for young stock and adults, a very conservative figure for total annual dollar loss worldwide due to deaths alone for these two diseases is estimated at $400 million.

This is only part of the negative economic impact, however. Recent data from the eastern plains (Llanos) of Colombia (Mullenax, 1984) indicate that on a worldwide basis, production losses due to the existence of the carrier state may well exceed the estimated worldwide dollar losses due to death from the acute form of these diseases. Calculated on the basis of the normal population distribution of a breeding herd in the tropics, just the production losses due to reduced calf weaning weights, reduced growth rates in one- to three-year-old cattle, and prolonged calving intervals in affected cows, result in the annual loss in beef production of some 850 kilograms per 100 animals.

In the Colombian case, where approximately 2 million cattle may be involved, this would represent a total of 17,000 metric tons (MT) of beef production lost annually due to hemoparasites. Even at the present low chilled carcass prices for beef on the world market of ± $700.00 /MT (USDA/FAS, 1986), this represents almost $12 million in loss for the 10% (as a minimum) of the total Colombian cattle population (23 million) estimated to be affected, and a cost to the rancher in enzootic areas of $6.00 per year for each animal in his herd.

If the situation in Colombia were extrapolated to the animal populations of the 38 tropical LDCs in Africa and the Americas known to be significantly affected by anaplasmosis and/or babesiosis, with a total population of 342 million cattle, and the same incidence (10 percent of the population) applied to this population, the annual dollar loss in beef production alone would be on the order of $205 million. This does not include losses in draft power nor milk production.

One further example of the magnitude of the economic costs of these diseases in their full complexity comes from Mexico which has a cattle population estimated between 31 to 37.5 million head. The costs of tick and insect control, prevention and treatment of hemoparasitic diseases, and production and death losses totalled $287 million in 1980 (Masiga, 1981). This amounts to an expense to the owner of $7.65 for every animal in

his herd. If we can use the Colombian figure of $6.00 per head as the value of losses, then prevention and treatment would cost $1.65 per head per year. If this project succeeds in producing the vaccine envisioned, the cost of preventing both anaplasmosis and babesiosis, with a single vaccine, would probably be less than $0.10* per dose applied.

(See Appendix V - A. for additional details on the production and dollar losses due to stable enzootic anaplasmosis and babesiosis in the Colombian Llanos.)

Assuming that about half of the present $1.65 expense per head per year is devoted to tick control, then the savings to the rancher through the use of the proposed vaccine would be roughly $0.75 per head per year. Extending this to the 342,000,000 cattle assumed to be at risk in the 37 African and American countries referred to above, the annual savings would amount to nearly $257 million. The anticipated cost to S&T/AGR of this subproject over a five-year life is on the order of $5.0 million. Its total cost with matching support from the participating institutions is calculated at $8.6 million. Thus, investment returns relative to project costs are extremely high. (A detailed economic and cost benefit analysis of this study can be found in Appendix V - B.) Results of the investment analysis shows the investment in the production and distribution of a vaccine to be very profitable. The calculated cost/benefit ratio is estimated at 11.1.

Additional support for developing more effective vaccines comes from Mexican and Australian data. In two trials using currently available vaccines for anaplasmosis, Mexican researchers found an advantage in weight gains in calves during the first 5 months following vaccination of 50 kgs and, at the end of 12 months, an advantage of 11 percent to 33 percent as compared with non-vaccinated calves (Osorno et al., 1975). An ex-post cost-benefit analysis of the development and introduction of an improved traditional vaccine against babesiosis in Australia showed (using discount rates of 5 percent and 10 percent) returns of 43.1 and 25.6 respectively (Bartholomew and Callow, 1980).

The benefits which could accrue to the U.S. livestock industry from the development of a more effective vaccine against anaplasmosis are indicated by statistics published regarding losses in Texas and California. The economic loss associated with anaplasmosis in California beef cattle in 1976 was $5,244,319 (Goodger et al., 1979). In Texas, with over three

* Based on the cost ($0.03/dose) of production of vaccinia vaccine used for smallpox eradication.

times as many beef cattle (12,795,000 head), the losses attributed to anaplasmosis in 1980 were nearly $9 million. (Alderink and Dietrich, 1983)

3.2 Technological

Although it requires verification with larger numbers of animals and more sensitive diagnostic techniques, the work reported by Palmer et al. in Science (1986) and James and Levy (1980) provides support for the idea that sterile immunity to hemoparasites might be achievable. A telephone survey (June, 1986) of scientists currently working in this field showed them all to feel that the chances for success were high enough to justify supporting further research along these lines.

3.3 Commercial

The currently low profit margin on vaccines in general (human and animal) has resulted in the withdrawal of many commercial producers of biologicals from the vaccine market. Under these conditions there is little or no incentive for commercial companies to invest in vaccine research and development.

This is even more true in the case of vaccinia-vectored vaccines because they can be easily produced by even the livestock producers, thereby reducing the potential market volume and/or complicating the control of patent or licensing rights.

If, therefore, the products envisioned in this project are to be developed without undue delay, the research and development costs will have to be underwritten by non-commercial entities such as AID.

4.0 Project Components and Outputs

4.1 AID's Contribution

4.1.1 Research

The methodology to be used to achieve the purpose of this project will be based on the latest advances in molecular biology and genetic engineering. These are exemplified by the successful immunization of calves against anaplasmosis using a subunit vaccine based on the specific immunogen denominated Am 105 as reported by Palmer, Barbet, Davis and McGuire (1986). The ideal vaccine would employ one or more surface antigens common to as many of the different field strains (types) of *Anaplasma* and *Babesia* as possible (in order to provide a broad range of heterologous protection); the genes for these immunogens should, ideally, be expressed in the vaccinia virus for the reasons already presented; finally, immunogens will be sought which are capable of producing sterile immunity to both anaplasmosis and babesiosis.

36

These specifications do not preclude the use of other systems and/or techniques if that should be necessary, but, under whatever circumstance, the product we seek is one which will be appropriate for and effective under the conditions encountered in LDCs. Research Activities will include the following:

- Development or improvement of methods for propagating the etiologic (disease causing) agents in the laboratory.

  At least one method will be developed for anaplasmosis and one method for babesiosis.

- Identification of the antigen(s) which provides the strongest, most persistent, and complete immunity to each disease, the genes expressing these antigens, and the related nucleotide sequencing.

  At least one antigen for each disease will be identified.

- Development of DNA probes or other improved methods for quantifying antibody levels and hemoparasite persistence in host animals for both Anaplasma and Babesia.

  At least one method developed for each disease.

- Development of DNA probes and monoclonal antibodies as necessary for antigen and gene identification or isolation.

  At least one system developed for each disease

- Transfer of the antigen-expressing gene to vaccinia virus (or other vector)

  For each disease, at least one

- Field surveys and epidemiological studies conducted in LDCs during years 2 and 3 to identify appropriate areas for the conduct of field trials.

  1,000 sera tested at 3 LDC sites for antibodies and/or active infection with anaplasmosis and babesiosis.

- Testing of developed vaccine(s) in U.S. laboratories and under contained conditions in the U.S. and LDCs.

  Two vaccines developed, one or more contained trials performed in the U.S., and one or more performed in the LDCs.

- Develop, publish and disseminate journal articles covering research activities.

  At least 13 publications/journal articles of the research results will be prepared and disseminated to the members of the network during the life of the project.

4.1.2 Training

Training programs in molecular biology and vaccine development and testing of varying intensity, duration, depth and emphasis will be designed and implemented at the Recipient institution and at LDC national and international institutions with the assistance of the Recipient's scientists. The training will be funded by S&T/AGR under the CA and by the missions, regional bureaus, and other AID/W offices under the companion BOA.

The training programs will include:

- Postdoctoral and/or graduate degree work in molecular biology.

  Three graduate degree and/or postdoctoral fellowships will be awarded annually- one from each region; i.e., Africa, Asia and Near East, and Latin America and the Caribbean.

- In-service and/or on-the-job training at the Recipient's and/or cooperating institution(s).

  Five in-service and/or on-the-job training courses will be held annually in each region starting in the third year of the cooperative agreement.

- Workshops/seminars, intensive short courses, field or U.S. internships, and collaborative specialization programs with universities or research institutions to foster the development of expertise among developing country scientists.

  At least one workshop/seminar or intensive short courses will be held annually in each region.

4.1.3 Networking and Technology Transfer

Early in the course of the project the Recipient will establish and maintain a network for information exchange on areas related to the project with all relevant scientific, developmental, and commercial institutions, from developed and developing countries and regional and international organizations.

The network will be designed to accomplish the following:

- Bring to light as early as possible all new research techniques and advances which may hasten the development and utilization of biotechnology methods and products having the potential for resolving problems in livestock production.

  Collection and dissemination of current research articles in the area of vaccine development.

- Serve as the basis for on-going transfer of technology so that, concomitantly with progress in the project, the project output becomes known and, to the degree possible, incorporated into the body of knowledge and research efforts of public and private institutions. This will keep interested organizations and agencies informed and will enhance their research and obviate the need to transfer a massive body of technology at the end of the project.

  Collaboration with at least four U.S., three LDC national and two international institutions will be established.

- Hold meetings and workshops for scientists involved in molecular biology and animal vaccine research.

  Keep interested organizations and agencies informed and interested in the hope that they can and will assist in the extension effort and wide-scale utilization of any products arising from the project.

  One international meeting or workshop will be held annually.

- Provide technical assistance to LDC institutions.

  Respond to over 50 requests for assistance during the life-of-project, such as requests for technical support and/or assistance in animal vaccine development and and the identification of resources available.

4.2 Participating Institutions

The proposed research will involve collaboration among several institutions in the United States and LDCs, including international organizations. The project will be administered by the recipient institution with overall responsibility for all aspects of the proposed work to be undertaken.

Written consent must be obtained from AID and LDC governments where small scale animal testing of the new vaccine(s) will be conducted.

4.2.1 Recipient Institution of the Cooperative Agreement

It is expected that the recipient of the cooperative agreement will assist in funding the following components of the cooperative agreement:

- Services of the research, administrative and other staff required to achieve the objectives of the project;
- Equipment, goods, services and travel;
- LDC trainee support in the United States;
- Information networking, short courses and seminars; and
- Vaccine trials in containment in the United States;

The anticipated level of support to be provided by the recipient of the cooperative agreement, the subcontractors, and the LDC and international organizations is shown in Table 1, Section 5.1, page 21 below.

5.0 Cost Estimate - Summary of Five-Year Budget

The total cost of this five-year Phase II (Anaplasmosis and Babesiosis of the Improved Animal Vaccines through Biotechnology) subproject to be funded by AID is $8,000,000, of which $5,000,000 will be funded by S&T/AGR and $3 000,000 by missions and regional bureaus beginning in the first year of the cooperative agreement. The $5,000,000 to be provided by S&T/AGR will allow the recipient of the cooperative agreement to expand its work in developing vaccines for anaplasmosis and babesiosis.

The $3.0 million as mission and regional bureau "buy-ins" will fund training, technical assistance and research starting in the first year of the project and continuing through year five.

Because this Phase of the project will be implemented under a cooperative agreement, it is anticipated that the recipient of this agreement and the subcontractors will already be making a substantial contribution to achieve the stated objectives. In addition, the LDC and international institutions which are chosen to participate in the research and training will be providing facilities and personnel in support of the goal, purpose, and objectives stated in Section 1.0 above, pages 4, 5, and 6. These contributions are expected to total $3,600,000.

5.1 Summary of Obligations by Fiscal Year

Table 1

Summary of Obligations by Line Items
(in thousands)

	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92	Total
S&T/AGR	$350	$480	$1,000	$1,060	$1,060	$1,050	$5,000
Mission Buy-Ins	-	100	300	700	900	1,000	3,000
Total AID	$350	$580	$1,300	$1,760	$1,960	$2,050	$ 8,000
Other Support							
Prime Contractor	200	100	400	440	485	470	2,095
U.S. Research Inst.	-	75	100	140	150	120	585
LDC Institutions	-	-	100	100	155	210	565
International Inst.	-	-	45	50	140	120	355
	200	175	645	730	930	920	3,600
Grand total	$550	$755	$1,945	$2,490	$2,890	$2,970	$11,600

5.2 Distribution of Funding by Line Item

5.2.2 S&T/AGR Funding and Mission Buy-Ins

A summary of the proposed obligations for S&T/AGR and the estimated mission buy-ins is listed below by fiscal year:

Table 2
Summary of Obligations by Line Items
(in thousands)

	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92	Total
Salaries & Benefits	$115	$235	$ 416	$ 436	$ 438	$ 477	$2,117
Overhead	46	94	166	174	175	190	845
Goods,ser. & travel	169	101	108	144	137	98	757
LDC trainees in U.S.	-	20	50	50	50	50	220
Info networking, short courses & seminars	-	10	30	50	50	50	190
Contain. trials (U.S.)	-	-	15	30	30	-	75
LDC Institutions	-	-	195	156	160	165	676
Tech Advisory Group and Evaluations	20	20	20	20	20	20	120
	$350	$480	$1,000	$1,060	$1,060	$1,050	$5,000
Mission Buy-Ins	-	100	300	700	900	1,000	3,000
Total AID	$350	$580	$1,300	$1,760	$1,960	$2,050	$8,000

41

5.2.3 Other Contributions to Achieve the Objectives

Table 3
Summary of Obligations by Line Items
(in thousands)

	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92	Total
Salaries & Benefits	$130	$150	$465	$465	$465	$470	$2,145
Overhead	-	-	-	-	-	-	-
Goods,ser. & travel	10	10	40	55	35	40	190
Equipment	40	-	40	50	130	150	410
LDC trainees in U.S.	-	5	30	40	105	105	285
Info networking, short courses & seminars	10	5	10	30	35	35	125
Contain. Trials (U.S.)	-	-	-	25	50	-	75
LDC Institutions	-	-	50	55	100	110	315
Tech Advisory Group and Evaluations	10	5	10	10	10	10	55
Total Other	$200	$175	$645	$730	$930	$920	$3,600

5.3 Distribution of Funding by Project Components

5.3.1 Summary by Project Components - AID's Contribution

Table 4 below lists by project components and fiscal year AID's contribution to the project.

Table 4

Summary of Obligations by Project Components
Total Funding - S&T/AGR and Missions
(In thousands)

	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92	Total
Research	$210	$338	$ 750	$ 986	$1,086	$1,130	$4,500
Training	35	78	190	316	376	405	1,400
Networking	35	48	100	106	106	105	500
Technical Information and Transfer	53	92	210	299	339	357	1,350
Administrative Cost	17	24	50	53	53	53	250
	$350	$580	$1,300	$1,760	$1,960	$2,050	$8,000

5.3.2 S&T/AGR Contribution to the Project

It is estimated that 60 percent of the S&T/AGR funding of this phase of the project will be used for research to fund those activities listed in Section 4.1.1; 10 percent for training activities listed in 4.1.2; 10 percent for networking and 15 percent for technical information and transfer activities listed in 4.1.3; and only 5 percent to administer and manage the cooperative agreement. In addition, to the S&T/AGR funding for the latter, it is estimated that the recipient of the cooperative agreement will be making a substantial contribution to carry out the administration and management of the activities.

Table 5
Summary of Obligations by Project Components
S&T/AGR Core Funding
(In thousands)

	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92	Total
Research (60 %)	$210	$288	$ 600	$ 636	$ 636	$ 630	$ 3,000
Training (10 %)	35	48	100	106	106	105	500
Networking (10 %)	35	48	100	106	106	105	500
Technical Info and Transfer (15%)	53	72	150	159	159	157	750
Adm. Support(.05%)	17	24	50	53	53	53	250
Total	$350	$480	$1,000	$1,060	$1,060	$1,050	$ 5,000

5.3.3 Mission Buy-Ins

It is expected that the missions will contribute $3.0 million to achieve the purposes of the project through special orders (Buy-Ins) under a companion basic ordering agreement. Of that total, 50 percent will fund operational and/or adapted research; 30 percent for training, including postdoctoral and/or degrees in molecular biology, in-service and on-the-job training, and workshops/seminars and intensive short courses; and 20 percent for networking and technology transfer.

The special orders funded by the missions under the companion basic ordering agreement will provide for confined vaccine testing in LDCs. The LDCs will be selected for this testing on the basis of their capability in the area of genetically engineered vaccine(s), the scientists and experts who are available to work with the U.S. scientists, and the appropriateness of the facilities for the vaccine(s) testing. Additional information on mission buy-ins is contained on pages 36 and 37 under the Section 7.6, "Criteria for Bilateral Buy-Ins".

Table 6 below distributes the anticipated mission buy-in level of $3.0 million by project components and fiscal year.

Table 6
Summary of Obligations by Project Components
Mission Funding

(In thousands)

	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92	Total
Research (50 %)	$ -	$ 50	$150	$350	$450	$ 500	$1,500
Training (30 %)	-	30	90	210	270	300	900
Networking, Technology Transfer (20%)	-	20	60	140	180	200	600
Total	$ -	$100	$300	$700	$900	$1,000	$3,000

6.0 Person Months

The person months of professional and administrative staff required to implement the cooperative agreement and subcontracts are shown below:

Table 7
Person Months

	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92	Total
Professional Staff							
Prin. Investigator	5	7	12	12	12	12	60
Senior Scientists	3	6	24	24	24	24	105
Junior Scientists	5	10	40	40	40	40	175
Research Technicians	5	7	36	36	36	38	158
Laboratory Technicians	12	20	27	30	30	30	149
Total Professionals	30	50	139	142	142	144	647
Administrative Staff							
Secretary	5	7	12	12	12	12	60
Administrative Ass't	3	6	6	6	6	6	33
Information Spec.	3	4	6	6	6	6	31
Total Admin. Staff	11	17	24	24	24	24	124
Total Person Months	41	67	163	166	166	168	771

6.1 Technical Specialties Requested

The following list includes technical specialties and range of disciplines which are expected to be needed, in addition to key personnel, to implement the project. All specialties listed may not be used and some specialties obviously overlap. However, the Recipient's demonstrated ability to provide the specialties listed will be one basis for evaluation of proposals.

- Food Animal Veterinary Medicine, including Nutrition
- Therapeutics, Medicine, and Surgery
- Chemistry, Biochemistry, Molecular Biology
- Microbiology (Bacteriology, Virology, Mycology, Immunology and Vaccine Development)
- Pathology
- Epidemiology, including an economic component
- Neurology
- Genetic Engineering

6.2 Subcontracts and Consultants

The subcontracts or other contractual arrangements to be implemented under the cooperative agreement could provide for, but not be limited to, the following activities:

- Research on vaccine production;
- Epidemiological Surveys;
- Testing of vaccines produced;
- Training of technicians and scientists; and
- Regional responsibility for the functioning of the information network.

6.2.1 Subcontracts with US Institutions, Private and/or Public

The Recipient will identify areas of research for subcontracting with U.S. public and/or private institutions and/or consultants. The program shall describe in detail the qualification of the consultants and the U.S. institutions(s). The contribution(s) of the latter to achieve the objectives of the Cooperative Agreement must be indicated. Priority is to be given to minority and women-owned firms, historically Black colleges and universities and minority controlled private voluntary organizations (PVOs).

6.2.2 LDC National and International Institutions

Over the life of the Cooperative Agreement the Recipient will collaborate with at least three LDC institutions, one in each region (i.e., Africa, Asia and Near East, and Latin America and Caribbean) and may do this through subcontracts.

The Recipient will identify LDC institutions for collaboration in the research work to be undertaken and describe the proposed program in detail including research to be undertaken and staff to be provided.

The developing countries and/or A.I.D. missions known to desire collaboration under this project are listed on page 27. This Table lists by country those LDCs: 1) with laboratory/containment facilities for testing; 2) which have the capability for future field testing and are interested in epidemiology studies; 3) where existing projects of complementary nature are being funded; and 4) desiring training for their scientists, experts, and extension agents.

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY - PHASE II

ANAPLASMOSIS AND BABESIOSIS

Countries and/or AID Missions Known to Desire Collaboration with the Project

Country	Area of Capability or Interest							
	Laboratory/ containment testing		Epidemiology or field testing		Existing projects of complementary nature		Desire training for national	
	Yes	No	Yes	No	Yes	No	Yes	No
Asia & Near East								
Indonesia	x		x		x		x	
Jordan	x		x		x		x	
Morocco		x	x		x		x	
Pakistan	x		x		x		x	
Sri Lanka	x		x		x		x	
Thailand	x		x		x		x	
Africa								
Cameroon		x	x		x		x	
Gambia		x	x		x		x	
Ghana	x		x			x	x	
Madagascar	x		x		?		?	
Mauritania	?		x		x		?	
Somalia	x (being developed)		x		x		x	
Sudan	possibly		x		x		x	
Zimbabwe	x		x		x		x	
Latin America & Caribbean								
Belize		x		x		x	x	
Bolivia		x	x		x		x	
Costa Rica (CATIE)	?		probably		?		?	
Ecuador		x	x		x		x	
Honduras		x	x		x		?	
Mexico	x		x		x		x	
Panama		x	x		?		?	
Peru	x		x		x		x	

7.0 Implementation Plan

This subproject will be implemented under a cooperative agreement which will be awarded competitively. Once the project is authorized and funds made available, the PIO/T and the Request for Applications (RFA) will be submitted to the Office of Procurement to be announced in the Commerce Daily.

The RFA consists of the following documents:

Section	I	Request Instructions and Conditions
	II	Selection Criteria
	III	Program Description
	IV	Cooperative Agreement Format

The recipient of the cooperative agreement will be selected on the basis of the best and final proposal. S&T/AGR will seek assistance from the National Science Foundation (NSF) or the National Academy of Sciences (NAS) to obtain an outside peer group to review the proposals submitted and to select the institution most appropriate to implement this project. Special emphasis will be placed on the evaluation of the research protocols presented.

7.1 Expansion of Recipient's Staff

Undertaking this research and development project will probably necessitate expansion of the staff and/or facilities of the recipient of the cooperative agreement in order to adequately implement all three components of the project. In an effort to keep this expansion within realistic bounds, it is anticipated that:

- Appreciable help can be obtained in developing monoclonal antibodies and DNA probes through S&T/H's working arrangement with the Centers for Disease Control (CDC).

- Some phases of the epidemiologic surveys proposed in the project (See Appendix VII - RFA, Section III, pp. 3-4), especially those dealing with the relationship between host animal antibody titers and frequency and severity of recurring parasitemias, can be performed in collaboration with S&T/H's survey of antibody titers in humans to malaria and Babesia in endemic areas of the world.

- A fair proportion of the training costs, especially training of LDC scientists and technicians, will be financed an supervised by the host country or the mission involved.

- The relevant International Agricultural Research Centers will collaborate, using their facilities and supporting some of the cost, in training technicians and scientists and in sustaining the information network.

7.2 Weighted Criteria for Selection of Recipient

The weighted criteria for selecting the recipient of the cooperative agreement are based on the specific requirements of this project, and the need to select the most qualified U.S. institution to implement the scope of work described in the Section III - Program Description of the RFA (Appendix VII). It is highly desirable that the institution selected have experience in genetically engineered vaccine(s) against anaplasmosis and babesiosis.

Applicants will be advised that these criteria are designed to: a) serve as the standard against which all technical proposals will be evaluated; and b) identify the significant components which should address in their technical applications.

Information relevant to the following criteria may be presented by the offeror(s) within the normal format of the proposal. Consideration for agreement award will be limited to those offerors falling within a competitive range presented by major category, with relative order of importance indicated by approximate weighting, so that the Applicants will know which areas require emphasis in the preparation of applications.

Weighted Criteria for Selection of Recipient

Description	Points
Total Number of Points	100
A. General Quality and Responsiveness of Proposal, Technical Approach, and Adequacy of facilities	50
1. Research Design	(30)
a. A protocol for animal vaccine development and testing which demonstrates an adequate understanding of the scope of work and its relationship to measures for global animal disease identification and prevention, including vaccines already available for anaplasmosis and babesiosis.	
b. A program for effective international collaborative research which includes in addition to vaccine development, veterinary epidemiology and provision for dealing with the economic, ecological, sociopolitical and cultural aspects of livestock disease and its control.	
2. Research Facilities	(20)
a. Adequate animal facilities and research laboratories to carry out the project.	
b. Facilities which meet the required Federal standards for research involving recombinant DNA molecules and testing of genetically engineered organisms.	
c. Facilities and procedures for the management and use of laboratory animals that satisfy the requirements of the Animal Welfare Act, 1970.	

Weighted Criteria for Selection of Recipient (continued)

B. Key personnel should have the Following Qualifications and Experience of Personnel — 30

1. Demonstrated multidisciplinary technical competence in development of animal vaccines using biotechnological approaches. (14)

   a. Animal vaccine research design and implementation, vaccine evaluation, field trials, and publication of results.

   b. Experience in research on animal vaccines pertinent to the needs of developing countries

2. Knowledge of A.I.D. project development, implementation, and evaluation procedures (1)

3. Collaborative relationships as necessary for the goals of this project with Animal and Plant Health Inspection Service of USDA; USDA/ARS Plum Island Animal Disease Center; National Institutes of Health; other U.S. institutions and LDC national and international institutions involved in the development of vaccines using biotechnology methods. (2)

4. Successful experience in LDC institutional resource development, including training. (3)

5. Extensive experience with animal health problems and disease prevention measures used in the developing countries and awareness of methods for integrating these into ecological, sociopolitical, and cultural frameworks. (3)

6. Advisory experience, availability for overseas work, foreign language capability. (3)

7. Management, communications, negotiating, coordinating experience and skills. (4)

Weighted Criteria for Selection of Recipient (continued)

C. <u>Institutional Organization and Management Capabilities should include</u>: 20

1. Adequate administrative, managerial, and institutional capability to plan, implement, coordinate, and evaluate project activities, and to ensure compliance with the relevant Federal and International Guidelines and Regulations. (15)

   a. Animal vaccine development and testing.

   b. Implement international research projects requiring inter-institutional coordination and collaboration to accomplish project objectives within the indicated ecological sociopolitical and cultural frameworks.

   c. Develop and maintain an international research and information network on biotechnology in animal health, including those in the LDCs, developed countries, and the international agricultural research centers.

2. Demonstrated long-term organizational interest and involvement in research on infectious diseases, animal biologics and other animal disease prevention measures, especially measures to control the diseases targeted by this project. (5)

AVSECTII:8/25/86:Revised 04/14/87

7.3 Critical Performance Indicators -

The chronogram, called "Critical Performance Indicators" which is attached as Appendix II of this Project Paper amendment, anticipates that the activities comprising Phase II will be undertaken and completed in the following order:

1. In-vitro propagation of the hemoparasites will be achieved during the first 6 to 12 months of the project in order to provide the raw materials for antigen identification and isolation.

2. Because of the possibility of finding ever more effective antigens, antigen identification, gene isolation, and nucleotide sequencing, may continue throughout the life of the project.

3. Work on DNA probes and monoclonal antibodies will continue until such point in time in the life of the project it is felt that these diagnostic tools are sufficiently precise and easy to employ in the field.

4. Obviously, if additional or more effective antigens are encountered over time, it will be necessary to continue transferring the genes for such antigens to the vector. Therefore, this activity could also extend through the life of the project.

5. Because the contractor should begin the critical activity (that is, the basic research) first and be free to dedicate full concentration to it, the epidemiologic survey will not begin until the second year. It is expected that initiating this work will entail considerable time and manpower since it involves selecting sites and collaborators and training personnel on three continents. The direct, supportive collaboration of AID will be especially important at this time, both in training and logistics.

6. Since the vaccine trials will be conducted under contained conditions, no special problems are anticipated in this phase so long as adequate logistical support is available.

7. Those LDC collaborators who will lead and/or participate in the epidemiologic work and field trials should be selected and their training begun during the first six months of the project. These will include both scientific and technical personnel. Postdoctoral and graduate degree candidates whose intention is to specialize in biotechnology will be selected and their training begun during the latter part of the first year or the early part of the second year of the project.

8. If at all possible, the DNA probes and monoclonal antibodies to be used in the epidemiologic survey for identifying carriers of Anaplasma or Babesia and for determining antibody titers to these diseases should be available no later than the beginning of the second year of the epidemiologic survey. Meanwhile, existing techniques will have to be used.

9. The logical inception of the information exchange network would be during participation by project scientists in the Third International Symposium on Malaria and Babesia (which will include a section on Anaplasmosis as well) to be held in Annecy, France on 6-11 September 1987.

7.4 Project Manager's Responsibility

This project will be managed by the S&T/AGR project manager who will deal directly with the recipient of the cooperative agreement to provide technical and administrative support and oversight. Current AID project staff and procedures are adequate to implement this project. The project manager will maintain close liaison with the recipient institution and the Principal Investigator and will spend approximately 60 percent of the time managing the activities to:

- Keep in contact with the appropriate international center(s) and inform them of the activities to be funded and request their support.

- Participate directly in determining the final design of the research, training, and networking and technology transfer components of the project.

- Participate in the selection of subcontractors and collaborators which will be involved in the project, especially those in LDCs.

- Approve the scope of work, time-tables for completing the work, and means for evaluating outputs in collaboration and by mutual agreement with the prime contractor.

- Monitor project operations to assure that the objectives are achieved and to implement evaluations when indicated;

- Participate in the selection of trainees and LDC collaborators/institutions;

- Assist in assuring that timely and adequate logistical support is provided for field activities;

- Help organize and, when indicated, participate in the technical advisory committee (composed of principal investigators/researchers) meetings as they are needed;

- Help identify and secure the services of experts from outside the project for assistance in project monitoring;

- Clear all field visits to LDCs which are funded by AID.

- Ensure that the approval of sites, methodologies and strategies for field activities follow appropriate US and LDC procedures and that the AID Environmental Coordinator is keep informed the activities funded under this Phase of the project.

- Approve the selection of the principal investigator and any alternate.

- Coordinate the external review and evaluation activities; and

- Attend to administrative actions relating to the project which fall in AID's domain.

7.5 Advisory Panel of Experts

A panel of experts on vaccine development and molecular biology will be established to advise the recipient on matters concerning the research and testing of the development of vaccines for anaplasmosis and babesiosis. The panel members will include representatives from the following: National Science Foundation, Small Ruminants - CRSP, International Laboratory for Research on Animal Diseases (ILRAD), USDA/ARS and from the private sector. Specifically, the Panel will assist in the following areas:

- Review the annual work plans and recommend additions, modifications, or deletion of components, as appropriate.

- Consult with the Principal Investigator of the recipient institution on the management implications of the suggested modifications.

- Participate in the annual reviews and the in depth evaluation of the activities under the cooperative agreement.

7.6 Criteria for Bilateral Buy-ins

The buy-in mechanism will be used to provide additional support to the missions with existing animal health problems and projects dealing with the use of animal vaccines. It will provide funding to: 1) plan, organize, reorganize and successfully implement operational research activities (adaptive research); 2) provide technical assistance in molecular biology; 3) monitor the testing of newly developed vaccines on a limited number of animals under contained conditions; 4) provide graduate level and postdoctoral training in molecular biology; 5) conduct in-service and/or on-the-job training courses or programs for target audiences in the LDCs and U.S. facilities; and 5) organize and implement "trainer-of-trainers " programs.

The buy-ins will not only allow the missions to access experts in molecular biology in those areas listed in Section 6.1, Technical Specialties, page 25, but also permit an opportunity to share information and experience throughout the LDCs in Latin America, Africa, and Near East and Asia.

Buy-ins will be used to support mission animal vaccine and health activities and their related developmental and environmental needs. The technical assistance under the buy-in mechanism will normally address the development, testing and use of vaccines through the use of vaccinia virus as a vector. Activities outside of animal vaccines would not normally be considered appropriate for project buy-ins.

Activities supported under the buy-in mechanism will contribute to and benefit from, the regional knowledge base organized under this project, including Phase I which funded the development and testing of rinderpest vaccine. The practical experiences and on-site information and insights gained during the activities under the ordering contract will be fed directly back into the cooperative agreement. It is also intended that the need and opportunity for con' act work will be identified by the cooperator in its work under the CA and proposed to the Office of Agriculture, regional bureaus and mission for approval and funding.

The activities will develop a high level of technical expertise and regional familiarity in the area of animal vaccines and regional familiarity in the animal health sector and buy-ins will be approached as contributing to this level of expertise and knowledge base in the missions.

Buy-in activities will normally require multi-disciplinary analysis and expertise that will be available from the project. Hence normally, the emphasis in providing technical services through buy-ins will be for multi-disciplinary teams of experts in the technical specialties listed in Section 6.1, page 24. Buy-ins will not be used to avoid competition or to fragment long-term bilateral contract activity. Also, buy-ins will not substitute for tasks planned under mission long-term bilateral project contracts.

The S&T/AGR project manager will review the appropriateness of buy-ins as part of the activity review process. Buy-ins will be approved in accordance with guidelines and procedures developed by SER/OP in collaboration with the S&T/AGR project manager.

8.0 Monitoring

Monitoring will be accomplished by the Principal Investigator of the recipient institution, the S&T/AGR Project Officer, collaborators under the subcontracts, and the USDA/ARS, as appropriate. Annual progress reports and copies of all documents resulting from field and laboratory activities will be submitted to the Project Officer for clearance prior to distribution.

Given that this is a relatively complex project and that its initial implementation will involve selection of and making contractual arrangements with both U.S. and foreign subcontractors/collaborators, close working arrangements will be required between the S&T/AGR project manager and the recipient of the cooperative agreement.

8.1 Annual Work Plans

The principal investigator of the recipient institution will develop the annual work plan as a working document to guide the operations and achievements expected from the project. Three copies of these plans will be forwarded to S&T/AGR for approval each year. The first plan will be submitted to S&T/AGR no later than 30 days after the cooperative agreement is signed and will cover the activities for the first year of the project. S&T/AGR will review the contents of the proposed work plan with the

external panel of experts, ask for points of clarification, if required, and grant final approval of the contents as proposed or modified by agreement between the recipient and S&T/AGR. Based upon collaborative review, a final work plan will be agreed upon within thirty (30) days of the submission of the draft work plan.

A similar annual work plan, subject to the collaborative review process described above, shall be submitted sixty (60) days prior to the completion of each project year over the remaining four (4) years of the Cooperative Agreement, and will summarize progress to date and describe the activities anticipated to be accomplished during the next project year. Such work plans will be divided into separate sections for activities at each field site identified in the project components, Section 4.0 - 4.2, pages 16 - 20 above. Thereafter, the annual work plan will be due thirty (30) days prior to the end of the anniversary date of the cooperative agreement.

The annual work plan shall include the following:

- A list of activities to be undertaken during the year, including testing at the various locations.
- A statement of how the activities relate to the outputs and research priorities.
- A projected beginning time frame for execution of the activity.
- A projected ending time frame for completion of the activity.
- A projected expenditure of person-months of input for each activity.
- The projected stage of research at the end of the work plan or the projected outputs at the end of the work plan.
- Statement indicating the provisions for complying with all relevant regulations dealing with biotechnology and genetically engineered biological products.

8.2 Reporting Requirements

In addition to the Annual Work Plans described above, the recipient will submit the following reports within the specified time frame. These reports will provide pertinent data for S&T/AGR to monitor project activities.

8.2.1. Annual Technical Progress Reports

Within thirty (30) days after the completion of each project year, the Recipient will submit to S&T/AGR three (3) copies of an annual technical progress report, in a mutually-agreed-to format, which details the accomplishments of the preceding twelve (12) month period. A final report which analyzes the research findings and results of the entire project (the format and distribution of which will be collaboratively determined) will be prepared within sixty (60) days after the completion of the final project year. Each annual technical progress report will detail the accomplishments and progress of each field site or sub-contractor individually, as well as provide a consolidated account of project activities as a whole.

8.2.2 Travel Reports

Trip reports will be prepared for each TDY or trip to an LDC. Each report will contain, but not be limited to, the following information:

- Logistical information; i.e., type of activity, geographical area of activity, dates of TDY, and team composition;
- Objective of the TDY, including scope of work, as appropriate;
- Activities performed while on TDY;
- Summary of any technical reports resulting from TDY;
- Summary of identifiable techniques or information which could be utilized in this project; and
- Summary of future potential needs of, or opportunities for, assistance to LDCs or missions, including possible networking potential.

One copy of this report will be forwarded to S&T/AGR not later than 30 days after the staff member returns to the recipient institution. Travel reports generally will not exceed four pages.

8.2.3 Training Activities

- The Recipient will complete A.I.D. Form 1381-4 for all A.I.D.-sponsored participants in training in the United States and third countries. (For additional information see Appendix VII, RFA, Section III, Appendix A - AID 1380-94 (4-77) Notice - Participant Training Notice.)

- An annual summary training report will be submitted covering activities undertaken under and in conjunction with this project, including: 1) the numbers of trainees by gender, nationality, training site, type of training activity, duration and purpose of the training; and 2) progress in conducting laboratory work in molecular biology.

8.2.4 Technical and Research Reports for Publication

Journal articles and other external publications will be encouraged. Manuscripts will be submitted to S&T/AGR project manager prior to submission to a publisher as well as copies of the resulting publications.

8.2.5 Annual Activity Reports

An annual Activity Report of the recipient s international activities will be prepared. These reports will also address regulatory issues related to the project. Although principally a technical document, it nevertheless must include pertinent statistics on quantitative information regarding the project and its activities described in Section 7.3, Critical Performance Indicators, pages 33 - 34 above. A minimum of five copies should be submitted to S&T/AGR Project Manager within 90 days of the end of each project year.

8.2.6 Annual Expenditure Reports

The recipient will submit annual expenditure reports by project line item and components; e.g., research, training, networking and technology transfer. The format will be collaboratively developed by S&T/AGR project manager and the Principal Investigator at the recipient institution.

8.2.7 Quarterly Reports

Quarterly reports will be submitted thirty (30) days after the end of each quarter. These reports will include, but not be limited to, a brief description of any program and budgetary deviations from the annual work plan, current status of the research and budget, and future activities to be undertaken during the next quarter.

8.2.8 Compliance with Federal Guidelines and Regulatory Procedures on recombinant DNA technology

The recipient of the cooperative agreement will be required to submit reports to A.I.D. to show compliance with:

- The National Institutes of Health Guidelines for Research Involving Recombinant DNA Molecules;
- Procedures issued by the USDA, EPA, or other appropriate Federal agency, regarding testing of genetically engineered organisms;
- A.I.D.'s environmental procedures; and
- Such other Federal guidelines and procedures as may apply during the course of the research.

For additional information on recombinant DNA technology, specifically using vaccinia virus as a vector, please refer to Section 10.4, page 45 and Appendix VI, Environmental Threshold Determination and Initial Environmental Examination.

8.3 Reviews and Evaluations

8.3.1 Management Reviews

Management reviews will be conducted annually by the S&T/AGR project manager in consultation with the recipient of the cooperative agreement; the subcontractors, USDA/ARS, and National Science Foundation, and other interested participants in the activity, as appropriate. The reports required under Section 8.2, pages 38 - 41 above will become an integral part of the review process.

8.3.2 In Depth Evaluation

An in depth evaluation will be performed at the end of the second year to determine the future direction and funding of the project. If it is determined that vaccinia virus vaccine cannot be developed during the life of the project, the cooperative agreement may be terminated by mutual agreement between the recipient of the cooperative agreement and A.I.D.

Another in depth evaluation will be performed at the end of the fourth year to review the progress made in achieving the established goal and purpose and to address follow-on project development and the future issues involved in bringing the new vaccine(s) to large scale field testing and eventual utilization in the LDCs.

These in depth evaluations will be performed by an external panel of experts in vaccine development and molecular biology. Recommendations for participants on the panel will be obtained from NSF.

The evaluation factors will include project achievement in developing an improved vaccine for anaplasmosis and babesiosis. These evaluations will be based on monitoring reports, inspection of physical facilities, the recipient's progress reports, technical publications, and trip reports.

In addition, the evaluation team will be required to review the following:

- Validity of the assumptions in the logframe and the critical performance indicators.
- Methodologies used to achieve the outputs and whether the outputs are being achieved as planned.
- Examination of alternative methods of achieving outputs with savings to the project.
- Examination of the recipient's management effectiveness.
- Review of expenditures to determine whether they correspond to the scope of work in the annual work plan.
- Review of unforeseen internal or external factors that have had specific adverse or beneficial impact on the project.
- Determine whether technology is being transferred effectively to LDC national, regional, and/or international organizations and institutions.

The evaluation team will recommend to S&T/AGR the future direction and funding of the project; and/or the appropriate changes in the project design and/or work plans to maximize use of S&T/AGR's limited funds.

9.0 Future Considerations

9.1 Field Testing of Vaccine(s) for Anaplasmosis and Babesiosis

At the end of this project improved vaccine(s) will be developed and ready for field testing. Environmental considerations and regulations which are in existence at that time will play a major role in the methods used for field testing. The issues and funding of field testing will be addressed in a follow-on project.

9.2 Other Programs Associated with Vaccine(s)

There are A.I.D. projects which can contribute to the field testing of the improved vaccine(s) for anaplasmosis and babesiosis. For example, the mission in Niger is currently supporting a project with Tufts University and Plum Island to develop a non-thermostable rinderpest vaccine. This project has been developing a field testing strategy which could be used with the vaccine(s) for anaplasmosis and babesiosis.

Following field testing, the actual utilization of the vaccine(s) will begin. Currently the European Economic Council (EEC) is developing a large project which will focus on vaccine delivery. The improved vaccine(s) are likely candidates for this program. We will keep EEC informed of the progress of this project, especially the delivery aspects of the utilization of the vaccines.

10.0 Assessment of Environmental Risks

10.1 Modified-live Anaplasma species and Babesia species

The only threat posed by organisms which have been modified to reduce their virulence, a procedure which has been used successfully for over a hundred years, is that they sometimes revert to full virulence for the original host. Thus, the creation of a "new" organism is not involved here. Rather, the organism simply reverts to the state in which it was originally found in nature.

10.2 Antigen production using genetically altered bacteria for the production of subunit vaccine

This procedure has been used successfully and without any hazard to the environment for the past several years. If there is any potential hazard involved it is further curtailed by the fact that the living organisms used in the production of a subunit vaccine do not leave the laboratory. It is only the non-hazardous antigenic protein particles, (immunogens) which are distributed in the field for use as a vaccine. The use of such a subunit vaccine will be made in accordance with appropriate regulations as promulgated by the U.S. government and the governments of the collaborating LDCs.

Laboratories involved in genetic engineering follow the guidelines for working with recombinant DNA and the containment procedures established by the National Institutes of Health (NIH), procedures which, over time, have been proven to be effective in safeguarding the environment.

10.3 The Vaccinia Virus as a Living Vector

The vaccinia virus was successfully employed by the World Health Organization as the immunizing agent in the global campaign which essentially eradicated smallpox from the world. Throughout this undertaking, and since, there is no evidence that its use has had any untoward effects upon any animal population or in the environment in general except for a minuscule number of humans which showed (as is the case, due to biological variability, with any medication) varying degrees of hypersensitivity to the organism. The U.S. Army continues to use the vaccinia virus in its immunization program for army personnel.

In the case of the genetically altered vaccinia virus, it was shown, when used as the vector for vesicular stomatitis, not to spread from vaccinated to non-vaccinated cattle held together in close confinement (Yilma, Pers. Comm., 1986). In a laboratory accident, this same altered virus was inadvertently injected into the finger of one of the researchers resulting only in the transient inflammatory response common to the unaltered virus (Jones, Ristow and Yilma, In Press). Neither are there reports of cross-contamination of laboratory animals vaccinated with vaccinia altered to contain the genes for antigens of the human diseases described in Section 2.4, page 8.

In sum, there is no evidence at present from any source that the use of the vaccinia virus as a vector and as a living vaccine carries any hazards which would preclude its use in the field. Further, such use, when it occurs in the course of this project, will be made in accordance with the appropriate regulations as promulgated by the United States government and the governments of the collaborating LDCs.

10.4 Risks in Containment Testing

Small Scale Contained Animal Testing - Once the genetically engineered vaccinia virus vaccine(s) is developed, it will be necessary to conduct tests in live animals. These animals will be inoculated with the new vaccine and then challenged with the respective hemoparasites. Such tests have two components which are safety issues:

a). The use of the recombinant vaccine; and

b). The use of the infectious agents.

All of these tests will be conducted in facilities which meet the specified U.S. and LDC regulations. The regulations for working with infectious agents have been established by USDA, Animal and Plant Health Inspection Service (USDA/APHIS).

The use of the recombinant vaccine will follow the regulations set forth by APHIS which is currently the Federal Agency with jurisdiction over animal diseases. At the writing of this project paper amendment, APHIS is in the process of developing defined procedures. If the proposed procedures are accepted, the Institutional Biosafety Committees (IBC) will be responsible for approving the laboratory testing as defined in this project.

10.5 Compliance with Federal Guidelines and Regulatory Procedures

The recipient of the cooperative agreement will implement this research activity in accordance with:

- The National Institutes of Health Guidelines for Research Involving Recombinant DNA Molecules;
- Procedures issued by the USDA, EPA, or other appropriate Federal agency, regarding testing of genetically engineered organisms;
- A.I.D.'s environmental procedures; and
- Such other Federal guidelines and procedures as may apply during the course of the research.

Additionally, the recipient cannot commence testing in any foreign location until written approval for such testing is obtained from A.I.D. and the Government of the country where testing is planned. Testing shall be conducted in accord with all applicable regulations of that country.

In addition, however, and prior to commencement of any such testing, the cooperator shall make a judgment and communicate the same to A.I.D. as to whether the regulations, procedures or facilities of the country in question are adequate to ensure testing in an environmentally sound manner. In the event such judgment is that they are not, the cooperator and A.I.D. will consult and agree on the conditions to be applied to the testing which will have such environmental effect.

Reports submitted under this activity to A.I.D. will address regulatory issues as above related to the activity. (See paragraph 8.2.8, page 41 above.)

Attached as Appendix VI are the Environmental Threshold Determination and Initial Environmental Examination Analysis.

WANG 3037f:10/7/86:Revised MMozynski:4/15/87

Improved Animal Vaccine Through Biotechnology

Phase II

Anaplasmosis and Babesiosis

Project Number 936-4178

APPENDIX I - PROJECT DESIGN SUMMARY

A. LOGICAL FRAMEWORK
AND
B. DETAILED LINE ITEM BUDGET

S&T/AGR:10/31/86:Revised 4/15/87

AID 1020-28 (1-72)

PROJECT DESIGN SUMMARY
A. LOGICAL FRAMEWORK

Life of Project:
From FY 1987 to FY 1992
Total U.S. Funding $5,728,000
Date Prepared: August 5, 1986

Revised April 15, 1987

Project Title & Number: Improved Animal Vaccines Thru Biotech - Phase II (Anaplasmosis and Babesiosis)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: To increase the incomes of the poor -- while maintaining stability and efficiency of food production, ensuring good economic returns to investments in livestock, and providing the technology to reduce livestock mortality and morbidity due to anaplasmosis and babesiosis.	**Measures of Goal Achievement:** - Increase in farm income - Increase supply of animal protein in selected target areas in LDCs - Increase in food consumption - Decrease in the mortality and morbidity of livestock.	- National Surveys - AID/W and Mission reports - FAO production statistics - Impact Evaluations	**Assumptions for achieving goal targets:** - Food production remains high priority in LDCs - Sufficient interest in LDCs to remove constraints which limit agricultural production systems.
Project Purpose: To use the biotechnological skills of the U.S. scientific community in collaboration with LDC scientists to develop and test new or improved vaccines for the control of anaplasmosis and babesiosis	**Conditions that will indicate purpose has been achieved: End of project status.** - Effective vaccines for the prevention or control of anaplasmosis and babesiosis are developed - Preliminary animal tests of anaplasmosis and babesiosis vaccines are completed - Vaccines are ready for large scale field testing	- Reports from preliminary animal tests indicate vaccine's potency - Scientific publications - Research results presented at scientific meetings - Preparation for large-scale field testing are underway	**Assumptions for achieving purpose:** - Within available funding and time constraints vaccines can be developed for anaplasmosis and babesiosis - The vaccines will be effective and suitable for use in LDCs - LDCs are willing to participate in field tests of experimental vaccines.

Appendix I
Page 1 of 4

AID 1020-25 (1-78)

PROJECT DESIGN SUMMARY
A. LOGICAL FRAMEWORK

Project Title & Number: Improved Animal Vaccines Thru Biotech - Phase II (Anaplasmosis and Babesiosis0

Life of Project:
From FY 1987 to FY 1992
Total U.S. Funding $5728,000
Date Prepared: August 5, 1986
Revised: April 15, 1987

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Outputs:	Magnitude of Outputs:		Assumptions for achieving outputs:
1. Project Components			
a. Research			
1) Etiological agents (disease causing agents) are propagated in the laboratories	1) - At least one method developed for propagating the etiologic agent for anaplasmosis - At least one method developed for propagating the etiologic agent for babesiosis	- Scientific publications and project reports - On site reviews and evaluations - Evidence from containment trials for good immunity in livestock vaccinated w/the vaccines produced by the project - Development of vaccine data from containment trials - Expanded LDC scientists' knowledge and skills in development and use of vaccines - Data from laboratories in LDCs and LDC scientists applying vaccine technology to develop vaccines for other important diseases	- Research direction pursued by scientists will lead to the development of successful vaccines - Continued cooperation and support by LDC institutions - Laboratory and field trials will be permitted in the U.S., LDCs, and IARCs - Technologies developed are appropriate for use in LDCs - LDC principal researchers will establish institutional affiliation with the recipient institution
2) Antigens identified which provide the strongest and most persistent immunity to each disease - Genes expressing these antigens - Related nucleotide sequencing	2) - At least one antigen for each disease identified		
3) DNA probes and monoclonal antibodies developed to identify antigen and facilitate gene identification and isolation	3) - At least one system developed for each disease		
4) Antigen-expressing gene transferred to vaccinia virus (or other vector)	4) - At least one for each disease		
5) studies conducted in LDCs during years 2 and 3 of project to identify appropriate areas for the conduct of future field trials	5) - 1,000 sera tested at 3 LDC sites for antibodies and/or active infection with anaplasmosis and babesiosis	Records of sampling sites, animals tested, serum antibody titers and determination of parasitized red blood cells	LDC institutions capable of supporting and performing surveys with minimal input from project
6) Developed vaccine(s) tested in: - Laboratories (U.S.) - Containment trials (U.S.) - Containment trials (LDC)	6) - 2 vaccines developed - To be tested in one or more containment trials - To be tested in one or more containment trials		

58

AID 1020-28 (1-72)

PROJECT DESIGN SUMMARY

A. LOGICAL FRAMEWORK

Project Title & Number: Improved Animal Vaccines Thru Biotech - Phase II (Anaplasmosis and Babesiosis)

Life of Project:
From FY 1987 to FY 1982
Total U.S. Funding $5,728,000
Date Prepared: August 5, 1986
Revised April 15, 1987

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Outputs:	Magnitude of Outputs:		Assumptions for achieving outputs:
b. Training 1) LDC scientists trained - post doctoral or graduate degree level in molecular biology and vaccine development (U.S.) 2) In-service and on-the-job 3) Workshops/seminars, intensive short courses	1) - 3 post doctoral or graduate degree scientists from LDCs annually beginning with second year of project 2) - 5 in each region annually starting year 3 3) - At least one workshop/seminar or intensive short course held annually in each region	- Copies of training courses and reports from recipient of cooperative agreement - Copies of transcripts - Copies of in-service and on-the-job training activities - Copies of reports and attendance at workshops	b. 1), 2), and 3) - Recipient will provide training opportunities for LDC scientists - Missions and LDC will provide some of the training costs, as required. - Facilities will be made available for training in the LDCs. - LDC scientists will be approved for training in animal vaccines.
c. Networking and Technology Transfer 1) Collaboration with U.S., national and international institutions 2) Produce, selectively collect and disseminate publications and scientific journals to LDC and international organizations 3) Hold meetings and workshops for scientists involved in molecular biology and animal vaccine 4) Provide technical assistance to LDC institutions	1) - Collaboration with U.S. (4), national (3) and international institutions (2) established 2) - 10 publications and 3 journals collected and disseminated during the life-of-project 3) - One international meeting or workshop held annually 4) - Responds to over 50 requests for assistance during the life-of-project, such as requests for technical support and/or assistance and identification of resources available.	- Copies of scientific publications and journals	c. 1), 2), 3), and 4) - International networks and linkages can be maintained with limited funding. - International institutions and developed country institutions will contribute to funding the network. - Recipient will be able to establish a international network of scientists and experts.
2. Sub-contracts 1) U.S. Institutions (may be used to implement portions of the outputs 1. a, b, c, above)	1) - (to be determined based on proposal selected)		2. 1) - U.S. institutions will be available if needed.
2) LDC Institutions Assistance in developing competence in epidemiologic surveys, data collection and analysis Assistance in the production and use of vaccines for anaplasmosis and babesiosis Assistance in Networking activities.	2) - At least three LDC institutions are assisted in developing competence in epidemiology in the production of vaccines for anaplasmosis and babesiosis, in their application, first in field trials and then to national livestock herds, and in performing the needed epidemiological studies.		2. 2) - LDC institutions will cooperate with the recipient of the CA to perform testing in confinement facilities

Appendix I
Page 3 of 4

59

IMPROVED ANIMAL VACCINES:
Phase II - Anaplasmosis and Babesiosis
Line-Item Budget - in thousands of US Dollars

Description	Year One FY 1987 Five Months	Year One FY 1988 Seven Months	Year Two FY 1989 Twelve Months	Year Three FY 1990 Twelve Months	Year Four FY 1991 Twelve Months	Year Five FY 1992 Twelve Months	Grand Total
I. Salaries and Benefits							
Research Staff							
Principal Investigator	$ 25	$ 35	$ 60	$ 62	$ 62	$ 62	$ 306
Scientific Staff	51	125	230	243	245	275	1,169
Total Research Staff	$ 76	$ 160	$ 290	$ 305	$ 307	$ 337	$1,475
Support Staff							
Secretary (full time)	$ 7	$ 13	$ 20	$ 20	$ 20	$ 20	$ 100
Administrative Assistant (part time)	3	6	8	8	8	9	42
Information Specialist (part time)	4	6	10	10	10	10	50
Total Support Staff	$ 14	$ 25	$ 38	$ 38	$ 38	$ 39	$ 192
Total Salaries	$ 90	$ 185	$ 328	$ 343	$ 345	$ 376	$1,667
Benefits (27%)	25	50	88	93	93	101	450
Total Salaries and Benefits	$ 115	$ 235	$ 416	$ 436	$ 438	$ 477	$2,117
II. Overhead (40% of Salaries and Benefits)	$ 46	$ 94	$ 166	$ 174	$ 175	$ 190	$ 845
Total Salaries, Benefits & Overhead	$ 161	$ 329	$ 582	$ 610	$ 613	$ 667	$2,962
III. Goods, Services and Travel							
Supplies and Equipment	$ 169	$ 83	$ 70	$ 105	$ 60	$ 40	$ 527
Animals	-	-	10	10	45	10	75
Publications and Graphics	-	-	2	2	5	10	19
Travel - Scientists	-	12	20	20	20	20	92
Trainees	-	6	6	7	7	18	44
Total Goods, Services & Travel	$ 169	$ 101	$ 108	$ 144	$ 137	$ 98	$ 757
IV. LDC Trainee Support in U.S.							
Post Doctoral Scientists	$ -	$ 20	$ 20	$ 30	$ 30	$ 30	$ 130
Research Technicians	-	-	30	20	20	20	90
Total LDC Trainee Support in U.S.	$ -	$ 20	$ 50	$ 50	$ 50	$ 50	$ 220
V. Information, Networking, Short Courses and Seminars	$ -	$ 10	$ 30	$ 50	$ 50	$ 50	$ 190
VI. Containment Trials in U.S.	$ -	$ -	$ 15	$ 30	$ 30	$ -	$ 75
VII. LDC Institutions - On-Site Support							
Laboratory Research	$ -	$ -	$ 60*	$ 21	$ 30	$ 45	$ 156
Scientific Training	-	-	30*	30	20	20	100
Information Network	-	-	45*	45	50	50	190
Containment Trials and Epidemiological Studies	-	-	60*	60	60	50	230
Total LDC Institutions	$ -	$ -	$ 195	$ 156	$ 160	$ 165	$ 676
VIII. Technical Advisory Group/Evaluation	$ 20	$ 20	$ 20	$ 20	$ 20	$ 20	$ 120
Grand Total	$ 350	$ 480	$1,000	$1,060	$1,060	$1,050	$5,000

* To start epidemiology (field surveys) at 3 sites in LDCs.

Appendix I
Page 4 of 4

Improved Animal Vaccines

Through Biotechnology

Phase II

Anaplasmosis and Babesiosis

Project Number 936-4178

APPENDIX II - CRITICAL PERFORMANCE INDICATORS AND CHRONOGRAM

S&T/AGR:10/31/86

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY - Phase II

(Anaplasmosis and Babesiosis)

Critical Performance Indicators

Major Outputs	Year one by quarters				Year Two by Quarters				Year Three by Quarters				Year Four by Quarters				Year Five by Quarters			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
1. Project Components																				
a. Research																				
1) Etiologic agents propagated in laboratories.																				
Anaplasmosis																				
Babesiosis																				
2) Antigens identified																				
Anaplasmosis																				
Babesiosis																				
- Genes Expressing antigens																				
Anaplasmosis																				
Babesiosis																				
- Related nucleotide sequencing																				
Anaplasmosis																				
Babesiosis																				
3) DNA probes and monoclonal antibodies developed																				
Anaplasmosis																				
Babesiosis																				
4) Antigen-expressing gene transferred to vaccinia virus (or other vector)																				
Anaplasmosis																				
Babesiosis																				

IMPROVED ANIMAL VACCINES THRU BIOTECHNOLOGY - PHASE II

(Anaplasmosis and Babesiosis)

Critical Performance Indicators

Major Outputs	Year one by quarters				Year Two by Quarters				Year Three by Quarters				Year Four by Quarters				Year Five by Quarters			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
5) Epidemiologic surveys of Anaplasma & Babesia in at least 3 LDC sites most likely to serve for field trials																				
6) Developed vaccine(s) tested in:																				
- laboratories (U.S.)																				
- Anaplasmosis																				
- Babesiosis																				
- laboratories (LDCs)																				
Anaplasmosis																				
Babesiosis																				
b. Training																				
1) LDC scientists trained - Post doctoral/graduate degree																				
2) Inservice and on-the-job																				
3) Workshops/seminars, intensive short courses																				

IMPROVED ANIMAL VACCINES THRU BIOTECHNOLOGY - PHASE II

(Anaplasmosis and Babesiosis)

Critical Performance Indicators

Major Outputs	Year one by quarters				Year Two by Quarters				Year Three by Quarters				Year Four by Quarters				Year Five by Quarters			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
c. Networking and technology transfer																				
1) Collaboration with U.S., foreign national & international institutions																				
2) Produce, collect and disseminate publications and scientific journals to LDCs & international organizations																				
3) Hold meetings & workshops for scientists involved in molecular biology and vaccine																				
4) Provide technical assistance to LDC institutions																				
2. Sub-contracts for research, epidemiological surveys, containment testing, training and networking																				
1) U.S. Institutions																				
2) LDC & International Institutions																				

WANG 1305C:7/31/86:Rev.10/31/86

Improved Animal Vaccines Through Biotechnology

Phase II

Anaplasmosis and Babesiosis

Project Number 936-4178

APPENDIX III - LITERATURE CITED

S&T/AGR:10/31/86

Literature Cited

Alderink, F. and R. Dietrich. 1983. Economic and epidemiological implications of anaplasmosis in Texas beef cattle herds. Texas Agricultural Experiment Station (Texas A&M University) Bull. No. 1426. 15 pp.

Bartholowmew, R. and L. Callow. 1979. A benefit-cost study (ex-post) of the development and introduction of a new vaccine against bovine babesiosis. In: Geering, W., R. Roe and L. Chapman, Eds., Proc. 2nd International Symposium on Veterinary Epidemiology and Economics. Canberra, Australia. pp. 448-457.

* 95. 1982 Berry, L. J., Osburn, B. I., Stott, J. L., Farber, T., Heron, B. and W. Patton: Inactivated bluetongue virus vaccine in lambs: Differential serological responses related to breed. Veterinary Research Communications 5:239-293.

Burne, S. and P. Mulvany. 1986. Livestock: the Cinderella of rural development. Appropriate Technology 13(1): 1-4.

FAO-WHO-OIE. 1984. Animal Health Yearbook. FAO Animal Production and Health Series No. 24.

Goodger, W., T. Carpenter and H. Riemann. 1979. Estimation of economic loss associated with anaplasmosis in California beef cattle. JAVMA 174(12): 1333-1336.

Hu, S., J. Bruszewski and R. Smalling. 1985. Infectious vaccinia virus recombinant that expresses the surface antigen of Porcine Transmissible Gastroenteritis Virus (TGEV). In: Quinnan, G. V., Ed. Vaccinia viruses as vectors for vaccine antigens. Elsevier, N.Y. p. 201.

James, M. A. & M. G. Levy. 1980. Induction of protective and sterile immunity against babesiosis with MASP culture-derived antigens and in-vitro inactivation of Babesia merozoites by immune serum. In Anon., Symposium proceedings: Review of research progress in bovine anaplasmosis and babesiosis. Mexico City, Mexico. 26-28 Feb. 1980.

Jones, L., S. Ristow and T. Yilma. 1985. Nature. In press.

Kieny, M., R. Lathe, R. Drilbien, D. Spehner, S. Skory, D. Schmitt, T. Wiktor, H. Koprowski, and J. Lecocq. 1984. Expression of rabies virus glycoprotein from a recombinant vaccinia virus. Nature 312: 163-166.

Mackett, M., T. Yilma, J. Rose and B. Moss. 1985. Vaccinia virus recombinants: Expression of VSV genes and protective immunization of mice and cattle. Science 227: 433-435.

Masigna, A. 1981. Proc. Conf. Anim. Disease Res. Livestock Prod., Africa. pp. 175-176.

Mullenax, C. H. 1986. Unpublished data.

National Science Foundation. 1985. Panel on Vaccine Development for Tropical Animal Diseases.

Norval, R., B. Fivaz, J. Lawrence and A. Brown. 1984. Epidemiology of tick-borne diseases of cattle in Zimbabwe. II. Anaplasmosis. Trop. Anim. Hlth. Prod. 16: 63-70.

Norval, R., B. Fivaz, J. Lawrence and T. Daillecourt. 1983. Epidemiology of tick-borne diseases of cattle in Zimbabwe. I. Babesiosis. Trop. Anim. Hlth. Prod. 15: 87-94.

Osorno, M., P. Solana, J. Perez and T. Lopez. 1975. Study of an attenuated *Anaplasma marginale* vaccine in Mexico: Natural challenge of immunity in an enzootic area. Am. J. Vet. Res. 36(5): 631-633.

Palmer, G., A. Barbet, W. Davis, T. McGuire. 1986. Immunization with an isolate-common surface protein protects cattle against anaplasmosis. Science 231: 1299-1302.

Panicali, D., S. Davis, R. Weinberg, and E. Paoletti. 1983. Construction of live vaccines by using genetically engineered poxviruses: Biological activity of recombinant vaccinia virus expressing influenza virus hemagglutinin. Proc. Natl. Acad. Sci. USA 80: 5364-5368.

Perkus, M. E., A. Piccini, B. Lipinskas, and E. Paoletti. 1985. Recombinant Vaccinia virus: Immunization against multiple pathogens. Science 229: 981-984.

77

Smith, G. L., G. Godson, V. Nussenzwieg, R. Nussenzwieg, J. Barnwell and B. Moss. 1984. Plasmodium knowlesi sporozoite antigen: Expression by infectious recombinant vaccinia virus. Science 224: 397-399.

Wiktor, T. J. et al. 1984. Protection from rabies by a vaccina virus recombinant containing the rabies virus glycoprotein gene. Proc. Natl. Acad. Sci. USA 81: 7194-7198.

Yilma, T., M. Mackett, J. Rose, B. Moss. 1985. Vaccinia virus recombinants expressing vesicular stomatitis genes immunize mice and cattle. In: Quinnan, G. V., Ed. Vaccinia viruses as vectors for vaccine antigens. Elsevier, N.Y. pp. 187-200.

W3896A

Improved Animal Vaccines Through Biotechnology

Phase II

Anaplasmosis and Babesiosis

Project Number 936-4178

APPENDIX IV - SUMMARY OF MISSION RESPONSES

S&T/AGR:10/30/86

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY - PHASE II

ANAPLASMOSIS AND BABESIOSIS

Countries and/or AID Missions Known to Desire Collaboration with the Project

Country	Area of Capability or Interest							
	Laboratory/ containment testing		Epidemiology or field testing		Existing projects of complementary nature		Desire training for national	
	Yes	No	Yes	No	Yes	No	Yes	No
Asia & Near East								
Indonesia	x		x		x		x	
Jordan	x		x		x		x	
Morocco		x	x		x		x	
Pakistan	x		x		x		x	
Sri Lanka	x		x		x		x	
Thailand	x		x		x		x	
Africa								
Cameroon		x	x		x		x	
Gambia		x	x		x		x	
Ghana	x		x			x	x	
Madagascar	x		x		?		?	
Mauritania	?		x		x		?	
Somalia	x (being developed)		x		x		x	
Sudan	possibly		x		x		x	
Zimbabwe	x		x		x		x	
Latin America & Caribbean								
Belize		x		x		x	x	
Bolivia		x	x		x		x	
Costa Rica (CATIE)	?		probably		?		?	
Ecuador		x	x		x		x	
Honduras		x	x		x		?	
Mexico	x		x		x		x	
Panama		x	x		?		?	
Peru	x		x		x		x	

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

Summary of Mission Responses to Requests for Information

Africa

Anaplasmosis and Babesiosis

Country	Rinderpest Interest	(A) Problem			(B) Interest		(C) Containment Facilities	(D) Host Country Regulations	(E) Mission Projects In Animal Diseases	(F) Training of LDC Scientists		(G) Comments
		Yes	No	$ Loss Mill.	Host C	Mission				No.	Type	
Cameroon	Yes	Yes		N/A	Yes	Yes	No	Yes	Yes	Yes	-	Very Interested
Gambia	-	Yes		N/A	Yes field testing	Yes	None	Clearance fm Dept. Animal Health and Production	Livestock com-component of trypanotolerance		-	-
Ghana	Interest in field testing	Yes		0.6M	Yes	Yes	Lab. is available & isolation facilities can be made available.	None	None	Yes	Vaccine production techniques	Mission interested as long as mission support not required.
Mali	-			N/A	Yes	Yes	Central Vet. Lab.	-	Livestock Sector Project	-	-	Cable not in response to 218952
Madagascar	-	Yes		$0.02	Yes	-	Yes	None	-	-	-	Endemic for hemoparasites
Mauritania	-			N/A	Yes	-	-	-	-	-	-	ADF,IDA,&OPEC providing $23.5 mil for 2nd livestock project. Mission suggests ST/AGR contact them.

WANG 1307C:8/29/86:Revised:10/7/86

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

Summary of Mission Responses to Requests for Information

Africa (continued)

Country	Rinderpest Interest	Anaplasmosis and Babesiosis (A) Problem Yes	(A) Problem No	(A) $ Loss Mill.	(B) Interest Host C	(B) Interest Mission	(C) Containment Facilities	(D) Host Country Regulations	(E) Mission Projects In Animal Diseases	(F) Training for LDC Scientists No.	(F) Training for LDC Scientists Type	(G) Comments
Niger	Will advise	?			Yes	-	-	-	-	-	-	Mission funding Rinderpest project with Tufts team and PIADC and testing methods for making vaccine more heat-stable.
Somalia	Yes	-	-		Yes	-	-	-	-	Yes	-	-
Sudan	-	-	-		Yes	-	-	-	-	Yes	-	-
Togo	$0.2 m * (Not identified as serious causes of cattle mortality in Northern Regions of Togo) to Economy.											-
Zimbabwe	No	Yes		Control cost 15/yr	Yes	Yes	Yes	Approval process for vaccines	Vaccine for heartwater	Yes	Molecular biology;epidemiology	Mission requested to be kept informed

* In 1985 in the Savanes Region (Northern-Most) Rinderpest killed more than 700 head of cattle, and in addition 700 head had to be slaughtered because they become sick from rinderpest. In the Kara Region, 700 head were reported killed, but many other deaths/killings were unreported.

WANG 1307C:8/29/86:Revised 10/07/86

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY PHASE II
(Anaplasmosis and Babesiosis)
Summary of Mission Responses to Requests for Information

Asia and Near East

		Anaplasmosis and Babesiosis											
		(A) Problem			(B) Interest		(C)	(D)	(E)	(F) Training for LDC Scientists		(G)
Country	Rinderpest Interest	Yes	No	$ Loss Mill.	Host C	Mission	Containment Facilities	Host Country Regulations	Mission Projects In Animal Diseases	No.	Type	Comments
Bangladesh	No	-		N/A	-	-	None	-	-	None at this time		Rinderpest common in border countries
Fiji	No	?		N/A	No	No	-	-	-		-	-
Indonesia	Yes	Yes		20 *	Yes	Yes	Limited labs and secure facilities	None	Agr. Res. Sm. Ruminants	Yes	Animal vaccines	Keep mission advised Bogor & AARD interested and want to visit project site
Jordan	-		No	N/A	Yes	Only in Results	Yes	None	Highland Agr. Dev. w/Livestock prod. component	yes	Vaccine production	
Morocco	No	Yes**		Yes***			none	none	Participant Trng in Vet Medicine Under Inst. Bldg	yes, but need USAID approval		keep Mission informed of project progress

* Indonesia - 55% of bovines tested were positive for anaplasma, 44% of buffalo. In 1984, 6757 cases of anaplasma were reported and 5579 cases of babesiosis. Annual losses are estimated at $20.0 million.

** Morocco - Problem with Babesiosis with imported sheep and cattle and occasionally with local breeds.

*** - Hassan II Institute would be interested in testing vaccine against Babesia under controlled conditions.

WANG 1307C:8/29/86:Revised 10/07/86

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

Summary of Mission Responses to Requests for Information

Asia and Near East (Continued)

		Anaplasmosis and Babesiosis									
		(A) Problem			(B) Interest		(C)	(D)	(E)	(F) Training for LDC Scientists		(G)
Country	Rinderpest Interest	Yes	No	$ Loss (Mill.)	Host C	Mission	Containment Facilities	Host Country Regulations	Mission Projects In Animal Diseases	No.	Type	Comments
Pakistan	Yes	Yes		Great	Yes	Yes	Limited veterinary hospital	May require approval.	Res. project in cell culture	1-2	Vaccine production	Mission/ST/AGR Coop. in develop. of vaccine will be beneficial to both
Sri Lanka	No	Yes		N/A	Yes	Yes (Testing)	Yes	None	None	Yes	Vaccine prod.	Ongoing project with Australians which has small component of Biotech - not adequate to meet needs.
Thailand	No	Yes		N/A	Yes	-	Yes	Not formally established	2 subprojects livestock vaccine & water buffalo	Yes	Vaccine research & dev.	Visit of US expert if further collaboration is anticipated

WANG 1307C:8/29/86:Revised 10/07/86

IMPROVEL ANIMAL VACCINES THROUGH BIOTECHNOLOGY

Summary of Mission Responses to Requests for Information

Latin America and Carribean

		Anaplasmosis and Babesiosis										
		(A) Problem			(B) Interest		(C)	(D)	(E)	(F) Training for LDC Scientists		(G)
Country	Rinder-pest Interest	Yes	No	$ Loss (Mil.)	Host C	Mission	Contain-ment Facilities	Host Country Regulations	Mission Projects In Animal Diseases	No.	Type	Comments
Belize	No	-	-	N/A	-	-	None	Yes	-	-	-	Vaccine not produced in Belize
Bolivia		Yes		N/A	Yes laboratory & field testing new vaccines	Yes	No contain-ment labs; isolation facil. avail.	No known regulations on vaccines	Private Agr. Prod. Organiz. (PAPO)	Yes vaccine production and research		Vaccines not produced for rinderpest, anaplasmosis or babesiosis
Ecu[illegible]		Yes		N/A	Yes	Yes	None	None aware of	Coastal beef and sierra dairy	Yes		Rural tech. transfer
H[illegible]		Yes		N/A	Poss. field testing		None	None	Priv. sector livestock	No		Keep mission informed
Mexico		Yes		N/A	Already test'g immunoprophy-lactic agents in labs & field		Yes, appropriate facilities exist	Yes	Mexico is funding a hemoprotozoan disease project	Yes postgrad. & possibly technical training		Mexico is willing to participate in collora-tive projects with univs. & res. Insts.
Panama		Yes		-	-	-	-	-	None	-	-	Keep mission informed
Peru		Yes		-	Yes	Yes	Yes	Yes	SR-CRSP	3	Postgrad. in genetic engineer'g	Mission wants to participate

WANG:1307C:8/29/86:Revised 10/07/86

Department of State

OUTGOING TELEGRAM

PAGE 01 STATE 218952 5436 037664 AID9318
ORIGIN AID-00

ORIGIN OFFICE STAG-07
INFO AAAF-02 AFEA-03 AFSA-03 AFRA-03 AFFV-04 AFCU-03 FPA-02
AALA-01 LACE-03 LASA-03 LADR-03 AFTR-05 AMAD-01 ANTR-06
STME-01 STPO-01 SAST-01 ES-01 STFA-01 AMHE-03 RELO-01
TELE-01 LACA-03 AMEA-02 AMEG-03 AMAA-01 AMSA-02
/065 AB

INFO LOG-00 /000 R

AB

DRAFTED BY: AID/ST/AGR/LP:HNORTIN:MYP
APPROVED BY: AID/ST/AGR:TGILL
AID/ST/AGR:CMULLENAX (DRAFT) AID/ST/AGR:BROCHE (DRAFT)
AID/AME/TR/ARD:ERICE (PHONE) AID/AFR/TR/ARD:KPRUESSNER (PHONE)
AID/LAC/DR/RD:RHINOJOSA (PHONE) AID/ES:GJOE
----------031057 120753Z /38

R 120750Z JUL 86 ZEX
FM SECSTATE WASHDC
TO AID WORLDWIDE

UNCLAS STATE 218952

ADM AID

E.O. 12356: N/A
TAGS:
SUBJECT: IMPROV[illegible]IOTECHNOLOGY

REF: [illegible]

[illegible]E OF ITS PROJECT [illegible]CHNOLOGY" TO THE [illegible]NST RINDERPEST. [illegible]IMBACKS OF THE [illegible]NTLY PLANNED, THIS [illegible]ION, CAN BE APPLIED BY [illegible]CESSARY, BE EASILY [illegible]

[illegible] NEW RINDERPEST [illegible]INE WILL BE PRODUCED THROUGH THE [illegible] OF GENETIC [illegible]RING AT THE UNIVERSITY OF CALIFO[illegible] UNDER THE DIRECTION OF DR. TILAHUN YILMA. [illegible]ER THE IMPROVED VACCINE HAS BEEN DEVELOPED, IT WILL BE TESTED IN CONTAINED LABORATORY SETTINGS AT PLUM ISLAND ANIMAL DISEASE CENTER OF THE USDA/ARS AND IN AFRICA. TENTATIVE AGREEMENT HAS BEEN REACHED WITH DR. CHEMA, DIRECTOR, VETERINARY SERVICES, MINISTRY OF AGRICULTURE AND LIVESTOCK DEVELOPMENT, KENYA TO USE THE ISOLATION LABORATORY AT MUGUGA WHICH HAS BEEN USED FOR PREVIOUS RINDERPEST WORK. OTHER MISSIONS INTERESTED IN TESTING RINDERPEST VACCINE IN APPROPRIATE ISOLATED LABORATORIES ARE ENCOURAGED TO SUBMIT PROPOSAL TO ST/AGR, DR. CHARLES MULLENAX. DURING THE LIFE OF THE PROJECT, 8 POSOCTORAL SCIENTISTS FROM AFRICA WILL BE TRAINED AT THE UNIVERSITY OF CALIFORNIA.

3. ST/AGR PLANS TO SUPPORT ADDITIONAL VACCINE DEVELOPMENT FOR OTHER ANIMAL DISEASES (E.G. ANAPLASMOSIS AND BABESIOSIS) AS AN EXTENSION OF THIS PROJECT. THESE DISEASES CAUSE SIGNIFICANT PRODUCTION LOSSES IN CATTLE, A INFECTION CAN BE EITHER ACUTE OR CHRONIC, RESULTING IN DEATH OR REDUCED PRODUCTIVITY. THE PROPOSED NEW VACCINES WILL ADDRESS BOTH CONDITIONS.

4. MANY OF THE MISSIONS RESPONDED TO REFTEL INDICATING THE PREVALENCE OF THESE DISEASES IN THEIR COUNTRIES AND THE NEED FOR ASSISTANCE. WE ARE NOW REQUESTING FURTHER INFORMATION AND EXPRESSIONS OF INTEREST FOR SUPPORT OF

STATE 218952 5436 037664 AID9318

ACTIVITIES RELATED TO THE CONTROL OF THESE DISEASES.

IF INTERESTED, PLEASE RESPOND TO THE FOLLOWING QUESTIONS BY AUGUST 12, 1986:

A. ARE THESE DISEASES A PROBLEM IN YOUR COUNTRY? INDICATE APPROXIMATE LOSS IN DOLLARS, IF DATA AVAILABLE.

B. IS THE HOST COUNTRY AND/OR THE MISSION INTERESTED IN PARTICIPATING IN LABORATORY AND/OR FIELD TESTING OF NEW VACCINES?

C. ARE CONTAINMENT LABORATORIES WITH SECURE ANIMAL ISOLATION FACILITIES AVAILABLE IN YOUR COUNTRY?

D. ARE THERE HOST COUNTRY REGULATIONS WHICH DEFINE THE USE OF THIS TYPE OF TECHNOLOGY; OR THE USE OF GENETICALLY ENGINEERED VACCINES? IF YES, EXPLAIN WHAT APPROVAL MUST BE OBTAINED.

E. WHAT EXISTING PROJECTS OR COMPONENTS OF PROJECTS ARE YOU FUNDING WHICH MIGHT BENEFIT FROM OR PROVIDE BENEFIT TO THE ST/AGR VACCINE PROJECT?

F. DOES THE MISSION FEEL IT IS ADVISABLE FOR HOST COUNTRY SCIENTISTS TO BE TRAINED IN ANIMAL VACCINE TECHNOLOGY? IF THE ANSWER IS "YES", INDICATE THE TYPE OF TRAINING REQUIRED.

G. ANY OTHER COMMENTS AND SUGGESTIONS ARE APPRECIATED. SHULTZ

86

APPENDIX IV

I M P R O V E D A N I M A L V A C C I N E S

T H R O U G H B I O T E C H N O L O G Y

PHASE II

ANAPLASMOSIS AND BABESIOSIS

Mission Cables Received

from

A F R I C A

ACTION COPY

Department of State

INCOMING TELEGRAM

ACTION AID-00

ACTION OFFICE STAG-02
INFO AFCW-03 AMAD-01 STFN-02 SAST-01 STFA-01 RELO-01 AGEE-01
/012 A0

INFO LOG-00 AF-00 /000 W
----------004317 211503Z /38

P 211459Z AUG 86
FM AMEMBASSY YAOUNDE
TO SECSTATE WASHDC PRIORITY 8630

UNCLAS YAOUNDE 07222

AIDAC

FOR S&T/AGR, CHARLES MULLENAX

E.O. 12356: N/A
TAGS: N/A
SUBJECT: IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

REF: STATE 218952

1. THE INSTITUTE OF ANIMAL RESEARCH (IRZ) UNDER THE MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH IS VERY INTERESTED IN TESTING THE NEW RINDERPEST VACCINE DESCRIBED IN REFTEL. APPOLOGIZE FOR THE DELAY IN RESPONDING, BUT THE DIRECTOR OF IRZ HAS BEEN ON OFFICIAL BUSINESS IN THE U.S. AND EUROPE AND WAS UNAVAILABLE TO RESPOND TO QUESTIONS IN REFTEL UNTIL NOW.

2. RESPONSES TO THE QUESTIONS POSED IN REFTEL ARE AS FOLLOWS:

A. RINDERPEST IS A SEVERE PROBLEM IN THE THREE NORTHERN PROVINCES OF CAMEROON, ESPECIALLY WITH THE MOVEMENT OF CATTLE FROM CHAD THROUGH CAMEROON TO NIGERIA. DATA ON APPROXIMATE LOSS IN DOLLARS IS NOT AVAILABLE. HOWEVER, THE DIRECTOR OF IRZ ESTIMATED THAT DURING THE LAST SEVERE OUTBREAK OF RINDERPEST IN 1983-84, 20 PERCENT OF THE NATIONAL HERD WAS LOST. AS WELL, CAMEROON HAD CONSIDERABLE OUTLAY OF EXPENSES TO FINANCE, WITH THE ASSISTANCE OF FAO, AN EXTENSIVE VACCINATION PROGRAM.

B. IRZ IS VERY INTERESTED IN PARTICIPATING IN THE LABORATORY AND FIELD TESTING OF NEW VACCINES.
C. CONTAINMENT LABORATORIES WITH SECURE ANIMAL ISOLATION FACILITIES ARE NOT AVAILABLE. HOWEVER, THE DIRECTOR OF IRZ SAID THAT THE INSTITUTE HAS IN ITS APPROVED BUDGET FOR ISHYEAR DUNDS FOR UPGRADING THEIR LABORATORY FACILITIES AT AAKWA RESEARCH STATIGN P THE ADAMAOUA PROVINCE. THIS CONSTRUCTION HAS BEEN PLANNED FOR IRZ'S CONTINUING RESEARCH ON AFRICAN SWINE FEVER, AND INCLUDES ANIMAL ISOLATION HOLDING FACILITIES. THE DIRECTOR SAID WITH SUFFICIENT LEAD TIME AND PROPER ARCHITECTURAL SPECIFICATIONS AND PLANS, THE FACILITIES COULD BE CONSTRUCTED.

D. THE GOVERNMENT OF CAMEROON DOES HAVE REGULATIONS GOVERNING THE USE OF ANIMAL VACCINE TESTING. THE DIRECTOR STATED THAT WITH THE CONSTRUCTION OF PROPER LABORATORY AND ISOLATION FACILITIES, APPROVAL FOR TESTING THE VACCINE WOULD BE GRANTED BY THE GRC.

E. USAID/CAMEROON'S LIVESTOCK RELATED PROJECTS HAVE ALL BEEN COMPLETED. HOWEVER, FUNDING OF NINE LONG-TERM PARTICIPANTS IN LIVESTOCK PRODUCTION AND RESEARCH ARE BEING FUNDED UNDER AMDP. ALSO, USAID/CAMEROON AND IRZ

HAVE BEEN WORKING IN COLLABORATIVE RESEARCH EFFORTS ON AFRICAN SWINE FEVER WITH USDA/ARS, ANIMAL DESEASE CENTER AT PLUM ISLAND, NEW YORK, SINCE 1982. USDA'S ASSISTANCE IN CAMEROON HAS BEEN EXPLORATORY IN NATURE, PRIMARILY TO PROVIDE THE GRC DIRECTION IN PURSUING SOLUTIONS TO CAMEROON'S AFRICAN SWINE FEVER PROBLEM. USAID/CAMEROON AND IRZ LOOK AT THE OPPORTUNITY PROVIDED BY THE SUBJECT PROJECT AS A MEANS OF PROVIDING THE GRC THE SAME SORT OF DIRECTION AND GUIDANCE IN ITS EFFORTS TO CONTROL RINDERPEST.

F. THE MISSION FEELS IT IS ADVISABLE FOR CAMEROONIAN SCIENTISTS TO BE TRAINED IN ANIMAL VACCINE TECHNOLOGY. THE GRC HAS RECENTLY FINISHED CONSTRUCTION OF A VETERINARY COLLEGE, LABORATORIES, AND ANIMAL VACCINE PRODUCTION FACILP
K IN GAROUA. THE GRC IS VERY INTESTED IN FURTHER TRAINING FOR THEIR VETERINARIANS AND SCIENTISTS IN VACCINE PRODUCTION. FRECHETTE

Cameroon

ACTION COPY

UNCLASSIFIED

Department of State

INCOMING TELEGRAM

PAGE 01 BANJUL 02465 041526Z 8271 005160 AID7383
ACTION AID-00

ACTION OFFICE STAG-02
INFO AFFW-04 AFPD-04 AFTR-05 AMAD-01 STHE-01 SAST-01 AFDA-02
STFA-01 RELO-01 /022 A0

INFO LOG-00 AF-00 /000 W
127240 041657Z /38

R 041443Z AUG 86
FM AMEMBASSY BANJUL
TO SECSTATE WASHDC 2940

UNCLAS BANJUL 02465

AIDAC

FOR ST/AGR

E.O. 12356 N/A
SUBJECT: IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

REF: STATE 334210

GAMBIAN DEPARTMENT OF ANIMAL HEALTH AND PRODUCTION, MINISTRY OF AGRICULTURE, INTERESTED IN ASSISTANCE. THE FOLLOWING RESPONDS TO QUESTION IN REFTEL.

A. RINDERPEST IS STILL CONSIDERED AS A POTENTIAL THREAT THOUGH THE LAST OUTBREAK OCCURRED IN 1968. SINCE THEN TH DEPARTMENT OF ANIMAL HEALTH AND PRODUCTION HAS BEEN CARRYING OUT COMPULSORY MASS VACCINATION CAMPAIGNS AGAINST BOTH RINDERPEST AND CBPP. WE STILL VACCINATE IN ORDER TO PREVENT THE RE-EMERGENCE OF THE DISEASE (OUTBREAKS OF WHICH STILL OCCUR IN SOME COUNTRIES OF THE WEST AFRICAN SUB-REGION).

B. SINCE WE DON'T HAVE ADEQUATE LABORATORY FACILITIES, WE WOULD ONLY BE INTERESTED IN CARRYING OUT FIELD TESTING OF THE VACCINE.

C. NO SUCH LABORATORIES EXIST.

D. CLEARANCE SHOULD ONLY BE SOUGHT FROM THE DEPARTMENT OF ANIMAL HEALTH AND PRODUCTION OF THE MINISTRY OF AGRICULTURE.

E. THE LIVESTOCK DEVELOPMENT PROJECT COMPONENT OF THE INTERNATIONAL TRYPANOTOLERANCE CENTRE. BAHL

Rwt
Gambia -

UNCLASSIFIED

99

ACTION COPY

Department of State

INCOMING TELEGRAM

PAGE 01 ACCRA 05670 281537Z 5167 000260 AID1540
ACTION AID-00

ACTION OFFICE STAG-02
INFO AFCW-03 AFPD-04 AFTR-05 AMAD-01 STHE-01 SAST-01 AFDA-02
STFA-01 RELO-01 /021 A0

INFO LOG-00 AF-00 /000 W
----------113727 281631Z /38

R 281534Z JUL 86
FM AMEMBASSY ACCRA
TO SECSTATE WASHDC 1302

UNCLAS ACCRA 05670

AIDAC FOR ST/AGR

E.O. 12356: N/A

SUBJECT: IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

REF: (A) STATE 334210 (B) STATE 218952

1. THE DEPARTMENT OF VETERINARY SERVICES, MINISTRY OF AGRICULTURE, GHANA, UNDER THE DIRECTORSHIP OF DR. K.O. GYENING HAS EXPRESSED INTEREST IN FIELD TRIAL PARTICIPATION PER REFTEL.

2. THE ANSWERS TO THE QUESTIONS ARE AS FOLLOWS:

A) THE DISEASES CITED IN REFTEL ARE A PROBLEM IN GHANA.
- THE APPROXIMATE LOSS FOR 1985 IS U.S. DOLLARS
- 643,000 AS A RESULT OF SERIES OF OUTBREAK OF RINDER-
- PEST IN GHANA. UNTIL THE 1985 OUTBREAK GHANA
- EXERCISED REASONABLE CONTROL OVER RINDERPEST THROUGH
- ANNUAL VACCINATION PROGRAMS.

B) THE HOST COUNTRY IS INTERESTED IN PARTICIPATING IN
- THE LABORATORY AND/OR FIELD TESTING OF NEW
- VARIETIES.

C) THERE ARE NO CONTAINMENT LABORATORIES WITH SECURE
- ANIMAL ISOLATION FACILITIES IN GHANA. HOWEVER,
- GHANA HAS LABORATORY FACILITIES.

D) THERE ARE NO REGULATIONS DEFINING THE USE OF THIS
- TYPE OF TECHNOLOGY IN GHANA OR THE USE OF GENETI-
- CALLY ENGINEERED VACCINES IN GHANA.

E) NONE

F) THE MISSION IS OF OPINION THAT SCIENTISTS FOR HOST
- COUNTRY BE TRAINED IN ANIMAL VACCINE TECHNOLOGY
- SINCE THIS IS ALMOST FOREIGN TO HOST COUNTRY.
- TRAINING SHOULD FOCUS ON USE OF THE TECHNIQUES AND
- MONITORING OF RESULTS WITH SPECIFIC REFERENCE TO
- THE ELISA TECHNIQUE FOR DETERMINING ANTI-BODY
- LEVELS.

G) LABORATORY FACILITIES ARE AVAILABLE. HOWEVER, IF
- FUNDS ARE PROVIDED ANIMAL ISOLATION FACILITIES
- CAN BE MADE AVAILABLE. LOCATION FOR ESTABLISHING
- QUARANTINE IS AVAILABLE, HOWEVER, IT DOES NOT
- CONTAIN PHYSICAL STRUCTURES.

3. MISSION DOES NOT FINANCE LIVESTOCK RELATED ACTIVITIES IN GHANA AND DOES NOT PROPOSE TO ENTER THE FIELD. HOWEVER, GIVEN ITS PROMINENCE IN THE REGIONAL LIVESTOCK INDUSTRY, LIVESTOCK DISEASE OUTBREAK IN GHANA POSES A DIRECT THREAT TO THE SAHALIAN REGION. GHANA'S LIVESTOCK INDUSTRY IS CONFINED PRIMARILY TO THE NORTHERN ONE THIRD

OF THE COUNTRY WITH LIVESTOCK HERDS EXTENDING TO THE COASTAL AREAS. ANOTHER REASON FOR CONSIDERING GHANA AS A TEST SITE IS ITS PAST PERFORMANCE IN LIVESTOCK DISEASE CONTROL AND IN ITS RESERVE OF HUMAN TALENT IN THIS AREA. MISSION SUPPORTS ST/AGR TEST PROGRAM IN LIVESTOCK DISEASE CONTROL AND PARTICULARLY, IT SUPPORTS GHANA AS A TEST SITE SO LONG AS NO MISSION LOGISTICAL SUPPORT IS REQUIRED AS MISSION IS UNABLE TO SUPPORT A SUBSTANTIAL FIELD EFFORT. ROY

Ghana

90

ACTION COPY

UNCLASSIFIED

Department of State

INCOMING TELEGRAM

PAGE 01 ANTANA 03047 190806Z 5189 014023 AID9197
ACTION AID-00

ACTION OFFICE STAG-03
INFO AFEA-03 AFPD-04 AFTR-05 AMAD-01 STHE-02 SAST-01 AFDA-02
STFA-01 RELO-01 AGEE-01 /023 A0

INFO LOG-00 AF-00 /000 W

223330 190807Z /38

Madagascar

R 190802Z AUG 86
FM AMEMBASSY ANTANANARIVO
TO SECSTATE WASHDC 1592
INFO AMEMBASSY NAIROBI

RNR

UNCLAS ANTANANARIVO 03047

AIDAC

AID/W FOR ST/AGR
NAIROBI FOR REDSO/ESA

E.O. 12356 N/A
SUBJECT: IMPROVED ANIMAL VACCINES THRDUGH BIOTECHNOLOGY

REF: STATE 218952

A) BABESIOSIS ARGENTINA, BIGEMINA AND OVIS HAVE BEEN FOUND IN MADAGASCAR SINCE 1906. ON AVERAGE, ABOUT 225 CASES OF THE DISEASE OCCUR PER YEAR IN CATTLE, WITH A 10 TO 20 PERCENT MORTALITY RATE. IMPORTED AND CROSS-BREED CATTLE ARE MORE AFFECTED THAN LOCAL CATTLE, HAMPERING GENETIC IMPROVEMENT. ANAPLASMOSIS IS LESS COMMON. ESTIMATED LOSS FROM BOTH DISEASES IS DOLS 20,000 PER YEAR.

B) HOST COUNTRY IS INTERESTED IN PARTICIPATING IN LABORATORY AND/OR FIELD TESTING OF NEW VACCINES.

C) A ZOOTECHNIC RESEARCH DIVISION EXISTS AT THE MINISTRY OF RESEARCH. THIS DIVISION IS RELATIVELY WELL EQUIPPED FOR VACCINE PRODUCTION. ISOLATION FACILITIES ARE AVAILABLE IN HOST COUNTRY.

D) NO REGULATIONS EXIST FOR USE OF THIS TYPE OF TECHNOLOGY NOR USE OF GENETICALLY ENGINEERED VACCINES.
LYNCH

UNCLASSIFIED

ACTION COPY

Department of State

INCOMING TELEGRAM

PAGE 01 BAMAKO 04171 181206Z 4216 101573 A104328
ACTION AID-00

ACTION OFFICE STAG-02
INFO AAAF-02 AFFW-04 AFTR-05 SAST-01 AFDA-02 STFA-01 RELO-01
/013 A4 818

INFO LOG-00 COPY-01 /001 W
----------374113 181208Z /43

R 181123Z JUL 86
FM AMEMBASSY BAMAKO
TO SECSTATE WASHDC 5895

UNCLAS BAMAKO 04171

ADM AID

FOR ST/AGR, K. JONES; AFR/TR/ARD

E.O. 12356: N/A
SUBJECT: ST/AGR/RNR - AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, DR. KERRI-ANN JONES TRAVEL

REF: STATE 287382

1. ADO JACKSON WAS UNSUCCESSUL DURING AID/W JUNE TDY TO CONTACT DR. JONES REFERENCE SUBJECT VISIT TO MALI. MISSION IS INTERESTED SPECIFICALLY IN BIOTECHNOLOGY APPLICATION AND POSSIBILITIES WHICH EXIST OR HAVE POTENTIAL FOR DEVELOPMENT AT CENTRAL VETERINARY LABORATORY (CVL), BAMAKO, MALI. GIVEN THE VACCINE PRODUCTION FACILITIES AT CVL AND NEW DIAGNOSTIC LABORATORY, ISOLATION/QUARANTINE BUILDINGS AND MODERN EQUIPMENT, THE ASPECTS OF BIOTECHNOLOGY AND ANIMAL HEALTH RELATIONSHIPS ARE PARTICULARLY INTERESTING, WORTHY OF INVESTIGATION, AND FUTURE ACTIVITIES WOULD BENEFIT AFRICA LIVESTOCK PRODUCTION IN GENEGAL. THE CVL WITHOUT DOUBT, IS THE BEST EQUIPPED AND MOST MODERN COMPARED TO OTHER VET TYPE LABORATORIES IN WEST AFRICA, AND HAS TECHNICAL STAFF TRAINED IN THE U.S.A.

2. MISSION HAS LESS INTEREST IN AGRICULTURE ASPECTS OF BIOTECHNOLOGY AND TECHNICAL ADVISORS/RESEARCHERS ASSOCIATED WITH OUR VARIOUS RESEARCH PROJECTS ARE DOUBTFUL OF BIOTECHNOLOGY APPLICATION POTENTIAL. SEVERAL RESEARCHERS REFERENCED AN EDITORIAL FOUND IN THE CROPS ANDSOILS MAGAZINE, PAGE 5, DATED OCTOBER 1985, VOL. 38, NO. 1.

3. DR. BOUBACAR SECK, DEPUTY DIRECTOR OF THE CVL IS PRESENTLY IN THE STATES AT THE UNIVERSITY OF PITTSBURG ATTENDIG THE MANAGEMENT SEMINAR.

MISSION URGES DR. JONES TO CONTACT DR. SECK AND DISCUSS PROPOSED TRIP, CVL ACTIVITIES, AND POTENTIAL FOR BIOTECHNOLOGY IN ANIMAL HEALTH IN MALI. DR. SECK'S TELEPHONE NUMBER AND SPECIFIC LOCATION CAN BE OBTAINED FROM YVONNE JACKSON-ANDUALEM, USDA/OICD/TAD, PHONE: 202-475-5393.

FYI. DR. HAMDY HAS DEPARTED BAMAKO. CONTACT CAN ALSO BE ARRANGED THROUGH Y. JACKSON-ANDUALEM. COPY OF HAMDY EOT REPORT WILL ALSO BE AVAILABLE FROM USDA/OICD/TAD. END FYI.

4. MISSION PLANS MID-TERM EVALUATION OF MALI LIVESTOCK SECTOR PROJECT FOR AUGUST AND SEPTEMBER. EVALUATION TEAM WILL BE IN AID/W FOR SEVERAL DAYS BRIEFING PRIOR TO DEPARTURE FOR MALI. EVALUATION WILL LAY GROUNDWORK FOR DESIGN OF PLANNED NEXT 5 YEAR PHASE OF USAID'S INVOLVEMENT IN THE MALI LIVESTOCK SECTOR WITH PLANNED EMPHASIS ON ANIMAL HEALTH RESEARCH, FORAGE AND PRODUCTION

BAMAKO 04171 181206Z 4216 101573 A104328
RESEARCH IN MIXED FARMING/LONTENT AND PRIVATIZATION AND POLICY ISSUES IN THE LIVESTOCK SECTOR. CLAUDIA CANTELL, AFR/PD/CWAP, WILL BE BACKSTOPPING THE EVALUATION TEAM IN AID/W AND (B)
LOCATION AND VARIOUS PHONE
CONTACTS.

5. MISSION CONCURS WITH VISIT OF DR. JONES AND WILL MAKE ARRANGEMENTS AND APPOINTMENTS AFTER FIRM ETA AND ETD KNOWN.
TWADELL

Mali

NAR

ACTION COPY

UNCLASSIFIED

Department of State

INCOMING TELEGRAM

PAGE 01 NOUAKC 03185 221526Z 9088 103715 AID7018
ACTION AID-00

ACTION OFFICE STAG-02
INFO AAAF-02 AFRA-03 AFFW-04 FPA-02 AFTR-05 STHE-01 STPO-01
SAST-01 ES-01 STFA-01 RELO-01 /024 A1 X22

INFO LOG-00 AF-00 /000 W

R 221521Z JUL 86
FM AMEMBASSY NOUAKCHOTT
TO SECSTATE WASHDC 7186

Mauritania

For Mary Mozynsky

UNCLAS NOUAKCHOTT 03185

AIDAC

E.O. 12356: N/A
SUBJECT: IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

REF: STATE 218952

1? MISSION IS NOT FUNDING NOR CONTEMPLATING FUNDING ANY LIVESTOCK DEVELOPMENT PROJECTS IN MAURITANIA.

2. THE AFRICAN DEVELOPMENT FUND (ADF), THE INTERNATIONAL DEVELOPMENT ASSOCIATION (IDA), THE OIL PRODUCING AND EXPORTING COUNTRIES (OPEC) ARE PROVIDING 34 PERCENT, 32 PERCENT AND 9 PERCENT RESPECTIVELY OF A 23.5 MILLION DOLLAR LOAN TO MAURITANIA FOR THE SECOND LIVESTOCK PROJECT. 22 PERCENT OF PROJECT COSTS ARE TO BE MET BY THE GIRM AND 2 PERCENT BY THE BENEFICIARIES. THE PROJECT IS DESIGNED TO IMPROVE LIVESTOCK SERVICES AND INPUTS AS NOW PROVIDED BY THE DIRECTORATE OF LIVESTOCK IN THE MINISTRY OF RURAL DEVELOPMENT. THIS NEW PROJECT ADDRESSES ANIMAL PRODUCTION THROUGH IMPROVING THE LIVESTOCK SERVICE OF THE NATIONAL GOVERNMENT. THE RESEARCH WING OR THE NATIONAL CENTER FOR LIVESTOCK AND VETERINARY RESEARCH (CNERV) HAS A MINOR ROLE IN THE PROJECT AND WOULD BE THE INSTITUTION MOST LIKELY TO BE INTERESTED IN DEVELOPING VACCINES THROUGH BIOTECHNOLOGY. PROJECT START-UP IS IMMINENT.

3. MISSION SUGGLSTS THAT ST/AGR CONTACT DIRECTLY EITHER ADF OR IDA, OR BOTH, AS THE VACCINE PROJECT COULD HAVE A ROLE IN THE NEW MAURITANIAN LIVESTOCK PROJECT. MISSION WILL INFORM LIVESTOCK AND CNERV PERSONNEL.
PUGH

UNCLASSIFIED

ACTION COPY

UNCLASSIFIED

Department of State

INCOMING TELEGRAM

PAGE 01 NIAMEY 05519 010906Z 7928 003

ACTION AID-00

ACTION OFFICE STAG-02

INFO AFFW-04 AFPD-04 AFTR-05 GC-01 GCAF-01 GCFL-01 STHE-01
SAST-01 RELO-01 /021 A4 301

INFO LQG-00 AF-00 /000 W

Niger

----------377221 010907Z /38

R 010856Z AUG 86
FM AMEMBASSY NIAMEY
TO SECSTATE WASHDC 6837

UNCLAS NIAMEY 05519

AIDAC

E. O. 12356: N/A

SUBJ: IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY
REF: STATE 218952

1. MISSION IS CURRENTLY FINANCING A RINDERPEST VACCINE DEVELOPMENT RESEARCH PROGRAM AT PIADC THROUGH OUR BILATERAL LIVESTOCK PROJECT. SEVERAL STABILIZERS ARE CURRENTLY BEING TESTED TO OVERCOME THE NEED FOR REFRIGERATION. SUBJECT CABLE INFORMATION HAS BEEN PASSED TO OFFICIALS OF THE MINISTRY OF ANIMAL RESOURCES AND THE TUFTS T.A. TEAM.

2. MISSION WILL ADVISE UPON RECEIPT OF THEIR COMMENTS.
BOGOSIAN

UNCLASSIFIED

94

ACTION COPY

UNCLASSIFIED

Department of State

INCOMING TELEGRAM

PAGE 01 MOGADI 08499 110658Z 8362 009200 AID2680 MOGADI 08499 110658Z 8362 009200 AID26
ACTION AID-00

ACTION OFFICE STAG-02
INFO AFEA-03 SEOP-01 AFPD-04 SERP-01 AFTR-05 AMAD-01 SEOS-02
STHE-01 STFN-02 SAST-01 AFDA-02 STFA-01 RELO-01 AGEE-01
/028 A0

INFO LOG-00 AF-00 IO-17 /017 W
----------146526 110659Z /38

R 110655Z AUG 85
FM AMEMBASSY MOGADISHU
TO SECSTATE WASHDC 2870

UNCLAS MOGADISHU 08499

AIDAC

FOR ST/AGR-DR. CHARLES MULLENAX

E.O. 12355: N/A
SUBJECT: IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

REF: STATE 218952

1. THE SERUM AND VACCINE INSTITUTE, MLFR, MOGADISHU CURRENTLY PRODUCING AND TESTING RINDERPEST AND OTHER ANIMAL VACCINES FOR DOMESTIC APPLICATION AND LIMITED EXPORT. THE VACCINE LABORATORY IS SUPPORTED BY FAO BY PRESENCE OF DR. LANCE HAYLES WITH A CONTRACT TO TEAM OF TECHNICIANS FROM CZECHOSLOVOKIA.

2. THE LIVESTOCK MARKETING AND HEALTH PROJECT, MLFR, SUPPORTED BY THIS MISSION, IS DESIGNED TO EXPAND EXPORT OF SOMALI LIVESTOCK ESPECIALLY TO REGAIN SAUDI MARKET. THE EFFECTIVE CONTROL OF RINDERPEST IN SOMALI LIVESTOCK IS AN IMPORTANT ASPECT OF THIS PROJECT. THEREFORE AN IMPROVED RINDERPEST VACCINE WITH THE ADVANTAGES POINTED OUT IN REFTEL WOULD HAVE DIRECT APPLICATION AND BENEFITS HERE.

3. MISSION EXPECTS TO RESPOND POSITIVELY TO AN OFFER OF TECHNICAL ASSISTANCE FROM U.S. NAVAL MEDICAL RESEARCH UNIT NO. 3, CAIRO, JAMES N. WOODY, DIRECTOR FOR RECOMBINANT RINDERPEST VACCINE TRIALS IN COLLABORATION AT SVI. MISSION WILL ENCOURAGE SVI AND NAMRU-3 TO SUBMIT PROPOSALS TO ST AGR DR. CHARLES MULLENAX.
4. SPECIFIC ANSWERS TO QUESTIONS IN REFTEL AS FOLLOWS:

A) RINDERPEST IS A PROBLEM HERE. ACCURATE MORBIDITY AND MORTALITY DATA NOT AVAILABLE LOST CATTLE EXPORT MARKETS TOTAL APPROXIMATELY 43 MILLION DOLLARS ANNUALLY.

B) THE HOST COUNTRY AND THE MISSION ARE INTERESTED IN PARTICIPATING IN LABORATORY AND FIELD TESTING OF NEW VACCINES.

C) IMPROVED CONTAINMENT LABORATORIES WITH SECURE ANIMAL ISOLATION FACILITIES ARE BEING DEVELOPED CURRENTLY.

D) THERE ARE HOST COUNTRY REGULATIONS WHICH DEFINE THE USE OF THIS TYPE OF TECHNOLOGY. GSDR APPROVAL MUST BE OBTAINED.

E) THE LIVESTOCK MARKETING AND HEALTH PROJECT.

F) YES. LABORATORY TECHNIQUES AND IMMUNOLOGY TRAINING.

G) PLEASE PROVIDE MISSION WITH COPIES OF PROTOCOL AND TECHNOLOGY TO BE EMPLOYED IN TRIALS. HIRSCH

Somalia

Due 8/15

UNCLASSIFIED

95

ACTION COPY

Department of State

INCOMING TELEGRAM

PAGE 01 KHARTO 10645 121424Z 6028 010205 AID4025
ACTION AID-00

ACTION OFFICE STAG-02
INFO AFEA-03 AFPD-04 AFTR-05 PPPB-02 PPDC-01 STHE-01 SAST-01
AGRI-01 RELO-01 AGEE-01 /022 A4 312

INFO LOG-00 AF-00 /000 W
247117 121426Z /38

Sudan

RNR

P 121427Z AUG 86
FM AMEMBASSY KHARTOUM
TO SECSTATE WASHDC PRIORITY 2846

UNCLAS KHARTOUM 10645

AIDAC

E.O. 12356: N/A
SUBJECT: SUDAN - IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

REF: (A) STATE 218952

1. RINDERPEST IS A SERIOUS CATTLE DISEASE IN THE SUDAN THOUGH THERE ARE NO STATISTICS IN THIS COUNTRY TO REFLECT ACCURATELY THE EXTENT OF THE LOSSES CAUSED BY RINDERPEST. IT IS TO BE EXPECTED THAT IN A COUNTRY LIKE SUDAN WITH VAST AREAS OF GRASSLANDS WHERE ANIMAL RESOURCES (MAINLY CATTLE AND LAMB) REPRESENT THE SECOND LARGEST NATIONAL INCOME, AND WHERE THE LEVEL OF VETERINARY SERVICES IS VERY POOR, THAT LOSSES DUE TO DISEASE ARE QUITE HIGH.

2. REALIZING THE IMPORTANT ROLE OF LIVESTOCK IN THE ECONOMY OF SUDAN, MISSION AND HOST COUNTRY ARE INTERESTED IN PARTICIPATING IN LABORATORY AND/OR FIELD TESTING OF NEW VACCINES.

3. THERE ARE FEW LABORATORIES IN-COUNTRY. HOWEVER, SOBA CENTRAL VET LAB IS RELATIVELY EQUIPPED AND MAY BE SUITABLE FOR TESTING THE IMPROVED ANIMAL VACCINES.

4. MISSION HAS DISCUSSED SUBJECT MATTER BRIEFLY WITH GOS VET RESEARCH ADMINISTRATORS. THEY HAVE WELCOMED ASSISTANCE IN THIS FIELD. IF REQUIRED, MISSION CAN ARRANGE FOR OFFICIAL APPROVAL. PLEASE ADVISE.

5. MISSION IS SUPPORTING WESTERN SUDAN AGRICULTURE RESEARCH PROJECT (WSARP 650-0020) WHICH INCLUDES LIVESTOCK RESEARCH COMPONENT. THIS PROJECT WOULD VERY LIKELY BENEFIT FROM THE ST/AGR VACCINE PROGRAM.

6. MISSION FEELS THAT SHORT TERM TRAINING IN FIELD OF ANIMAL VACCINE TECHNOLOGY FOR THE GOS STAFF IS NEEDED.
ANDERSON

96

ACTION COPY

UNCLASSIFIED

Department of State

INCOMING TELEGRAM

PAGE 01 LOME 04068 062217Z 1463 007123 AID9761
ACTION AID-00

ACTION OFFICE STAG-02
INFO AFCW-03 AFPD-04 AFTR-05 AMAD-01 STHE-01 SAST-01 AFDA-02
STFA-01 RELO-01 /021 A0

INFO LOG-00 /000 W

R 061556Z AUG 86
FM AMEMBASSY LOME
TO SECSTATE WASHDC 9537

UNCLAS LOME 04068 Togo

ADM AID FOR S&T/AGR

E.O. 12356: N/A
SUBJECT: IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

REF: STATE 218952

USAID/TOGO OFFERS RESPONSES TO REFTEL PARA 4.

A. RINDERPEST KILLED MORE THAN 700 HEAD OF CATTLE, AND AN ADDITIONAL 700 HEAD HAD TO BE SLAUGHTERED BECAUSE THEY BECAME SICK WITH RINDERPEST. INCIDENTS OCCURRED IN THE SAVANES REGION (NORTHERN-MOST) OF TOGO DURING 1985. IN THE KARA REGION (JUST SOUTH OF SAVANES), 700 HEAD WERE REPORTED KILLED, BUT MANY OTHER DEATHS/KILLINGS ARE UNREPORTED. ASSUMING A VALUE OF DOLS 100 PER ANIMAL, MORE THAN DOLS 200,000 COULD HAVE BEEN LOST TO THE ECONOMY. SOURCE OF INFORMATION: REGIONAL DIRECTORS (DVV) OF GOVERNNENT VETERINARY SERVICE AND ANIMAL HEALTH.

C. TOGOLESE VETERINARY DOCTORS CLAIM THAT TOGO LACKS THE ISOLATION FACILITIES THAT ARE NEEDED FOR VACCINE RESEARCH.

G. AS FOR OTHER DISEASES MENTIONED REFTEL, THEY HAVE NOT BEEN IDENTIFIED AS SERIOUS CAUSES OF CATTLE MORTALITY IN NORTHERN REGIONS OF TOGO. BAAS

336220 062220Z /38

Togo
BNR
Jones

UNCLASSIFIED

97

ACTION COPY

UNCLASSIFIED

Department of State

INCOMING TELEGRAM

PAGE 01 HARARE 04078 170300Z 6928 100737 AID3028
ACTION AID-00

ACTION OFFICE STAG-02
INFO AAAF-02 AFSA-03 AFPD-04 AFTR-05 SAST-01 AFDA-02 AGRI-01
STFA-01 /021 A4 817

INFO LOG-00 AF-00 CIAE-00 EB-08 DODE-00 /008 W
---------- 305221 170801Z /38

Zimbabwe

R 170750Z JUL 86
FM AMEMBASSY HARARE
TO SECSTATE WASHDC 1462

UNCLAS HARARE 04078

AIDAC

AR

E.O. 12356: N/A
SUBJECT: IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

REF: STATE 218952

1. USAID HAS DISCUSSED REFTEL WITH GOZ/DEPT OF VET SERVICES. IT WOULD BE MOST INTERESTED IN PARTICIPATING IN SUBJECT PROJECT. FOLLOWING RESPONSES KEYED TO QUESTIONS IN REFTEL PARA 4.

A. RINDERPEST IS NOT A PROBLEM AT THIS TIME BUT ANAPLASMOSIS AND BABESIOSIS ARE PROBLEMS. LOSS FROM DISEASES IS DIFFICULT TO ESTIMATE. HOWEVER ZIMBABWE'S TICK CONTROL PROGRAM IS COSTING AT LEAST DOLS 15 MILLION ANNUALLY.

B. YES, UNIVERSITY OF FLORIDA HAS APPROACHED GOZ RE FIELD TESTING OF VACCINES. GOZ HAS SAID IT WOULD AGREE TO PARTICIPATE IN FIELD TESTING. GOZ NOW WAITING FOR FLORIDA'S RESPONSE RE POSSIBLE PROGRAM.

C. YES, CONTAINMENT LABS AND ISOLATION FACILITIES ARE AVAILABLE.

D. THERE ARE NO GOZ REGULATIONS AGAINST GENETICALLY ENGINEERED VACCINES. HOWEVER, THERE IS AN APPROVAL PROCESS FOR ALL VACCINES AND VACCINES MUST BE REGISTERED WITH DRUGS COUNCIL.

E. USAID AND GOZ ARE FUNDING A CONTRACT WITH UNIVERSITY OF FLORIDA. FLORIDA T.A. TEAM IS WORKING WITH GOZ VET RESEARCH LABORATORY TO DEVELOP A VACCINE FOR HEARTWATER DISEASE.

F. YES, GRADUATE LEVEL TRAINING WOULD BE APPROPRIATE IN IMMUNOLOGY, MOLECULAR BIOLOGY AND EPIDEMIOLOGY.

2. PLEASE KEEP USAID ADVISED OF PROGRESS OF PROJECT.
FUGIT

UNCLASSIFIED

98

APPENDIX IV

I M P R O V E D A N I M A L V A C C I N E S

T H R O U G H B I O T E C H N O L O G Y

PHASE II

ANAPLASMOSIS AND BABESIOSIS

Mission Cables Received

from

Asia and Near East

ACTION COPY

UNCLASSIFIED

Department of State

INCOMING TELEGRAM

PAGE 01 DHAKA 05260 180540Z 2642 101498 AID4698
ACTION AID-00

ACTION OFFICE STAG-03
INFO ANTR-06 SAST-01 AGRI-01 STFA-01 RELO-01 ANSA-02
/014 A4 818

INFO LOG-00 NEA-07 /007 W
357357 180540Z /38

Bangladesh

R 171100Z JUL 86
FM AMEMBASSY DHAKA
TO SECSTATE WASHDC 7373

UNCLAS DHAKA 5260

AIDAC

AP

NAR

E.O. 12356: N/A
SUBJ: IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

REF: STATE 218952

1. SINCE THE OFFICIAL BANGLADESH REPORTS INDICATE NO RINDERPESTSINCE THE 60'S THERE IS NO OFFICIAL RESEARCH NEED. THE LACK OF ISOLATED LABORATORY FACILITIES WOULD ALSO ELIMINATE BANGLADESH AS A RESEARCH COOPERATOR DURING EARLY STAGES OF THE TESTING.

2. ON THE OTHER HAND, RINDERPEST IS COMMON IN BORDER COUNTRIES AND SOME VETS HAVE EXPRESSED DOUBT AS TO THE ACTUAL STATUS HERE. GIVEN THE EXPECTED RESULTING VACCINE, BANGLADESH WOULD LIKELY WELCOME THE NEW VACCINE FOR BORDER PREVENTION WHEN AVAILABLE.

3. IN THE MEANTIME, THE LIVESTOCK RESEARCH INSTITUTE PLANS SOME EPIDEMIOLOGICAL STUDIES OF RINDERPEST. HOWEVER, MISSION DOES NOT FEEL IT IS ADVISABLE FOR HOST COUNTRY SCIENTISTS TO BE TRAINED IN ANIMAL VACCINE TECHNOLOGY AT THIS TIME.
LESSER

UNCLASSIFIED

100

ACTION COPY

Department of State

INCOMING TELEGRAM

PAGE 01 SUVA 03448 180418Z 9380 013365 AID8192

ACTION AID-00

ACTION OFFICE STAG-02

INFO ANDP-03 ANPD-05 ANTR-06 STHE-02 SAST-01 ES-01 AGRI-01
STFA-01 RELO-01 ANEA-02 ANAA-01 AGEE-01 /027 A1 1118

INFO LOG-00 /000 W [redacted] FIJI

----------144372 180438Z /38

R 180223Z AUG 86
FM AMEMBASSY SUVA
TO SECSTATE WASHDC 7560

FNR

UNCLAS SUVA 03448

ADM AID

E.O. 12356: N/A
TAGS: N/A
SUBJECT: IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

REF: (A) STATE 218952, (B) 85 SUVA 4912

MISSION HAS NO PLANS IN FORSEEABLE FUTURE TO TEST RINDERPEST VACCINE AND/OR THOSE REFERRED IN REF (A) PARA 3. SHERMAN

101

ACTION COPY

Department of State

INCOMING TELEGRAM

PAGE 01 JAKART 12610 020449Z 2677 004517 AID530
ACTION AID-00

ACTION OFFICE 31AG-02
INFO ANPO-05 ANTR-06 SAST-01 AGRI-01 RELO-01 DO-01 ANEA-02
/019 A1 702

INFO LOG-00 EAP-00 /000 W
----------045561 020450Z /38

R 020444Z AUG 86
FM AMEMBASSY JAKARTA
TO SECSTATE WASHDC 6809

UNCLAS JAKARTA 12610

AIDAC

E.O. 12356 : N/A

SUBJECT : IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

REF. : STATE 216952

1. USAID HAS REVIEWED THE CONTENT OF THE REF MESSAGE WITH THE RESEARCH COORDINATING CENTER FOR ANIMAL SCIENCE WHICH IS LOCATED IN BOGOR. THIS CENTER IS ONE OF SEVEN CENTERS THAT COORDINATE RESEARCH IN AGRICULTURE RELATED MATTERS IN INDONESIA. ALL CENTERS ARE UNDER THE SUPERVISION OF THE MINISTRY OF AGRICULTURE'S AGENCY FOR AGRICULTURAL RESEARCH AND DEVELOPMENT (AARD). RESEARCH AND DEVELOPMENT IS CARRIED OUT IN NUMEROUS PRIMARY AND SECONDARY STATIONS THROUGHOUT INDONESIA.

2. ADDITIONALLY THE MESSAGE WAS SHARED WITH THE SECRETARIATE OF AARD.

3. THE BOGOR CENTER AND AARD EXPRESSED UNQUALIFIED INTEREST IN JOINING AN EXTENSION OF S&T'S VACCINE DEVELOPMENT PROJECT CONCERNED WITH ANAPLASMOSIS AND BABESIOSIS. THEY WOULD LIKE TO REVIEW A MORE DETAILED TERMS OF REFERENCE FOR THE PROJECT AND OR VISIT THE PROJECT SITE IN THE US TO DISCUSS THEIR CONCERNS WITH PROJECT INVESTIGATORS. AARD IS WILLING TO SEND THEIR CHIEF ANIMAL HEALTH RESEARCH SCIENTIST AND THEIR DESIGNATED PRINCIPAL INVESTIGATOR TO A US SITE IF THIS IS ADVISABLE.

4. IN RESPONSE TO YOUR SPECIFIC QUESTIONS:

A. RESULTS FROM SELECTIVE TEST SITES IN FIVE PROVINCES INDICATED THAT 55 PERCENT OF THE BOVINE TESTED WERE POSITIVE FOR ANAPLASMA. A SMALLER SAMPLE IN THREE PROVINCES OF BUFFALO SHOWED 44 PERCENT POSITIVE. THE GOI RECORDS INDICATE THAT IN 1984, 6757 CASES OF ANAPLASMA WERE REPORTED AND 5579 CASES OF BABESIOSIS. IN 1984 THEY ESTIMATE THE ANNUAL LOSSES TO BE IN THE NEIGHBORHOOD OF DOLS. 20,000,000.

B. THERE IS NO VACCINATION PROGRAM IN THESE TWO AREAS AND NO VACCINES ARE MADE IN INDONESIA. THEY STATE THEY ARE VERY INTERESTED IN TESTING VACCINES BOTH IN FIELD AND LABORATORY.

C. THEY STATE THAT THEY HAVE LABORATORIES WITH SECURE ANIMAL ISOLATION FACILITIES BUT THAT SPACE IS LIMITED. WITH MODIFICATIONS OTHER BUILDINGS COULD BE EASILY ADAPTED.

D. THERE ARE NO REGULATIONS AGAINST THE INTRODUCTION OR USE OF GENETICALLY ENGINEERED VACCINES. THE USE OF HIGH

JAKART 12610 020449Z 2677 004517 AID530

TECH VACCINE PRODUCTION IS A SUBJECT MUCH DISCUSSED IN THE PROFESSIONAL COMMUNITY OF AGRICULTURE SCIENTISTS.

E. AID IS CURRENTLY ASSISTING INDONESIA IN AGRICULTURE RESEARCH WITH THE SMALL ANIMAL RUMINANT CRSP AND A LARGE EFFORT WITH THE AARD ON APPLIED RESEARCH. SPECIFIC ATTENTION ON THE LATTER IS DIRECTED TO STATION DEVELOPMENT AND ADMINISTRATION.

F. OVER THE PAST YEARS AND IN UNION WITH THE WORLD BANK AID HAS BEEN INVOLVED WITH A LARGE STATION DEVELOPMENT AND THE TRAINING OF RESEARCH STAFF TO THE PHD LEVEL. SOME 137 HAVE BEEN TRAINED. THE MID 80'S WILL SEE THE STAFF AND FACILITIES IN PLACE AND MEANINGFUL RESEARCH CONDUCTED. AID IS DOING ALL THAT THEY CAN TO PROVIDE TRAINING TO THESE NEW PHD'S IN RESEARCH PLANNING, ADMINISTRATION, EQUIPMENT MANIPULATION, AND VARIOUS METHODS OF RESULTS DESSEMINATION. ASSISTANCE IN ANIMAL VACCINE TECHNOLOGY DEVELOPMENT SEEMS APPROPRIATE TO THE USAID.

5. PLEASE KEEP US ADVISED ON THE PROJECT DEVELOPMENT AND THE POSSIBILITIES OF INDONESIA BEING A PART OF THE PROJECT EXTENSION. IF A VISIT BY INDONESIAN ANIMAL HEALTH SCIENTISTS TO THE PROJECT SITE IN THE US SEEMS RELEVANT, PLEASE PROVIDE US WITH APPROPRIATE DATES AND INFORMATION THEY SHOULD BRING TO THE SITE.

MOORE

Indonesia

ACTION COPY

Department of State

INCOMING TELEGRAM

PAGE 01 AMMAN 07545 271418Z 2344 106738 AID1082
ACTION AID-00

ACTION OFFICE STAG-03
INFO ANDP-03 ANPD-05 AMAD-01 ANTR-06 STHE-01 SAST-01 STFA-01
ANME-03 RELO-01 /024 A0

INFO LOG-00 NEA-07 /007 W

R 271414Z JUL 86
FM AMEMBASSY AMMAN
TO SECSTATE WASHDC 5429

Jordan

UNCLAS AMMAN 07545

AIDAC

AR

FOR: DR. CHARLES MULLENAX, ST/AGR

E.O. 12356: N/A
SUBJECT: IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

REF: STATE 218952

1. USAID IS NOT UNDERTAKING AND DOES NOT CONTEMPLATE ANY ACTIVITIES RELATED TO SUBJECT. USAID, HOWEVER, PROVIDED COPY OF REFTEL TO DR. GHASOUB AL-ASALI, DIRECTOR OF THE ANIMAL HEALTH AND PRODUCTION DIRECTORATE OF THE MINISTRY OF AGRICULTURE. FOLLOWING IS RESPONSE TO PARA 4 REFTEL. ANSWERS ARE KEYED TO SAME ORDER OF QUESTIONS:

(A) NO
(B) HOST COUNTRY IS INTERESTED, USAID ONLY INTERESTED
-- IN RESULTS.
(C) YES
(D) NO
(E) HOST COUNTRY IS FUNDING LUNG WORM AND DADESIA Babesia
-- VACCINE PRODUCTION. A USAID-SUPPORTED HIGHLAND
-- AGRICULTURAL DEVELOPMENT PROJECT WITH A
-- LIVESTOCK PRODUCTION COMPONENT COULD BENEFIT FROM
-- THIS PROJECT.
(F) YES, GENERAL TRAINING ON VACCINE PRODUCTION.
(DRAFT: FQUSHAIR, APPR: WFURTICK)

NAC

103

ACTION COPY

Department of State

INCOMING TELEGRAM

PAGE 01 RABAT 08346 221807Z 3587 016750 AID2606
ACTION AID-00

ACTION OFFICE AFTR-06
INFO ANPO-05 STHE-02 SAST-01 HHS-09 CDC-06 AHME-03 RELO-01
AGEE-01 /034 A4 322

INFO LOG-00 NEA-07 /007 W

----------047655 221807Z /38

R 221807Z AUG 86
FM AMEMBASSY RABAT
TO SECSTATE WASHDC 7634

UNCLAS RABAT 08346

AIDAC

E.O. 12356:N/A
SUBJECT: IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

REF: STATE 218952

1. USAID APPRECIATES INFORMATION REGARDING ANIMAL VACCINES THROUGH BIOTECHNOLOGY AND THE CONSIDERATION OF MOROCCO NEEDS. RESPONSE TO QUESTIONS A THRU G IN REFTEL FOLLOW.

2. -RINDERPEST IS NOT CURRENTLY A PROBLEM IN MOROCCO BUT DISEASE EXISTS IN MAURITANIA AND MALI, WHICH ARE BORDERING COUNTRIES. ANAPLASMOSIS, BABESIOSIS AND THELERIOSIS ARE PROBLEMS WHICH EXIST PARTICULARLY WITH IMPORTED BREEDS OF CATTLE AND SHEEP.

-ANAPLASMOSIS IS THE LEAST IMPORTANT BLOOD PARASITE DISEASE IN MOROCCO.

-THERE IS VERY LITTLE DEFINITIVE DATA ON BABESIOSIS BUT IT IS FREQUENTLY A PROBLEM IN IMPORTED SHEEP AND CATTLE BREEDS AND OCCASIONALLY A PROBLEM IN LOCAL BREEDS. A SEROLOGICAL STUDY HAS SHOWN THAT 20 OF THE SPORT HORSES ARE INFECTED WITH BABESIOSIS. MORTALITY IS NOT A PROBLEM BUT THE INFECTION OF SPORTING HORSES DOESN'T ALLOW THEM TO MOVE INTO DISEASE FREE COUNTRIES.

-THELERIOSIS IS THE MOST SERIOUS OF THE REPORTED DISEASE. HERDS WHICH BECOME INFECTED EXPERIENCE A HIGH LEVEL OF MORTALITY. HERDS COMPOSED OF LOCAL BREEDS WHICH BECOME INFECTED EXPERIENCE 50 MORTALITY RATE WHEREAS HERDS COMPOSED OF IMPORTED BREEDS HAVE A 70 MORTALITY RATE. THE PROBLEM IS MOST SEVERE IN THE IRRIGATED AND DEVELOPED AREAS. THUS IT IS A SIGNIFICANT PRODUCTION LIMITING DISEASE PROBLEM. UNFORTUNATELY NO THOROUGH EPIDEMIOLOGIC-ECONOMIC LOSS STUDY HAS BEEN CONDUCTED. DR. M. OUHELLI IN THE DEPARTMENT OF VETERINARY PARASITOLOGY AT IAV HASSAN II HAS INITIATED A STUDY TO DEVELOP A VACCINE AND WOULD BE INTERESTED IN COOPERATING WITH SOMEONE.

-THERE IS ALSO A PROBLEM OF SHEEP POX IN THE SHEEP FLOCK OF 15 MILLION HEAD. YEARLY VACCINATION IS NECESSARY TO CONTROL THE DISEASE. THREE TO FIVE MILLION DOSES OF VACCINE ARE USED ANNUALLY. HOWEVER, THE MORBIDITY RATE STILL REMAINS AT A REPORTED 5 CASES PER 1000 ANIMALS AND A MORTALITY RATE OF 1 PER 1000.

3. THE IAV HASSAN II INSTITUTE WOULD BE INTERESTED IN TESTING VACCINE AGAINST BABESIA AND THELERIA OR OTHER BIOTECHNOLOGY DEVELOPED VACCINES WHICH WOULD PROTECT AGAINST DISEASES IN THE COUNTRY, BUT UNDER CONTROLLED CONDITIONS.

RABAT 08346 221807Z 3587 016750 AID2606

4. THERE ARE CURRENTLY NO CONTAINMENT LABORATORIES WITH SECURE ANIMAL ISOLATION FACILITIES.

5. THERE ARE NO CURRENT REGULATIONS WHICH DEFINE THE USE OF BIOTECHNOLOGY AND/OR GENETICALLY ENGINEERED VACCINES.

6. THE USAID FUNDED INSTITUTION BUILDING PROJECT 0500-01601 WITH THE INSTITUT AGRONOMIQUE ET VETERINAIRE HASSAN II PROVIDES DOCTORATE LEVEL PARTICIPANT TRAINING IN THE U.S WITH THESIS RESEARCH PROGRAMS CONDUCTED IN MOROCCO. A LARGE NUMBER OF PARTICIPANTS HAVE ALREADY BEEN TRAINED IN A WIDE RANGE OF VETERINARY MEDICINE DISCIPLINES. THE UNIVERSITY OF MINNESOTA ASSISTS THE INSTITUTE UNDER A HOST COUNTRY COLLABORATIVE CONTRACT. ANY POTENTIAL COLLABORATION INCLUDING TRAINING WOULD HAVE TO BE CONSIDERED THROUGH DISCUSSIONS WITH THE TEAM LEADER (DR DONALD JOHNSON) AND MOROCCAN INSTITUTE STAFF AND WOULD BE SUBJECT TO USAID APPROVAL.

7. PLEASE BE ADVISED THAT USAID PRIORITIES WITH LIMITED STAFF RESOURCES SERIOUSLY CONSTRAIN OUR ABILITY TO DEVOTE ANY MANAGEMENT AND/OR LOGISTICAL SUPPORT TO THIS KIND OF POTENTIAL ACTIVITY. KIRBY

Morocco

ACTION: Lissegue
Due Date: 8/1/86
Info:
Date
Remarks:

104

ACTION COPY

Department of State

INCOMING TELEGRAM

PAGE 01 ISLAMA 16494 020317Z 3103 004519 AID6428
ACTION AID-03

ACTION OFFICE STAG-02
INFO AMPD-05 ANTR-06 STHE-01 SAST-01 AGRI-01 RELO-01 DO-01
ANSA-02 /020 A1 702

INFO LOG-00 NEA-07 /007 W
----------050631 020635Z /38

R 020315Z AUG 86
FM AMEMBASSY ISLAMABAD
TO SECSTATE WASHDC 5617

UNCLAS ISLAMABAD 16494

AIDAC

E.O. 12356: N/A
SUBJECT: IMPROVED ANIMAL VACCINE THROUGH BIOTECHNOLOGY

REF: STATE 219952

1. A COPY OF THE REFERENCED CABLE WAS SUPPLIED TO PAKISTAN AGRICULTURAL RESEARCH COUNCIL (PARC) FOR RESPONSE TO QUESTIONS CONTAINED IN PARA 4. THE REPLIES RECEIVED ARE REPRODUCED BELOW
QOUTE

A. RINDERPEST DISEASE IS A PROBLEM AT LANDHI (KARACHI) CATTLE AND BUFFALO COLONY. AT THIS COLONY ABOUT 60,000 DAIRY TYPE WATER BUFFALOES ARE MAINTAINED. RINDERPEST AND RINDERPEST LIKE DISEASES ARE PREVALENT IN THIS COLONY AND THE INCIDENCE IS HIGHER DURING WINTER MONTHS FROM OCTOBER UPTO FEBRUARY. LOSSES FROM DEATHS AND DEPRECIATION, LOSS OF MILK AND LOSSES FROM TRADE IN LIVESTOCK PRODUCTS ARE COLOSSAL.

B. YES, WE ARE INTERESTED FOR VIRUS TYPING WORK AT LANDHI, KARACHI.

C. LIMITED FACILITIES ARE AVAILABLE AT VETERINARY HOSPITAL LANDHI, KARACHI, WHERE 50 ANIMALS COULD BE KEPT IN ISOLATION SPACE FOR MORE ANIMALS COULD BE ARRANGED.
D. WE MAY REQUIRE A FORMAL APPROVAL FROM LIVESTOCK DIVISION, MINISTRY OF FOOD, AGRICULTURE AND COOPERATIVES, ISLAMABAD AND DEPARTMENT OF AGRICULTURE, GOVERNMENT OF SIND.

E. PARC HAS FUNDED A RESEARCH PROJECT ON RINDERPEST LIKE DISEASES AT LANDHI KARACHI AT A COST OF RS. 1.683 (DOLLARS 100,000) MILLION FOR 5 YEARS. SEROLOGICALLY THIS PROJECT HAS CONFIRMED THAT RINDERPEST EXISTS AT THE COLONY. IN ADDITION ANTIBODIES FOR IBR, BVD, PIZ, FMD, ALSO EXIST. REPLACEMENT PROJECT IS UNDER PROCESS IN WHICH FACILITIES FOR CELL CULTURE ARE LIKELY TO BE CREATED. A SUM OF RS. 3.827 (DOLLARS 230,000) MILLION IS EARMARKED FOR THIS. THIS REPLACEMENT PROJECT THAT IS EXPECTED TO START FROM LATE 1986 AND IS OF 3 YEAR DURATION. THIS ENTIRE PROGRAM IS FINANCED BY USAID, PL-480 PROJECT.

F. YES, ONE/TWO SCIENTISTS MAY BE REQUIRED TO GET TRAINING IN VACCINE PRODUCTION BIOTECHNOLOGY OF THE KIND STATED. UNQUOTE

2. THE MISSION FEELS PARC COOPERATION WITH ST/AGR WILL BE FRUITFUL IN THE DEVELOPMENT OF NEW VACCINES

ISLAMA 16494 020317Z 3103 004519 AID6428
AND PROVE HIGHLY BENEFICIAL TO PAKISTAN FOR EFFECTIVE CONTROL OF SOME OF THE LIVESTOCK DISEASES OF GREAT ECONOMIC IMPORTANCE. MCCARTHY

Pakistan

105

ACTION COPY

Department of State

INCOMING TELEGRAM

PAGE 01 COLOMB 05702 290540Z 8525 001811 AID2124
ACTION AID-00

ACTION OFFICE STAG-02
INFO AMTR-06 SAST-01 STFA-01 RELO-01 ANSA-02 /013 A3 229

INFO LOG-00 NEA-07 /007 W
----------144444 290543Z /38

R 290514Z JUL 86
FM AMEMBASSY COLOMBO
TO SECSTATE WASHDC 8242

UNCLAS COLOMBO 05702.

AIDAC

E.O. 12356: N/A
SUBJECT: IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

REF: STATE 218952

THE MISSION COMMENTS AND RECOMMENDATIONS ON QUESTIONS A TO G RAISED IN THE REFTEL ARE GIVEN BELOW:

A. RINDERPEST WAS SUCCESSFULLY ERADICATED IN SRI LANKA IN THE EARLY FORTIES, AND HAS NOT REAPPEARED SINCE THEN. HOWEVER, ANAPLASMOSIS AND BABESIOSIS ARE PREVALENT, AND CAUSE SIGNIFICANT LOSSES, SPECIFICALLY IN THE HILL-COUNTRY AND MID-COUNTRY AREAS, WHERE HIGH YIELDING TEMPERATE MILK BREEDS AND/OR THEIR CROSSES, ARE ADAPTED. ESTIMATES OF LOSSES CAUSED BY THESE DISEASES, NEVERTHELESS, ARE NOT AVAILABLE TO GSL SOURCES.

B. THE DIRECTOR, GSL DEPARTMENT OF ANIMAL PRODUCTION AND HEALTH (DAPH) HAS EXPRESSED INTEREST IN PARTICIPATING IN THE TESTING OF NEW VACCINES FOR ANAPLASMOSIS AND BABESIOSIS, WHEN THEY BECOME AVAILABLE.

C. THE MISSION IS INFORMED THAT LABORATORIES WITH SECURE ANIMAL ISOLATION FACILITIES ARE AVAILABLE AT THE VETERINARY RESEARCH INSTITUTE, PERADENIYA, AN INSTITUTION MANAGED BY THE DAPH.

D. THERE ARE NO HOST COUNTRY REGULATIONS RELATING TO THE ISSUES RAISED IN THE REFTEL.

E. THE CURRENT MISSION FUNDED PROJECTS WILL NOT BENEFIT FROM OR PROVIDE BENEFIT TO THE ST/AGR VACCINE PROJECT.

F. TRAINING OF HOST COUNTRY SCIENTISTS IN ANIMAL VACCINE PRODUCTION TECHNOLOGY THROUGH BIOTECHNOLOGY WILL HAVE POSITIVE BENEFITS ON DAPH'S EFFORTS TO EXPAND THE CURRENT PROGRAM OF ANIMAL VACCINE PRODUCTION, ESPECIALLY TO COVER OTHER DISEASES LIKE MAREK AND GUMBORO, TWO SERIOUS VIRUS DISEASES, THAT ARE A THREAT TO DOMESTIC POULTRY PRODUCTION. HOWEVER, GIVEN THE CURRENT FUNDING LIMITATIONS AND MISSION PRIORITIES, ANY PROPOSAL FOR TRAINING SHOULD BE CONSIDERED OUTSIDE THE EXISTING MISSION'S PORTFOLIO. TYPES OF TRAINING, LIKELY TO BE MOST PRODUCTIVE, AT THE PRESENT STAGE OF DEVELOPMENT OF BIOTECHNOLOGY, WILL BE IN AREAS OF RESEARCH IN THE PRODUCTION OF VACCINES THROUGH BIOTECHNOLOGY, TECHNOLOGY OF PRODUCTION, PRESERVATION, AND FIELD APPLICATION OF VACCINES.

G. DAPH IN COLLABORATION WITH THE AUSTRALIAN CENTER FOR INTERNATIONAL AGRICULTURAL RESEARCH (ACIAR)

COLOMB 05702 290540Z 8525 001811 AID212
HAS AN ONGOING PROJECT IN THE PRODUCTION OF VACCINES FOR ANAPLASMOSIS AND BABESIOSIS. THE MISSION UNDERSTANDS, THAT THIS PROJECT HAS ONLY A SMALL COMPONENT ON BIOTECHNOLOGY, AND IS INADEQUATE TO MEET THE GROWING INTEREST FOR ANIMAL VACCINE PRODUCTION THROUGH BIOTECHNOLOGY AND GENETIC ENGINEERING. SPAIN

SRI LANKA

106

ACTION COPY

Department of State

INCOMING TELEGRAM

PAGE 01 BANGKO 34761 281121Z 3785 000412 AID1294
ACTION AID-00

ACTION OFFICE STAS-02
INFO FPA-02 ANTR-06 STHE-01 STPO-01 SAST-01 ES-01 STFA-01
RELO-01 ANEA-02 /018 A1 X28

INFO LOG-00 /000 W

R 281122Z JUL 86 077370 281121Z /38 Thailand
FM AMEMBASSY BANGKOK
TO SECSTATE WASHDC 5603

UNCLAS BANGKOK 34761

ADM AID

E.O. 12356: N/A
SUBJECT: IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

REF: STATE 218952

1. RINDERPEST HAS BEEN ERADICATED IN THAILAND. AS SUCH, TESTING OF THE NEW VACCINE AGAINST THIS DISEASE WILL NOT BE APPROPRIATE HERE.

2. RTG DEPARTMENT OF LIVESTOCK DEVELOPMENT IS INTERESTED IN PARTICIPATING IN THE DEVELOPMENT OF NEW VACCINE FOR OTHER ANIMAL DISEASES, ESPECIALLY ANAPLASMOSIS AND BABESIOSIS. BOTH DISEASES ARE CONSIDERED TO BE SEVERE PROBLEMS FOR IMPORTED DAIRY COWS. HOWEVER THE EXTENT OF LOSS THEY CAUSE HAS NEVER BEEN ASSESSED.

3. CONTAINMENT LABORATORIES WITH SECURE ANIMAL ISOLATION FACILITIES ARE AVAILABLE AT THE ANIMAL VACCINE CENTER ABOUT 150 KILOMETERS FROM BANGKOK.

4. REGULATIONS ON THE USE OF GENETICALLY ENGINEERED VACCINES HAVE NOT YET BEEN FORMALLY ESTABLISHED. HOWEVER, THE DEPARTMENT OF LIVESTOCK ASSERTS IT HAS THE AUTHORITY TO PURSUE SUCH ACTIVITIES.

5. WE ARE PRESENTLY SUPPORTING TWO SUBPROJECTS CONCERNED WITH LIVESTOCK VACCINES FOR CATTLE, AND WATER BUFFALO, UNDER OUR AGRICULTURAL TECHNOLOGY TRANSFER PROJECT (493-0337). BOTH THE HAEMORRHAGIC SEPTICEMIA AND FOOT AND MOUTH SUBPROJECTS AIM TO DEVELOP AND PRODUCE NEW AND MORE EFFECTIVE VACCINES FOR THESE DISEASES. BOTH SUBPROJECTS WILL COLLABORATE WITH USDA/ARS (AT PLUM ISLAND FOR THE FOOT AND MOUTH SUBPROJECT AND AT AMES, IOWA FOR THE HAEMORRHAGIC SEPTICEMIA SUBPROJECT).

6. WE BELIEVE THAT TRAINING IN ADVANCED METHODOLOGIES FOR VACCINE RESEARCH AND DEVELOPMENT WILL BE VERY USEFUL FOR THAILAND.

7. VISIT OF U.S. EXPERT SHOULD BE ARRANGED IF FURTHER COLLABORATION IS ANTICIPATED, EITHER WITH ANAPLASMOSIS AND BABESIOSIS, OR THE TWO ATT SUBPROJECT. BROWN

107

APPENDIX IV

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

PHASE II

ANAPLASMOSIS AND BABESIOSIS

Mission Cables Received

from

Latin America and Caribbean

ACTION COPY

UNCLASSIFIED

Department of State

INCOM TELEGI

PAGE 01 BELIZE 03175 052102Z 6544 026510 AID4585
ACTION AID-00

ACTION OFFICE STAG-02
INFO FPA-02 STHE-02 STPO-01 SAST-01 STFA-01 RELO-01
/010 A4 GB08

INFO LOG-00 ARA-00 /000 W
----------050373 052115Z /38

R 052020Z SEP 86
FM EMEMBASSY BELIZE
TO SECSTATE WASHDC 0141

UNCLAS BELIZE 3175

AIDAC

FOR: CHARLES MULLENAX, S AND T, AGR

E.O. 12356: N/A
SUBJECT: IMPROVED ANIMAL VACCINE THROUGH BIOTECHNOLOGY

RE: STATE 218952

MISSION HAS CONSULTED WITH MINISTRY OF AGRICULTURE (MOA), ON CONTENTS OF SUBJECT CABLE. FOLLOWING IS MOA RESPONSE: QUOTE - THOUGHT WE ARE INTERESTED IN ADVANCES MADE IN THE DEVELOPMENT OF VACCINES ESPECIALLY AS REGARDS ANAPLASMOSIS AND BABESIOSIS, BELIZE WOULD HARDLY BE IN A POSITION TO SUPPORT THESE ACTIVITIES. BELOW ARE ANSWERS TO THE QUESTIONNAIRE SUBMITTED:
A. RINDERPEST HAS NEVER OCCURED IN BELIZE. ANAPLASMOSIS AND BABESIOSIS ARE CONSIDERED ENZOOTIC THOUGH THERE IS NO DATA AVAILABLE AS TO APPROXIMATE LOSSES.
B. BELIZE COULD NOT PARTICIPATE IN LABRATORY NOR FIELD TESTING OF NEW VACCINES.
C. CONTAINMENT LABORATORIES WITH SECURE ANIMAL ISOLATION FACILITIES ARE NOT AVAILABLE IN BELIZE.
D. APPROVAL FOR THE USE OF VACCINES REQUIRED FROM VETREINARY SERVICES, MINISTRY OF AGRICULTURE.
E. NONE.
F. WE DO NOT PRODUCE ANY TYPE OF VACCINE AND IT MAY BE PREMATURE TO TRAIN ANYONE IN ANIMAL VACCINE TECHNOLOGY. SHOULD YOU REQUIRE MORE INFORMATION DO NOT HESITATE TO CONTACT US - UNQUOTE. GUTHRIE

AR

NAR

109

UNCLASSIFIED

ACTION COPY

Department of State

INCOMING TELEGRAM

PAGE 01 LA PAZ 06393 011912Z 1043 004126 AID6059
ACTION AID-00

ACTION OFFICE STAG-02
INFO LASA-03 LADP-04 LADR-03 AMAD-01 STHE-01 SAST-01 STFA-01
RELO-01 /017 A0

INFO LOG-00 ARA-00 /000 W
030372 011917Z /38 Bolivia

R 011910Z AUG 86
FM AMEMBASSY LA PAZ
TO SECSTATE WASHDC 3842

UNCLAS LA PAZ 06393

AIDAC

FOR DR. CHARLES MULLENAX, ST/AGR

E.O. 12356/NA
SUBJECT: IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

REF: STATE 218952

1. IN RESPONSE TO REF CABLE USAID/BOLIVIA OFFERS THE FOLLOWING INFORMATION:

No - A. THE THREE DISEASES NOTED IN YOUR CABLE (I.E. RINDERPEST, ANAPLASMOSIS AND BABESIOSIS) ARE A PROBLEM IN BOLIVIAN LIVESTOCK REGIONS. UNFORTUNATELY, DATA REGARDING APPROXIMATE LOSS IN DOLLARS IS NOT CURRENTLY AVAILABLE.

- B. USAID/BOLIVIA AND THE GOVERNMENT OF BOLIVIA (GOB) WOULD BE INTERESTED IN PARTICIPATING IN LABORATORY AND/OR FIELD TESTING OF NEW VACCINES.

- C. THERE ARE NO CONTAINMENT LABORATORIES WITH SECURE ANIMAL ISOLATION FACILITIES AVAILABLE IN BOLIVIA.

- D. THERE ARE NO KNOWN GOB REGULATIONS WHICH DEFINE THE USE OF ANY TYPE OF VACCINE OR VACCINE TECHNOLOGY.

- E. USAID/BOLIVIA IS CURRENTLY FUNDING ONE PROJECT THAT MAY BENEFIT OR PROVIDE BENEFIT TO THE ST/AGR VACCINE PROJECT. THE PRIVATE AGRICULTURE PRODUCER ORGANIZATIONS PROJECT (PAPO) WILL CONTRACT TECHNICAL ASSISTANCE IN VARIOUS FIELDS OF AGRICULTURAL PRODUCTION WHICH MAY INCLUDE SOME ACTIVITIES RELATED TO LIVESTOCK PRODUCTION.
- F. USAID/BOLIVIA FEELS IT IS ADVISABLE TO TRAIN BOLIVIAN SCIENTISTS ON VACCINE PRODUCTION AND RESEARCH.

- G. BOLIVIA DOES NOT CURRENTLY PRODUCE ANY OF THE VACCINES MENTIONED IN THE REFERENCED CABLE. ANY TRAINING OR SERVICES FROM THIS PROJECT WILL BE OF GREAT BENEFIT TO ANIMAL HEALTH PROGRAMS IN BOLIVIA. ROWELL

Note: There is no rinderpest in Bolivia. CAM

UNCLASSIFIED

110

ACTION COPY

Department of State

INCOMING TELEGRAM

PAGE 01 QUITO 07453 301652Z 8152 002276 AID3748

ACTION AID-00

ACTION OFFICE STAG-02

INFO LASA-03 SAST-01 ES-01 RELO-01 /008 A2 1030

INFO LOG-00 ARA-00 /000 W Ecuador

----------264011 301807Z /38

R 301651Z JUL 86

FM AMEMBASSY QUITO

TO SECSTATE WASHDC 3982

UNCLAS QUITO 07453

AIDAC

E.O 12356: N/A

SUBJECT: IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

REF: STATE 218952

THE ANSWERS TO THE QUESTIONS ASKED IN REFTEL ARE:

A. YES, BUT THERE ARE NO RELIABLE DOLLAR ESTIMATES OF LOSS

B. YES

C. NO

D. NONE WE ARE CURRENTLY AWARE OF

E. COASTAL BEEF AND SIERRA DAIRY SUBPROJECTS IMPLEMENTED UNDER PROJECT 518-U032.

F. YES, THERE IS A PERSON WORKING ON A LEPTO DISEASE WHO HAS THE BACKGROUND AND COULD BE A CANDIDATE UNDER THIS PROGRAM. MORLEY

ACTION COPY

Department of State

INCOMING TELEGRAM

PAGE 01 TEGUCI 11252 291754Z 2203 001428 AID2763
ACTION AID-00

ACTION OFFICE STAG-02
INFO FPA-02 AALA-01 LACE-03 LADR-03 STHE-01 STPO-01 SAST-01
ES-01 AGRI-01 STFA-01 RELO-01 /018 A1 X29

INFO LOG-00 ARA-00 /000 W
204420 291938Z /38

Honduras

R 291737Z JUL 86
FM AMEMBASSY TEGUCIGALPA
TO SECSTATE WASHDC 2754

UNCLAS TEGUCIGALPA 11252

AIDAC

E.O. 12356: N/A
SUBJECT: IMPROVED ANNUAL VACCINES THROUGH BIOTECHNOLOGY

REF: STATE 218952

1. MISSION IS PROVIDING THE FOLLOWING INFORMATION WITH REGARD TO ANAPLASMOSIS AND BABESIOSIS IN HONDURAS. IN RESPONSE TO THE QUESTIONS CONTAINED IN REFTEL:

- A) THE FINANCIAL IMPACT OF THE DISEASES IS UNKNOWN DUE TO THE LIMITED DATA AVAILABLE.

- B) THE HONDURAN GOVERNMENT MAY BE INTERESTED IN FIELD TESTING VACCINES, BUT OTHER ANIMAL HEALTH PROBLEMS CURRENTLY ARE HIGHER PRIORITY (E.G., CATTLE GRUBS, SCREWWORM, HOG CHOLERA).

- C) CONTAINMENT LABORATORIES WITH SECURE ISOLATION FACILITIES ARE NOT CURRENTLY AVAILABLE IN HONDURAS.

- D) THERE ARE NO REGULATIONS CURRENTLY DEFINING THE USE OF BIOTECHNOLOGIES OR GENETICALLY ENGINEERED VACCINES IN HONDURAS.

- E) ALTHOUGH THE MISSION IS CURRENTLY FUNDING A LARGE PRIVATE SECTOR LIVESTOCK PROJECT, THE ST/AGR VACCINE PROJECT WOULD PROVIDE LIMITED BENEFITS TO THE EFFOR.

- F) THE MISSION DOES NOT DEEM IT ADVISABLE TO PROVIDE TRAINING IN ANIMAL VACCINE TECHNOLOGY TO HONDURAN PROFESSIONALS AT THIS TIME.

2. ANAPLASMOSIS AND BABESIOSIS ARE ENDEMIC IN HONDURAS. THE IMPACT OF THESE DISEASES IS MOST OFTEN OBSERVED IN CATTLE IMPORTED FROM THE UNITED STATES. HOWEVER, THERE NRE INDICATIONS THAT CATTLE IMPORTS FROM OTHER INFECTED AREAS (E.G., COSTA RICA) ARE ALSO SUSCEPTIBLE TO THE HONDURAN INFECTIONS.

3. PLEASE KEEP MISSION INFORMED REGARDING THE IMPLEMENTATION OU THE PROJECT SO THAT FUTURE COOPERATION MAY BE CONSIDERED. DRAFTED BY RD:KAROCKEMAN, NJ.
PASTORINO

112

ACTION COPY

Department of State

INCOMING TELEGRAM

PAGE 01 MEXICO 16544 062136Z 1293 007115 AID9749
ACTION AID-00

ACTION OFFICE STAG-02
INFO LASA-03 LADP-04 LADR-03 AMAD-01 STHE-01 SAST-01 STFA-01
RELO-01 /017 A0

INFO LOG-00 ARA-00 /000 W
----------334475 062139Z /38

Mexico -

R 062134Z AUG 86
FM AMEMBASSY MEXICO
TO SECSTATE WASHDC 5365

UNCLAS MEXICO 16544

AIDAC

FOR ST/AGR

Ana Jones

E.O. 12356: N/A
TAGS:
SUBJECT: IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

REF: STATE 218952

1. PER REFTEL, AID/MEXICO OBTAINED FOLLOWING INFORMATION CONCERNING IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY.

A. YES, ANAPLASMOSIS AND BABESIASIS ARE EXTREMELY IMPORTANT DISEASES OF CATTLE IN MEXICO. THERE IS NO OFFICIAL DATA AVAILABLE REGARDING ECONOMIC LOSSES.

B. YES, MEXICO IS ACTUALLY TESTING IMMUNOPROPHYLACTIC AGENTS IN THE LABORATORY AND IN THE FIELD.

C. YES, MEXICO HAS APPROPRIATE FACILITIES FOR ANAPLASMA AND BABESIA TESTING.

D. MEXICO IS NOT AWARE OF ANY SPECIFIC REGULATIONS.

E. INSTITUTO NACIONAL DE INVESTIGACIONES FORESTALES Y AGROPECUARIAS OF SECRETARIA DE AGRICULTURA Y RECURSOS HIDRAULICOS IS FUNDING A HEMOPROTOZOAN DISEASES PROJECT, WHICH IS INVOLVED IN DEVELOPING IMMUNOPROPHYLACTIC AGENTS AGAINST ANAPLASMA AND BABESIA.

F. YES, WE MIGHT REQUEST TRAINING MAINLY AT POSTGRADUATE LEVEL, HOWEVER, WE ARE ALSO INTERESTED IN TECHNICAL TRAINING SOR SHORT PERIODS OF TIME (4 TO 6 MONTHS).
COMMENTS: ONE MUST BE AWARE THAT ANAPLASMA MARGINALE (A RICKETTSIA) AND BABESIA SPP. (PROTOZOANS), ARE MORE COMPLEX MICROORGANISMS THAN RINDERPEST VIRUS. THEREFORE THESE HEMOPARASITES MUST BE STUDIED MORE SPECIFICALLY. SINCE THE DETAILS FOR PRODUCING A GENETICALLY ENGINEERED VACCINE FOR RINDERPEST IS UNKNOWN TO US PERHAPS SPECIFIC KNOWLEDGE DERIVED FROM THIS EXPERIENCE MAY NOT BE DIRECTLY APPLIED TO THE HEMOPARASITES. IT IS NOT JUST A MATTER OF SIMPLE TECHNOLOGY TRANSFER, BUT THAT OF A COMMITTED INTERINSTITUTIONAL EFFORT. MEXICO IS WILLING TO PARTICIPATE IN COLLABORATIVE PROJECTS WITH UNIVERSITIES AND RESEARCH INSTITUTES, WHICH MAY HELP TO IMPROVE LABORATORY FACILITIES. (DRAFTED: PSANTOS). BUSBY

113

ACTION COPY

Department of State

INCOMING TELEGRAM

PAGE 01 PANAMA 10821 252003Z 8920 106315 AID0443

ACTION AID-00

ACTION OFFICE STAG-02

INFO FPA-02 LACE-03 STHE-01 STPO-01 SAST-01 STFA-01 RELO-01 /012 A4 GB25

INFO LOG-00 ARA-00 /000 W

----------022210 252004Z /38

R 252000Z JUL 86

FM AMEMBASSY PANAMA

TO SECSTATE WASHDC 1678

UNCLAS PANAMA 10821

AP

AIDAC

E.O. 12356: N/A

SUBJECT: IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

REF: STATE 218952

1. USAID/PANAMA/AGR IS VERY INTERESTED IN THE TECHNOLOGICAL ADVANCES THAT ARE MADE WITH ANIMAL VACCINES. ALTHOUGH THE MISSION DOES NOT HAVE A PROJECT NOR CURRENTLY ARE WE ANTICIPATING A PROJECT THAT COULD SUPPORT RESEARCH IN VACCINE DEVELOPMENT, WE NEVERTHELESS CONTINUE TO SEEK NEW INFORMATION IN THIS IMPORTANT FIELD. PLEASE KEEP US INFORMED. DAVIS

14

Appendix V

Improved Animal Vaccines Through Biotechnology

Phase II

Anaplasmosis and Babesiosis

Project Number 936-4178

APPENDIX V - ECONOMIC ANALYSIS

October 14, 1986

115

Improved Animal Vaccines Through Biotechnology

Phase II

Anaplasmosis and Babesiosis

Project Number 936-4178

APPENDIX V-A - ECONOMIC ANALYSIS
Production and Dollar Losses due to Stable Enzootic Anaplasmosis and Babesiosis in the Colombian Llanos

S&T/AGR:10/31/86

PRODUCTION AND DOLLAR LOSSES DUE TO STABLE ENZOOTIC ANAPLASMOSIS AND BABESIOSIS IN THE COLOMBIAN LLANOS (1981-1984)

CHARLES H. MULLENAX, D.V.M
SEPTEMBER 1986

I. INTRODUCTION -

Anaplasmosis and babesiosis are enzootic in many of the tropical areas of the world. In the absence of vaccines capable of producing long-term sterile immunity, it has been considered that the stable enzootic condition was epidemiologically unavoidable and even desirable, and economically acceptable because it precludes the occurrence of acute illness and death. There are few detailed data in the literature which contradict this assessment.

Nevertheless, a number of workers have presented observations which indicate that the stable enzootic situation is not entirely benign nor cost-free. (See: Craig, 1976; Morrison et al., 1985; Osorno, et al, 1975; Otte, el al., 1985; Smith, et al, 1980; Todorovic, et al., 1979).

An attempt is made in this paper to separate the production losses due to the combined effects of enzootic anaplasmosis and babesiosis from those due to tropical climate, nutritional stress, external and gastrointestinal parasites, and other diseases. These estimated losses are then given dollar values based on local prices with the purpose of determining the possible benefit-cost ratio of investment in research aimed at producing engineered vaccines capable of producing long-lasting, heterologous, sterile immunity to these hemoparasites.

II. ECOLOGICAL SETTING -

Well drained, humid tropical grassland savannas situated at $4^0 5'$ north latitude, 72^0 west longitude, comprised of 80% high savanna and terraces and 20% subirrigated bottomlands. The principal forage species of the savanna was **Trachypogon spp**. While the forage of the bottomlands, which provided the major part of the diet in the dry season (mid-December to April), consisted of 8 to 12 species of palatable grasses and forbs plus limited amounts of native legumes. The carrying capacity of the savannas was 1 animal unit (AU- 280 KG) per 5 hectares (HA) and of the bottomlands 1 AU/HA. Fattening cattle were provided with 0.5 to 1.0 HA of introduced (improved) pasture (mostly **Brachiaria decumbens**).

Average annual rainfall varied from 2115mm to 2776mm with a total of 133 rainy days per year; of this total, an average of 1989mm fell during the rainy season (April - December) and 126mm during 13 days with rain in the dry season. Evaporation varied from 150mm per month in the dry season to 100mm in the rainy season. Hours of sunshine per month varied from 100 to 180 and provided (in June and July) some 350 to (December-January) 500 **Langleys** of solar radiation. Annual average maximum temperature was approximately 31^{0}C while the minimum was 21^{0}C. Average altitude was 125m above sea level.

Soils were primarily deep oxisols on the savannas and terraces with some ultisols in the bottomlands and had very low cation exchange capacities (CEC), low pH (4.3 to 5.2), low calcium and magnesium content, and high iron and aluminum content. Annual cyclic changes in soil pH (increasing by 0.5-1.0 pH unit from January to July and indicating a high content of variable charge clays) resulted in decreases (up to 90%) in the availability of all major soil nutrients except sodium during the months of June - August (mid-rainy season). Forage foliar nutrient content followed the same pattern despite being in the middle of the growing season, the decrease in forage nutrient value and/or balance being more related to changes in the availability of soil nutrients than to climatic factors. Forage nutrient losses also ranged from 60% to 80% of the annual optimal values (April - May).

III. HERD COMPOSITION AND GENETIC BACKGROUND -

Because of the low reproductive efficiency typical of cattle herds maintained on native forages growing on acidic oxisols, the makeup of the herd by classes is quite different from that of herds raised under optimal conditions. The percentage composition of the herd (1493 head) from which data was collected in this study was as follows: **BREEDING COWS**- 39.7 (lactating, 17.9; milked, 7.5; dry-pregnant, 21.8); **REPLACEMENT HEIFERS**- 6.0; **FATTENING STEERS**- 13.4; **FATTENING FEMALES**, (cull cows and heifers)- 4.9; **STOCKERS AND FEEDERS**- 16.5; **CALVES**- 17.9; and **BULLS**- 1.7.

The majority of animals in the herd carried 62.5% to 100% zebu blood, the crosses being on criollo (native) cattle, red poll, or brown Swiss. Animals with 50% or less zebu blood were notably more susceptible to tick infestation and heat stress. The Red Poll breed, similar to other **Bos taurus**, were much more fertile than the **Bos indicus** where both received improved nutrition.

118

IV. HERD MANAGEMENT -

A typical cow-calf and limited fattening, semi-extensive operation based on natural savannas as described above. The herd was supplemented with a minimally adequate, complete mineral mix fed **ad lib.** year-round and consumed at the rate of 30 to 70 gm/hd/day (ave. = 50 gm) depending on the adequacy of the nutrient content of forage. Disease and parasite control included vaccination against anthrax, blackleg, and foot and mouth disease; young stock (9-15 months of age) were all treated with broad spectrum anthelminitics once per year (July-September) and approximately 30% of them (those most unthrifty) re-treated between November and January. The entire herd was bathed for ticks (**Boophilus microplus**) 4 to 6 times per year depending on the tick load. Peak biting insect (mosquitoes, **Simulium**, flies, and tabanids) activity occurred annually between August and October and resulted in 2 to 4 episodes during these months which lasted for periods of 3 to 5 days each when cattle lost up to 50% of normal grazing time because they bunched up and lay down in defense against insects from near sundown when the breeze died down until the breeze began the next day several hours after sunrise. Due to the diversity of insects and the short duration of effect of insecticides because of frequent rains, spraying was of little effect in attempting to control this problem.

Year-round breeding was practiced because it gave higher conception rates than controlled/seasonal breeding. Calves were weaned in several lots in the corral on green chop at 9 to 12 months of age.

V HEALTH AND IMMUNE STATUS -

Positive titers for complement fixing (CF) antibody to **Anaplasma marginale** were measured in 70% of the population and positive CF antibody titers to **Babesia bigemina** were encountered in 90% of the population in two surveys conducted five years apart (1969 and 1974--Corrier, 1975). No cases of acute anaplasmosis or babesiosis were ever seen in indigenous cattle during more than fifteen year's observations. Data collected during 1981-82 indicated that the peak annual period of hemoparasite recrudescense coincided with the nutritional stress brought about by the agronomic downphase (June-August) when nutritional status was lowest (and complicated by secadera, an acute wasting disease accompanied by marked thiamin deficiency--see Figure 4, p.14) and insect attack was increasing. Packed cell volumes (PCV) were found to be less than 30% (14-29) in from 45% to 55% of cattle tested (26 head) at various times during this period. In this same group, red blood cell

parasitemias, as determined from Giemsa-stained smears, ranged from 0.01% to 0.2% for **Anaplasma** and 0.01% to 0.5% for **Babesia**. (See Figures 1-3.)

Epidemiologic data collected during 1981 and 1982 showed (whether causally or coincidentally) the highest annual incidence of foot and mouth disease to occur also during this time. This period also marked the peak annual activity of gastrointestinal parasites and the peak incidence of gastroenteritis in calves.

VI PRODUCTION PARAMETERS -

Conception rate, 55%; total abortions, 6-10%; calfhood mortality, 6-8%; weaning rate, 45%; replacement heifers first calved at 3.5 to 4 years of age with > 85% calving rate; calving interval, 2 years; calves weaned at 9 to 12 months weighing 145 to 175 kg live weight; fat steers sold at 3.5 to 4.5 years of age at 420 to 450 kg live weight. Fattening steers were estimated to gain 700 gm/day; stockers and feeders and fattening females, 500 gm/day; average milk production per cow, 450 liters per lactation.

VII CALF PRODUCTION IN THE ABSENCE OF HEMOPARASITES -

40 (39.7) cows X 0.55 conception = 22 cows pregnant
22 cows pregnant x 0.03 abortion rate = 0.66 calves aborted
22 - 0.66 = 21.3 calves born
21.3 calves x 0.03 death rate = 0.64 dead
0.66 calves aborted + 0.64 calves dead = 1.3 calves lost
22 cows pregnant - 1.3 calves lost = 20.7 calves weaned
20.7 calves weaned/40 breeding cows = 51.8% weaning rate
51.8% weaning rate = 0.52 calf/cow/year
[20.7/39.7 = 52.1% weaning rate]

VIII PRODUCTION LOSSES ATTRIBUTED TO HEMOPARASITES -

(Based on a herd of 100 animals distributed by class in the percentages indicated for herd composition on page 2) -
Abortions, 3%; delayed conception of 2 months, 18% and of 5 months, 12% of lactating cows; 400 gm/day reduction in weight gain during 45 days per year in 20% of fattening steers and 25% of stockers and

feeders; 300 gm/day recuction in weight gain during 45 days per year in 15% of fattening females; 25 kg less gain in 30% of calves at weaning due both to direct effect of hemoparasites on calves and to reduced milk production by dams.

A. LOSSES IN CALF PRODUCTION IN BREEDING COWS DUE TO HEMOPARASITES -

1. ABORTION AND DEATH

22 pregnant cows x 0.03 abortion rate = 0.66 calf aborted
21.3 calves born - 0.66 calf aborted = 20.6 calves born
20.6 live calves born x 0.03 mortality = 0.62 calf dead
20.6 calves born - 0.62 calf dead = 19.98 calves live at weaning
19.98 live calves/ 40 breeding cows = 0.50 weaning rate

2. DELAYED CONCEPTION

20 lactating cows x 0.30 hemoparasite attack rate = 6 cows
6 x 0.40 requiring 5 months to recover = 2.4 cows [12% of 20]
6 x 0.60 requiring 2 months to recover = 3.6 cows [18% of 20]
2 month's anestrus = 2/9 calf lost per cow =
0.22 x 3.6 = 0.79 calf lost
5 months' anestrus = 5/9 calf lost per cow =
0.56 x 2.4 = 1.34 calf lost
0.79 calf lost + 1.34 calf lost = 2.13 calves lost

3. LOSS IN NUMBER OF CALVES WEANED DUE TO HEMOPARASITES

	TOTALS
ABORTED	0.66
DIED	0.62
LOST TO DELAYED CONCEPTION	2.13

TOTAL LOSS IN NUMBER OF CALVES WEANED/YEAR BY BREEDING COWS IN A 100-HEAD HERD DUE TO HEMOPARASITES 3.41

22 cows of 40 pregnant - 3.41 = 18.59 cows which wean calves =
18.59/40.0 = 46.5% weaning rate

DOLLAR LOSS BASED ON VALUE OF CALF ON HOOF AT WEANING = $50 x 3.41 calves = $170.50

4. **LOSS DUE TO REDUCED WEIGHT GAINS IN SURVIVING CALVES OF BREEDING COWS DUE BOTH TO DIRECT EFFECT OF HEMOPARASITES ON CALVES AND REDUCED MILK PRODUCTION IN DAMS**

   18.59 calves x 0.30 hemoparsite attack rate = 5.6 calves
   175 kg normal calf weight - 150 kg affected calf weight =
   25 kg reduced weight gain/affected calf/year
   25 kg x 5.6 calves = 140 kg lost weight gain
   140 kg x $0.34/kg value of calf on hoof = $47.60

5. **TOTAL DOLLAR LOSS IN CALVES FROM BREEDING COWS IN A 100-HEAD HERD DUE TO THE EFFECT OF HEMOPARASITE INFECTION**

   $170.50 + $47.60 = $218.10

B. **<u>LOSSES IN CALF PRODUCTION IN REPLACEMENT HEIFERS IN A 100 ANIMAL HERD DUE TO HEMOPARASITES</u>** -

1. **ABORTION AND DEATH** -

   6 pregnant heifers x 0.03 abortion rate = 0.18 calf
   6 heifers - 0.18 calf = 5.82 calves born
   5.82 calves x 0.03 mortality = 0.17 calf
   5.82 calves - 0.17 calf = 5.65 calves weaned
   0.17 + 0.18 = 0.35 calf lost
   0.35 calf x $50.00 value on hoof at weaning = $17.50

2. **DELAYED CONCEPTION** -

   6 heifers x 0.15 hemoparasite attack rate = 0.9 heifer affected
   0.9 heifer x 5 month delay in conception = 0.9 x 5/9 = 0.9 x 0.56 = 0.50 calf lost.
   0.50 calf x $50.00 value at weaning = loss of $25.00

3. **LOSS IN NUMBER OF CALVES WEANED DUE TO HEMOPARASITES**

		TOTAL
Abortion + death:	0.35 calf x $50.00 =	$17.50
Lost to delayed conception:	0.50 calf x $50.00 =	$ 25.00
Total loss in number of calves weaned by replacement heifers in a 100 head-herd due to hemoparasites:	0.85 calf x $50.00 =	$42.50

4. **LOSS DUE TO REDUCED WEIGHT GAINS IN SURVIVING CALVES OF REPLACEMENT HEIFERS DUE BOTH TO DIRECT EFFECT OF HEMOPARASITES ON CALVES AND REDUCED MILK PRODUCTION IN DAMS -**

5.65 calves weaned x 0.3 hemoparasite attack rate = 1.7 calves
1.7 calves x 25 kg. reduced weight gain = 42.5 kg.
42.5 kg x $0.34/kg value of calf on hoof = $14.45

5. **TOTAL DOLLAR LOSS IN CALVES FROM REPLACEMENT HEIFERS IN A 100-HEAD HERD DUE TO THE EFFECT OF HEMOPARASITE INFECTION -**

$42.50 + $14.45 = $56.95

C. **SUMMARY - TOTAL DOLLAR LOSS IN CALVES FROM BREEDING COWS AND REPLACEMENT HEIFERS -**

$218.10 + $56.95 = $275.05 in 100 head-herd.

D. **LOSSES IN MILK PRODUCTION DUE TO HEMOPARASITES -**
Of 18.59 cows lactating (see A-4, p. 6), approximately 30% were milked at any given time starting from the date of parturition and lasting through the fourth or fifth month of lactation, depending on the rate of natural decline in production. Average daily production was 6 to 8 liters of which the calf got 2 to 4 liters and 4 liters were sold at an average price of $0.20 per liter. Reduction in milk production resulting from hemoparasite recrudescence and the accompanying reduction in PCV, was estimated at approximately 50% for a period of 45 days.

18.59 cows x 0.30 hemoparasite attack rate = 5.6 cows affected
5.6 cows x 4 l milk/day = 22.4 l / day
5.6 cows x (0.50 x 4 l) = 11.2 l lost/day
11.2 l x 45 days = 504 l total milk production lost
504 l x $0.20 = $100.80 total dollar loss due to lost milk production in 100-head herd.

E. **FAILURE OF WEIGHT GAIN IN 2 1/2- 4-YEAR-OLD FATTENING STEERS DUE TO HEMOPARASITES** -

13.4 steers x 0.20 hemoparasite attack rate = 2.68 steers whose daily rate of gain drops from 700 gm to 300 gm during 45 days

2.68 steers x 0.40 kg reduced gain per day x 45 days = 48.2 kg
48.2 kg x $0.75 = $36.15 loss in 100-head herd.

F. **FAILURE OF WEIGHT GAIN IN FATTENING FEMALES DUE TO HEMOPARASITES** -

4.9 head x 0.15 hemoparasite attack rate = 0.68 animals
0.68 head x 0.30 kg reduced gain per day x 45 days = 9.18 kg
9.18 kg. x $0.75 = $6.89 loss in 100=head herd.

G. **FAILURE OF WEIGHT GAIN IN STOCKERS AND FEEDERS DUE TO HEMOPARASITES** -

16.5 head x 0.25 hemoparasite attack rate = 4.1 head
4.1 head x 0.40 kg reduced gain per day x 45 days = 73.8 kg
73.8 kg x $0.75 = $55.35 loss in 100-head herd.

H. **DEATH LOSS IN NON-INDIGENOUS MALADAPTED BULLS ATTRIBUTABLE TO HEMOPARASITES** -

1.7 bulls per 100-head herd x 0.10 hemoparasite attack rate = 0.17 bull
0.17 bull x $550 replacement cost = $93.50

I. SUMMARY OF LOSSES IN A 100-HEAD HERD -

(See also Table 1 - Page 10 of this Appendix)

Calves and calfhood losses	$275.05
Milk production losses	100.80
Failure of weight gain in fattening steers	36.15
Failure of weight gain in fattening females	6.89
Failure of weight gain in stockers and feeders	55.35
Death loss in bulls	93.50
Total	$567.74
Total per animal loss in a 100-head herd	5.68/head
Total estimated per head treatment cost in a 100-head herd	1.87
Total cost of loss and treatment	$7.55/head

IX. DISCUSSION -

The per head costs and losses reported here are comparable with those reported by Masiga (1981) for Mexico in 1980 where, with a national herd of approximately 31 million head, the costs of tick and insect control, prevention and treatment of hemoparasitic diseases, and production and death losses were reported to total $287 million. This amounts to $9.26 per head for each animal in the national herd as compared with the $7.55 reported here for stable enzootic areas of Colombia.

In contrast, per-head costs in beef cattle (including losses, treatment, and prevention) due to anaplasmosis alone in both non-enzootic and enzootic areas of California (1976) and Texas (1980) were, respectively, $1.36 * (Goodger et al., 1979) and $0.70 ** (Alderink and Dietrich, 1983).

---

* California: Total cost in 1976 of $5,244,319 / Total beef herd of 3,870,000 hd = $1.36/hd

** Texas : Total cost in 1980 of $8,960,000 / Total beef herd of 12,795,000 hd = $0.70/hd

*** If Mexican national herd is 35 M then/hd losses are: $8.20
37 M 7.65

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY
PHASE II: ANAPLASMOSIS AND BABESIOSIS

Table 1. - Production and Dollar Losses Due To Stable Enzootic Anaplasmosis and Babesiosis In the Colombian Llanos (1981 - 1984)

Animals in herd by class and sub-class	Normal population distribution in herd by class (sub-class)	Percentage of population with PCV less than 30 for 30-60 days per year	Normal production	Production loss (type/amount) in affected animals	Cost due to losses per 100-head herd with normal population distribution (local prices in US dollars)	Cost of treatment (local prices in US dollars)	Total cost (loss plus treatment)
Breeding cows	39.7	21.8% (ave.)	55% conception	Delayed conception, abortion, neonatal death - 15.5%; 50% (-2L/day)	$170.50		$170.50
Lactating	(17.9)	30%	6-10% abortion		100.80	9 hd x $10 = $90	190.80
Milked	(7.5)	30%	5-8% calfhood mortality				
			45% weaning rate				
Dry-pregnant	(21.8)	15%					
Replacement Heifers	6.0	15%	100% conception, calve at 3-4 years	Abortion and calf mortality--6%; delayed conception	56.95	1 hd x $7 =$7	63.95
Fattening Steers	13.4	20%	± 700 gm gain/day	400 gm x 45 days	36.00	3 hd x $5 = $15	51.00
Fattening Females	4.9	15%	± 500 gm gain/day	300 gm x 45 days	6.89	1 hd x $5 = $5	11.89
Stocker/Feeder	16.5	25%	± 500 gm gain/day	400 gm x 45 days	55.35	4 hd x $5 = $20	75.35
Calves	17.9	25%	175 kg weaning wt.	25 kg at weaning	47.60	5 hd x $8 = $40	87.60
Bulls	1.7	10%	± 10% mortality (non-indigenous)		93.50	1 hd x $10 = $10	103.50
Cost/100-head herd					$567.74 +	$187=	$754.74/100 hd
Cost per animal spread over total population					$ 5.68 +	$1.87=	$ 7.55/hd

FIGURE 1-

SECADERA/HEMOPARASITE INTERACTION (DIET CONTROL $\bar{5}$ B_1)

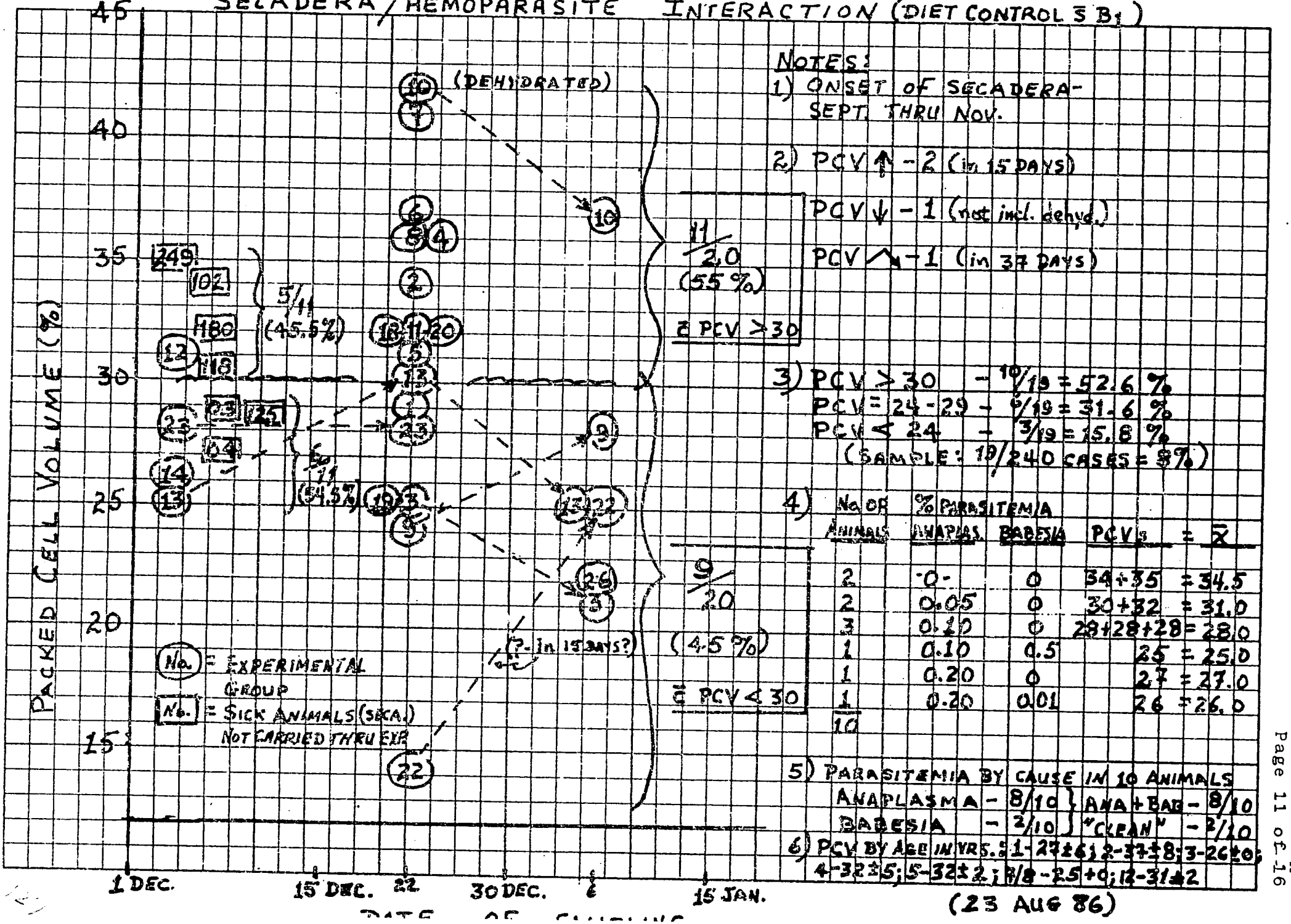
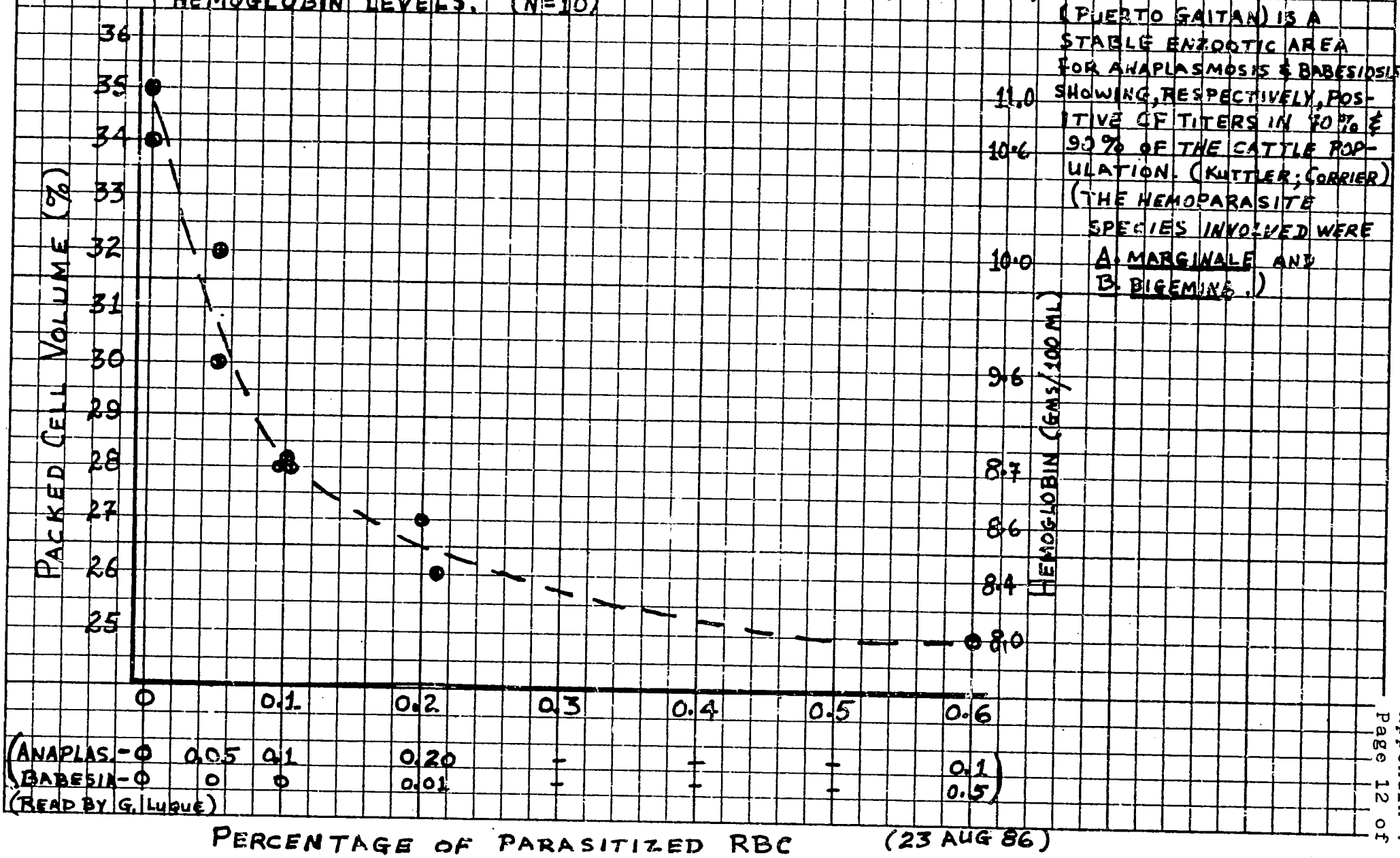


FIGURE 2 - SECADERA (COLOMBIAN LLANOS - 1982/83)

RELATIONSHIP BETWEEN PERCENTAGE OF PARASITIZED RED BLOOD CELLS, PACKED CELL VOLUME, AND HEMOGLOBIN LEVELS. (N=10)



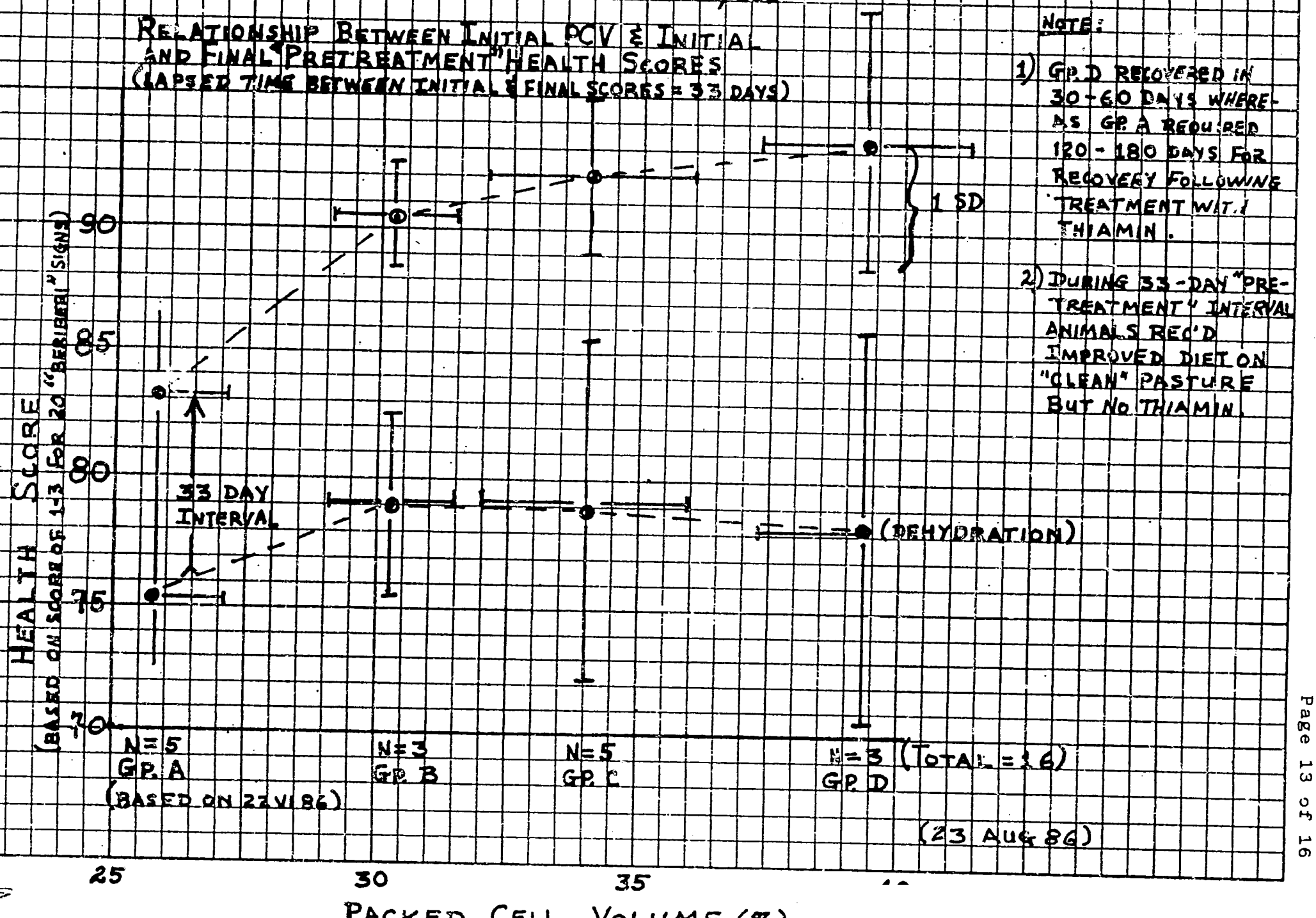
NOTE:

1) THIS AREA OF THE LLANOS (PUERTO GAITAN) IS A STABLE ENZOOTIC AREA FOR ANAPLASMOSIS & BABESIOSIS SHOWING, RESPECTIVELY, POSITIVE OF TITERS IN 70% & 90% OF THE CATTLE POPULATION. (KUTTLER; CORRIER) (THE HEMOPARASITE SPECIES INVOLVED WERE A. MARGINALE AND B. BIGEMINA.)

128

FIGURE 3 - SECADERA (COLOMBIAN LLANOS - 1982/83)

RELATIONSHIP BETWEEN INITIAL PCV & INITIAL AND FINAL "PRETREATMENT" HEALTH SCORES
(LAPSED TIME BETWEEN INITIAL & FINAL SCORES = 33 DAYS)



NOTE:

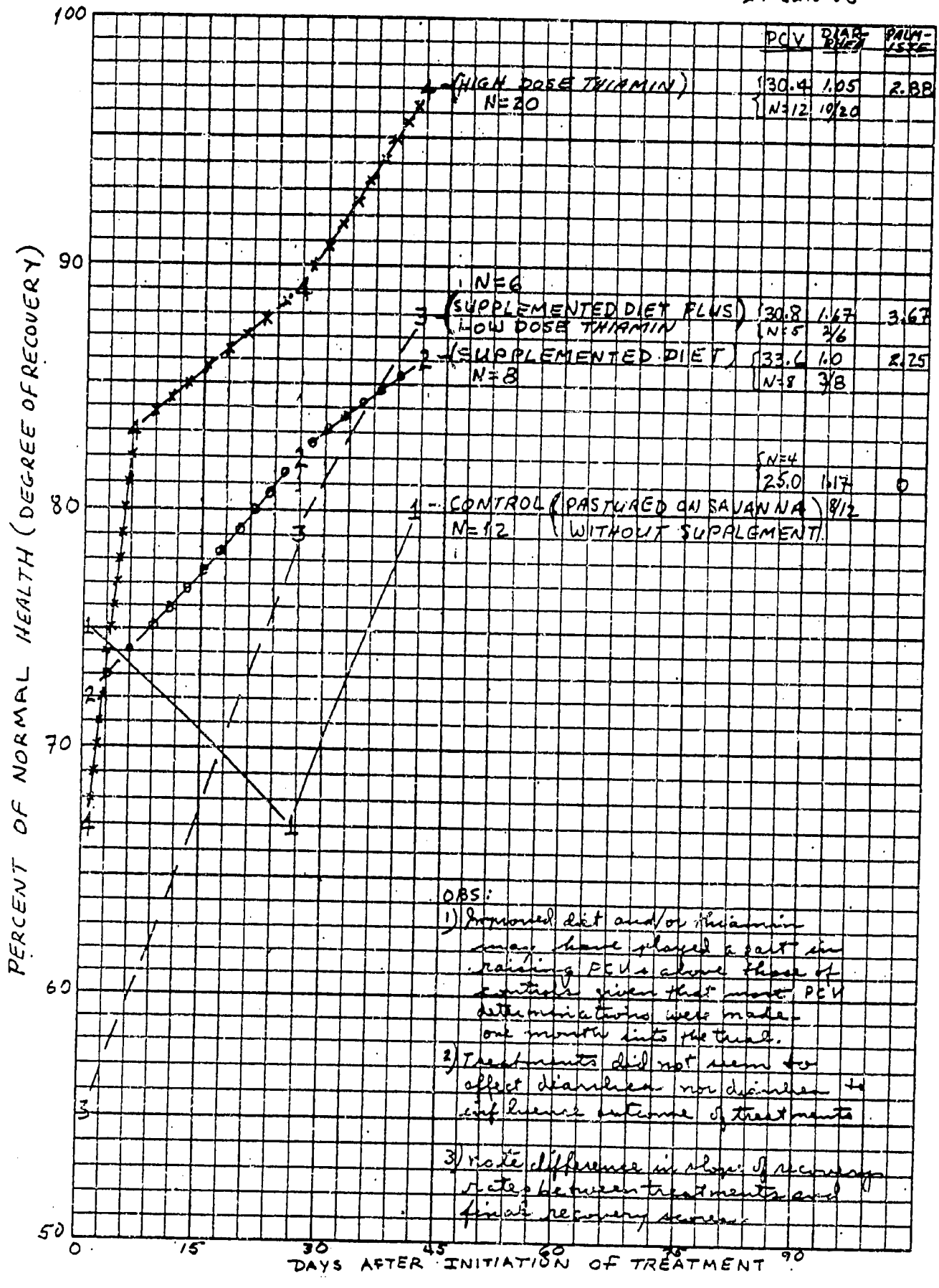
1) GP. D RECOVERED IN 30-60 DAYS WHEREAS GP. A REQUIRED 120-180 DAYS FOR RECOVERY FOLLOWING TREATMENT WITH THIAMIN.

2) DURING 33-DAY "PRETREATMENT" INTERVAL ANIMALS REC'D IMPROVED DIET ON "CLEAN" PASTURE BUT NO THIAMIN.

129

FIGURE 4 -
SECADERA (BOVINE BERIBERI) - COLOMBIAN LLANOS
RESPONSE TO TREATMENTS (1982/83)

SECADERA
21 JUN 86



LITERATURE CITED/REVIEWED

Alderink, F. and R. Dietrich. 1983. Economic and epidemiological implications of anaplasmosis in Texas beef cattle herds. Tex. Agric. Exp. Sta. Bull. No. 1426. 15 pp.

Corrier, D. E. 1972. A Clinical, Serologic and Pathological Study of Concurrent Anaplasmosis and Babesiosis in Experimentally Infected Calves. M. S. Thesis, Texas A&M Univ. (Citation No. 38 in Maurer, F.D. which see.)

Corrier, D. E. and L. G. Adams. 1973. Observations during concurrent anaplasmosis and babesiosis in experimentally infected calves. Proc. 6th National Anaplasmosis Conf., Las Vegas, Nevada. pp. 60-65.

Corrier, D. E. 1975. The epidemiology of anaplasmosis and babesiosis in the lowland tropics of Colombia. Proc. Seminar on Hemoparasites. CIAT, Cali, Colombia. 17-22 March.

Corrier, D. E. et al. 1978. A field survey of bovine anaplasmosis, babesiosis, and tick vector prevalence in the eastern plains of Colombia. Trop. Anim. Hlth. Prod. 10: 91-92.

Craig, T. M. 1975. The prevalence of bovine parasites in various environments within the lowland tropical country of Guyana. Ph.D. Thesis. Texas A&M Univ.

Craig, T. 1976. Cattle health problems in Guyana. Report of the 21ld AID Consortium on Expanding Competence in the Design and Execution of Livestock Development Programs in the Tropics Emphasizing Ruminant Livestock Production Systems. Georgetown, Guyana. 1-4 March 1976.

Goodger, W. J., T. Carpenter, and H. Riemann. 1979. Estimation of economic loss associated with anaplasmosis in California beef cattle. JAVMA 174(12): 1333-1336.

Masiga, A. 1981. Proc. Conf. Anim. Dis. Res. Livestock Prod., Africa. pp. 175-176.

Maurer, F. D. 1978. ITVM Project Report: Hemoparasitic Diseases of Ruminant Livestock - Colombia. p. 42.

Morrison, R. B., F. Orjuela, M. Navarrete and R. S. Morris. 1985. Weight gain and associated factors in cattle on the North Coast of Colombia. Abstract C1.7 in: 4th Intnatl. Symp. Vet. Epidemiol. and Economics. Singapore. 18-22 November.

Osorno, M., P. Solana, J. Perez, and T. Lopez. 1975. Study of an attenuated Anaplasma marginale vaccine in Mexico: Natural challenge of immunity in an enzootic area. Am. J. Vet. Res. 36(5): 631-633.

Otte, E., M. Navarrete, J. Orjuela, and R. B. Morrison. 1985. Animal health management in Colombia. Abstract in: 4th Intnatl. Symp. Vet. Epidemiol. and Economics. Singapore. 18-22 November.

Smith, R. D., E. Molinar, F. Larios, J. Monroy, F. Trigo, and M. Ristic. 1980. Babesia bovis vs Babesia bigemina cross serology, infection and immunity. Proc. Review of Research - Progress in Bovine Anaplasmosis and Babesiosis. Mexico City, Mexico. 26-28 February 1980. pp. 56-59.

Todorovic, R. A. et al. 1978. In: Maurer, F. D. which see.

2984f

Improved Animal Vaccines Through Biotechnology

Phase II

Anaplasmosis and Babesiosis

Project Number 936-4178

APPENDIX V- B - ECONOMIC ANALYSIS
Estimate of Annual Dollar Losses Due to Stable Anaplasmosis and Babesiosis in Cattle in the Tropical Zones of the Americas and of Africa.

S&T/AGR:10/31/86

Investment Analysis

Table 2 shows the estimated annual dollar loss from anaplasmosis and babesiosis to be $1.032 billion.

The critical assumptions for the investment analysis are as follows:

- Twenty year pay-out period.
- Adoption rates by farmers are 20 percent, 30 percent, 40 percent and 50 percent for years 1, 2, 3, and 4 respectively. Adoption rates for the remaining years are assumed constant at the 50 percent rate.
- Ten percent discount rate.
- A $0.25 cost per dose per year for production and distribution.
- Little or no market impact is assumed as losses due to death and productivity are eliminated.

Results of the investment analysis shows the investment in the production and distribution of the vaccine to be very profitable. The calculated benefit/cost ration was about 11.0.

When profitability is viewed from a rate of return approach, the calculated rate of return (internal rate of return) was approximately 80 percent.

W:3053f:

TABLE 2 — ESTIMATE OF ANNUAL DOLLAR LOSSES DUE TO STABLE ENZOOTIC ANAPLASMOSIS AND BABESIOSIS IN CATTLE IN THE TROPICAL ZONES OF THE AMERICAS AND OF AFRICA

1 COUNTRY/ STATE/AREA	2 REFERENCE	3 PATHOGEN(S) AND ENZOOTIC STATUS	4 CATTLE HERD (MILLIONS)	5 % OF POPULATION IN STABLE ENZOOTIC ZONES	6 HEADS OF CATTLE IN STABLE ENZOOTIC ZONES (MILLIONS)	7 $ LOSS/HD/ YR IN STABLE ENZOOTIC ZONES (LOSS+TREAT)	8 TOTAL DOLLAR LOSS/YEAR (MILLIONS) STATE/NATIONAL/AREA	9 $COST/HD/ YR SPREAD OVER TOTAL NATNL/STATE POPULATION	10 AVERAGE $ COST/HD/YR SPREAD OVER TOTAL NATNL/ STATE POP.
BASIS FOR ESTIMATE									
Entire U.S.	McCallon 1973	A. marginale Enzootic to Non-enzootic	Tot. 1973 118	—	—	—	100.0	0.85	—
California	Goodger et al., 1979	" " " "	Beef, 1980 3.9	—	—	—	5.2	1.33	—
Texas	Alderink & Dietrich, '83	" "	Beef, 1980 12.8	—	—	—	9.0	0.70	0.96*
Mexico	Masiga, '81	Anaplas+Bab. Spp. Enzootic to Non-enzoootic	Tot. 1980 35.0	—	—	—	287.0	8.20	8.20**
Colombian Llanos	Mullenax 1986	A. marginale B. bigemina Stable Enzootic	Tot. 1985 22.0	30 50	6.6 11.0	7.55 7.55	50.0 83.0	2.27 3.77	— 3.02***
ESTIMATED LOSSES FOR TROPICAL AMERICA & AFRICA (37 countries) - Based on estimate of Colombian losses									
Cent. Am + Caribbean	FAO	Anaplas. + Babesia Spp.	Tot. 1985 58.0	—	—	—	175.0	—	—
So. America	WHO	Stable enzo-	177.0	—	—	—	534.0	—	3.02
Africa	OIE	otic to non-	107.0	—	—	—	323.0	—	—
		enzootic	342.0	—	—	—	1,032.0x	—	—

* Morbidity & mortality losses due to anaplasmosis only in enzootic to non-enzootic situations.

** If these figures are accurate, the large difference as compared to U.S. and Colombian losses may be due in part to the presence of B. bovis and to higher mortality in transitional areas between enzootic and non-enzootic zones.

*** This figure might well be higher if losses for the North Coast of Colombia were calculated due the presence there of Babesia bovis. Therefore, the estimated per head loss of $3.02 would seem to be a conservative estimate of losses related to the stable enzootic situation.

x This number could reasonably be doubled to give worldwide losses if the per head figure for the U.S. were applied to the world buffalo population (129 m) and the cattle of Asia (369 m), Europe (132 m), Oceania (31 m), & the USSR (121 m) which total 653 million head.

See page 10c for the investment analysis.

TABLE 2a -
ESTIMATE OF ANNUAL DOLLAR LOSSES DUE TO STABLE ENZOOTIC ANAPLASMOSIS AND BABESIOSIS IN CATTLE IN THE TROPICAL ZONES OF THE AMERICAS AND OF AFRICA

AREA/ COUNTRY/ STATE	REFER.	PATHOGEN AND ENZOOTIC STATUS	CATTLE HERD- MILLIONS	TOTAL $ LOSS/YR.- MILLIONS	$ COST/ HD/YR - TOTAL POPULATN	AVE.$ COST/ HD/YR - TOTAL POPULATN
BASIS FOR ESTIMATE						
ENTIRE U.S.	McCALLON 1973	A.marg.- enzootic to non-enzootic	118- tot. '73	100	0.85	
CALIF.	GOODGER et al.'79	" " "	3.9 beef '76	5.2	1.33	
TEXAS	ALDERINK DIETRICH 1981	" " "	12.8 beef '80	9.0	0.70	0.96
MEXICO	MASIGA 1981	Ana+Bab- enzootic to non-enzootic	35.0 tot. '80	287.0	8.20	8.20
LLANOS COLOMBIA	MULLENAX 1986	A.marg.+ B.bigem- stable enzootic	22.0 tot. '85	66.4	3.02	3.02
(Colombian losses assume that 40% of total population is in enzootic areas.)						
ESTIMATED LOSSES FOR TROPICAL AMERICA AND AFRICA - (37 COUNTRIES) Based on estimate of Colombian losses.						
CENT.AM.+ CARIBB.	FAO WHO OIE	Ana+Bab- enzootic to non-enzootic	Tot.'85 58.0	175.0		3.02
SO.AMER.			177.0	534.0		3.02
AFRICA	"	" " "	107.0	323.0		3.02
			342.0	1,032.0		

CHM-9/86

Improved Animal Vaccines Through Biotechnology

Phase II

Anaplasmosis and Babesiosis

Project Number 936-4178

APPENDIX VI - ENVIRONMENTAL THRESHOLD DETERMINATION AND INITIAL ENVIRONMENTAL EXAMINATION

S&T/AGR:10/31/86:Revised 3/12/87

MEMORANDUM TO: S&T/FA, Dr. Duane Acker

FROM: S&T/AGR, David D. Bathrick

SUBJECT: Environmental Threshold Determination

REF: Improved Animal Vaccines Through Biotechnology - Phase II - Anaplasmosis and Babesiosis Project Number 936-4178

I have concluded that this project involves controlled experimentation exclusively for the purpose of research and contained laboratory evaluation, in the form of testing on live animals in containment facilities both of which are carefully monitored. The categorical exclusion from environmental review set forth in Section 216.2 (c), (2), (ii) of AID's Environmental Procedures is applicable, therefore to this project. Nevertheless, S&T/AGR has conducted an Initial Environmental Examination of this project.

On the basis of the Environmental Threshold Determination, I recommend that you make the following determination:

_X_ 1. The proposed agency action is not a major Federal action which will have a significant effect on the human environment.

____ 2. The proposed agency action is a major Federal action which will have a significant effect on the human environment, and:

____ a. An Environmental Assessment is required; or

____ b. An Environmental Impact Statement is required.

The cost of and schedule for this requirement is fully described in the referenced document.

____ 3. Our environmental examination is not complete. We will submit the analysis no later than _____ with our recommendation for an environmental threshold decision.

Approved: _____

Disapproved _____

Date: _____

Clearance:Environmental Officer Carroll Collier
Carroll Collier

CHMullenax: 8/25/86:Revised 10/31/86:Revised 3/12/87

Improved Animal Vaccines Through Biotechnology

INITIAL ENVIRONMENTAL EXAMINATION

PROJECT LOCATION:	WORLDWIDE
PROJECT TITLE:	Improved Vaccines Through Biotechnology Phase II - Anaplasmosis and Babesiosis
PROJECT NUMBER:	936 4178
LIFE OF PROJECT:	Five Years
IEE PREPARED BY:	C. H. Mullenax/K. Jones
DATE:	August 25, 1986:Revised 10/31/86
ACTION RECOMMENDED:	NEGATIVE DETERMINATION

CONCURRENCE: _____

DATE: _____

Improved Animal Vaccines through Biotechnology
Phase II - Anaplasmosis and Babesiosis

ENVIRONMENTAL ANALYSIS

I. Project Description - The following is a brief project description. The full project description is contained in the project paper.

This project is designed to develop an improved vaccine(s) for anaplasmosis and babesiosis, which are tick-borne hemoparasitic diseases of livestock. This vaccine(s) will be developed using recombinant DNA technology, specifically using vaccinia virus as a vector. The product that emerges from this project will be an effective live recombinant vaccinia virus vaccine(s) for anaplasmosis and babesiosis which is suitable for use in the developing countries. These vaccines will be tested under contained laboratory conditions in both the U.S. and in LDCs. The laboratory testing in the U.S. will follow the established guidelines of the Animal and Plant Health Inspection Service (APHIS) and other USDA Services.

Prior to conducting research in the LDCs, the facilities and procedures for testing genetically engineered organisms will be reviewed to ensure that they are based on standards of the U.S. and the LDC(s) where the testing will take place. The AID Environmental Coordinator will assist S&T/AGR in developing the containment facility certification team and will participate in this review process. A.I.D. will also obtain written approval of the appropriate Ministries of the Government(s) involved before testing is commenced.

There are only two areas of possible safety concern in this project. These are:

1) Recombinant DNA laboratory work - The procedures for laboratory work of this nature have been defined by the National Institutes of Health (NIH).

2) Testing of a live genetically engineered vaccine - Regulations of the Animal and Plant Health Inspection Service (APHIS) and other appropriate U.S. agencies, international regulations as they develop, and regulations of the appropriate ministries of the governments of the collaborating LDCs will be adhered to in all instances.

This project proposes to do only limited testing in the United States under isolated contained laboratory conditions. Therefore, it is subject to a categorical exclusion from environmental review under Environmental Procedures 22, CFR Section 216.2 (C), (2), (ii). Nevertheless, once the participating institutions have been selected, the project will be reviewed to determine whether there is a significant effect forseeable on the human environment. This discussion will be included in the Environmental Determination.

The Recipient of the Cooperative Agreement will implement this research activity in accordance with:

1) The National Institutes of Health Guidelines for Research involving Recombinant DNA Molecules;
2) Procedures issued by the USDA, EPA, or other appropriate Federal Agency, regarding testing of genetically engineered organisms;
3) A.I.D.'s Environmental Procedures; and
4) Such other Federal guidelines and procedures as may apply during the course of research.

Additionally, the cooperator cannot commence testing in any foreign location until written approval for such testing is obtained from A.I.D. and the Government of the country where testing is planned. Testing shall be conducted in accord with all applicable regulations of that country.

In addition, however, and prior to commencement of any such testing, the cooperator shall make a judgement and communicate the same to A.I.D. as to whether the regulations, procedures or facilities of the country in question are adequate to ensure testing in an environmentally sound manner. In the event such judgement is that they are not, the cooperator and A.I.D. will consult and agree on the conditions to be applied to the testing which will have such environmental effect.

Reports submitted under this activity to A.I.D. will address regulatory issues as above related to the activity.

II. Recommendations

From the discussion above and those contained in Attachment 1, and the analysis contained on the following "Impact Identification and Evaluation Form," it is determined that the implementation of this project will not have a significant direct effect on the environment. A negative determination is recommended.

Improved Animal Vaccines Through Biotechnology

Phase II - Anaplasmosis and Babesiosis

ENVIRONMENTAL ANALYSIS

IMPACT IDENTIFICATION AND EVALUATION FORM

Impact Areas and Sub-Areas	Impact Identification *
A. LAND USE	
1. Changing the character of the land through:	
a. Increasing the population	N
b. Extracting natural resources	N
c. Land clearing	N
d. Changing soil character	N
2. Altering natural defenses	N
3. Foreclosing important use	N
4. Jeopardizing man or his work	N
5. Other factors:	
Reducing pesticide pollution and contamination	N
B. WATER QUALITY	
1. Physical state of water	N
2. Chemical and biological states	N
3. Ecological balance	N
4. Other factors	N
C. ATMOSPHERIC	
1. Air additives	N
2. Air pollution	N
3. Noise pollution	N
4. Other factors	N
D. NATURAL RESOURCES	
1. Diversion, altered use of water	N
2. Irreversible, inefficient commitments	N
3. Other factors	N

E. CULTURAL	
1. Altering physical symbols	N
2. Dilution of cultural traditions	N
3. Other factors	N
F. SOCIO-ECONOMIC	
1. Changes in economic/employment patterns	N +
2. Changes in population	N
3. Changes in cultural patterns	L +
4. Other factors	L +
G. HEALTH	
1. Changing a natural environment	N
2. Eliminating an ecosystem element	N
3. Other factors	
Reducing pesticide poisoning	N +
Reducing nitrates in water	N
H. GENERAL	
1. International impacts	L +
2. Controversial impact	U
3. Larger program impacts	M/H
4. Other factors	N
I. OTHER POSSIBLE IMPACTS (not listed above)	
1. Introduction of new plant species	U
2. Agricultural chemicals	L +
3. Other factors	N

* The following symbols are used for Impact Identification

N = No environmental impact
L = Little environmental impact
M = Moderate environmental impact
H = High environmental impact
U = Unknown environmental impact

+ = Beneficial impact
- = Negative impact

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

Phase II - Anaplasmosis and Babesiosis

Expanded Environmental Discussion

In the area of biotechnology regulation is one of the critical issues. It can be divided into two categories:

1) Questions which arise concerning containment; and

2) Questions which arise concerning release of genetically engineered organisms into the environment

This subproject is designed to develop improved vaccine(s) for anaplasmosis and babesiosis. This vaccine will be developed using recombinant DNA technology, specifically using vaccinia virus as a vector. The product that emerges from this project will be effective live recombinant vaccinia vaccine(s) for these diseases suitable for use in the developing countries. This vaccine will be tested under laboratory conditions in both the U.S. and certain LDCs. At the end of this project the vaccine(s) will be ready for large scale field testing.

There are 3 major areas of safety concerning this project. These are:

1) Recombinant DNA laboratory work;

2) Testing of live genetically engineered vaccine(s); and

3) Deliberate release of genetically engineered vaccine(s) in large scale field testing.

1) Recombinant DNA Laboratory Work - Since the initial recombinant experiments were performed in the 1970's specific guidelines have been developed by NIH. It is the responsibility of the principal investigator (PI) of the recipient institution to insure that all laboratory procedures follow these regulations.

A general description is given below of the NIH guidelines cited from GAO's report -- Biotechnology - Agriculture's Regulatory System Needs Clarification, March 1986:

> The 1976 "NIH Guidelines for Research Involving Recombinant DNA Molecules" were the Federal Government's initial response to the concern about risks associated with recombinant DNA research. The guidelines were developed in response to concerns among scientists and the general public about the potential hazards of genetic engineering. They were formalized by an NIH Recombinant DNA Advisory Committee (NIH-RAC) following an international conference held in February 1975 at Asilomar California, and attended by a group of eminent scientists.
>
> The guidelines originally were binding only on research supported by NIH; subsequently, all Federal agencies that perform, fund, or regulate recombinant DNA research agreed to adopt the NIH guidelines and to require compliance by Federally funded researchers doing work involving recombinant DNA. An agency can encourage the compliance of researchers who receive Federal funds by threatening to cut off such funds in the event of noncompliance. The guidelines do not cover privately funded research, but contain a section encouraging voluntary compliance by industry.

The guidelines provide an administrative framework that specifies the responsibilities of the scientists, their institutions, and the Federal Government. For each institution, the key organization is the Institutional Biosafety Committee (IBC), comprising experts in relevant scientific disciplines and lay persons representing the public interest. More than 300 IBCs throughout the nation oversee recombinant DNA research to ensure compliance with the guidelines. At the Federal level the key parties are the NIH Director, who are the final decision-makers under the guidelines, and the NIH-RAC, a diverse group of experts who advises the NIH Director on the major technical and policy issues involved.

The guidelines also classify experiments into three categories: a) those requiring special review by the NIH-RAC, b) those requiring containment of potentially harmful organisms and review by the IBC, and c) those exempt from special NIH-RAC and IBC review.

a) Those requiring special review by the NIH-RAC

The NIH-RAC reviews experiment in this category to assess risk and assign an appropriate level of containment.

b) Those requiring containment of potentially harmful organisms and review by the IBC

These experiments must be conducted in accordance with previously established containment standards that become more rigorous as the level of perceived hazard increases. These standards specify physical types of containment relating to special laboratory features and biological types of containment relating to the deliberate weakening of experimental organisms to reduce their chance of survival outside the laboratory. According to USDA, compliance with these standards is ensured by the IBC at the local level.

c) Those experiments exempt from special NIH-RAC and IBC review

Those experiments which are exempt from NIH-RAC and IBC review have grown to the point where they now represents about 80 to 90 percent of all recombinant DNA experiments. Research since 1976 has led to less concern among many scientists about the risks of recombinant DNA research and, as a result, there has been a gradual, but substantial, relaxation of original containment requirements and oversight mechanisms through a series of formal revisions in the NIH guidelines.

Three following limitations of the NIH guidelines, however, have caused more people to be concerned about their adequacy in terms of regulating the biotechnology industry:

a) Apply to nonfederally funded research on a purely voluntary basis;

b) Do not apply to organisms created by genetic engineering techniques other than recombinant DNA; and

c) Do not adequately address the issue of deliberate release of genetically engineered organisms into the environment.

(Orginally, they simply prohibited such releases, but more recently they were changed to require special review under category a.)

2) Small Scale Contained Animal Testing - Once the genetically engineered vaccinia virus vaccine(s) is developed, it will be necessary to conduct tests in live animals. These animals will be inoculated with the new vaccine and then challenged with the respective hemoparasites. Such tests have two components which are safety issues:

a) The use of the recombinant vaccine; and

b) The use of the infectious agents.

All of these tests will be conducted in facilities which meet the specified U.S. and LDC regulations. The regulations for working with an infectious agent such as rinderpest have been established by USDA, Animal and Plant Health Inspecation Service (USDA/APHIS.

The use of the recombinant vaccine will follow the regulations set forth by APHIS which is currently the Federal Agency with jurisdiction over animal diseases. At the writing of this project paper amendment, APHIS is in the process of developing defined procedures. If the proposed procedures are accepted the Institutional Biosafety Committees (IBC) will be responsible for approving the laboratory testing as defined in this project.

3) Deliberate Release of a Genetically Engineered Organism - This is the final step in the testing process of a new vaccine. It requires the administration of the vaccine in an open system; i.e., released into the environment. This is the most controversial step in the process as there is not a data base of risk assessment. This step (field testing) is not anticipated as part of the present project.

The proposed APHIS regulations indicate this step is the most controlled. A complete environmental assessment fully reviewed by APHIS is required before any field testing can be initiated.

LDC Governments - In all of the above regulatory issues the approval of the appropriate LDC government ministries and other appropriate LDC institutions (e.g., Organization of African Unity (OAU)) will be obtained.

Principal Investigator - It is the responsibility of the PI to insure that appropriate regulations regarding facilities and procedures be followed throughout this project.

A.I.D. - It is the responsibility of the S&T/AGR project manager in collaboration with Environmental Officers to monitor the project in regards to all regulations.

W:3049f:10/14/86:Revised 10/31/86

Improved Animal Vaccine Through Biotechnology

Phase II

Anaplasmosis and Babesiosis

Project Number 936-4178

APPENDIX VII - REQUEST FOR APPLICATION (RFA)

S&T/AGR:10/31/86:Revised 4/10/87

Issue Date:
Closing Date:
Closing Time:

Subject: Request for Application (RFA) AID/
Improved Animal Vaccines Through Biotechnology

Gentlemen/Ladies:

The United States Government, represented by the Agency for International Development (A.I.D.) is seeking applications from institutions or groups of institutions interested in cooperating in the development of animal vaccines against anaplasmosis and babesiosis in livestock which will retain good antigenicity and provide good immunity even under harsh tropical conditions in the LDCs. The research and development activities to be undertaken are described in Section III of this RFA.

This proposed Cooperative Agreement is designed so that project implementation will serve the common interests of both A.I.D. and the Recipient organization(s). In addition to providing assistance to A.I.D.'s animal vaccines program, it is anticipated that involvement in this project will strengthen the capabilities of the Recipient in animal vaccine development provide new opportunities for professional involvement in the LDCs, and establish or expand an international network of scientists working on the prevention and eradication of animal diseases through the use of vaccines.

A.I.D. considers the proposed cooperative undertaking to be primarily assistance to an institution or an organization for a public purpose, rather than the acquisition of services. Accordingly, an assistance instrument, in lieu of contractual relationship, has been determined to be the most appropriate vehicle for implementing subject Program.

Under a Cooperative Agreement, A.I.D.'s involvement is on a partnership basis as opposed to the relationship established under a contract, where the Agency is acquiring specific goods or services for its own use or benefit. Unlike other types of assistance instruments, a Cooperative Agreement entails substantial involvement by A.I.D. in project activities.

Consequently it is not the Agency's intention to pay a fee or profit for the program that results from this RFA.

To this end, this RFA is being issued and consists of this cover letter and the following documents:

Section No.	Title
I	Request Instructions and Conditions
II	Selection Criteria
III	Program Description
IV	Cooperative Agreement Format

If you decide to submit an application, it must be received no later than 3.00 p.m. local time at the place designated for receipt of application on the date indicated above. Applications and modifications thereof, shall be submitted in sealed envelopes with the name and address of the applicant and the RFA number inscribed thereon, to:

Agency for International Development
Office of Procurement
AID/W Projects Division
Twin Towers II, Room 1532
Attn: Mr. Jay M. Bergman
Washington, D. C. 20523

If hand carried - deliver to:

Agency for International Development
Office of Procurement
AID/W Projects Division -
Twin Towers II, Room 1532
Attn: Mr. Jay M. Bergman
1100 Wilson Boulevard
Arlington, Virginia 22209

Issuance of this request does not constitute an award commitment on the part of the Government nor does it commit the Government to pay for costs incurred in the submission of an application. Further, the Government reserves the right to reject any or all applications received and to negotiate separately with an applicant, if such action is considered to be in the best interest of the Government.

Telegraphic applications or telegraphic notices of intent to apply are not authorized for this requirement and will not be accepted.

In the event of an inconsistency between the documents comprising this RFA, it shall be resolved in the following order of precedence: (a) Proposed Cooperative Agreement Format; (b) Program Description; and (c) request instructions.

Questions concerning this RFA should be directed to Ms. Joyce Frame, Contracting Officer, of this Office who can be reached by phone at (703) 875-1155.

Applicants should retain for their records, one copy of any and all enclosures which accompany their application.

Sincerely yours,

Jay M. Bergman
Agreement Officer
A/N Science and Technology Branch
AID/W Projects Division -
Office of Procurement

AVRFALT1:8/05/86:Revised:4/07/87

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

PHASE II - ANAPLASMOSIS AND BABESIOSIS

SECTION I - REQUEST INSTRUCTIONS AND CONDITIONS (RFA)

AVRFALT1:8/05/86:Revised:4/07/87

SECTION I - REQUEST INSTRUCTIONS AND CONDITIONS

Table of Contents

		Page
1.	Receipt of Applications	1
2.	Preparation of Application	1
	a. Technical Content of Application	1
	b. Cost Content of Application	3
	c. Applicant's Responsibility	4
	d Business Management Information	5
3.	Explanation to Applicants	5
4.	Late Applications	5
	a. Received after closing date	5
	b. Modification of an application	6
	c. Late Modifications	6
	d Acceptable Evidence	6
	e. Late Modification of successful application	6
	f. Withdrawal of applications	7
5.	Disclosure of Information	7
6.	Award of Cooperative Agreement	7
7.	Alternate Applications	8
8.	Authority to Bind Applicant	8
9.	Authority to Obligate Government	8
10.	Organizational Conflicts of Interest	8
11.	Non-Discrimination in Federally Assisted Programs	9
12.	Patent Rights - Improved Animal Vaccines Through Biotechnology	9

APPENDIX A - Grantee/Recipient Analysis Program Cost Proposal
APPENDIX B - Organizational Conflicts of Interest Representation
APPENDIX C - Assurance of Compliance with Laws and Regulations Governing Non-Discrimination in Federally Assisted Programs

AVSECITC:8/26/86:Revised 04/08/87

SECTION I

REQUEST INSTRUCTIONS AND CONDITIONS

The Applicants shall follow the instructions contained herein and supply all information required. Failure to furnish all information may disqualify an applicant. Applicants must set forth full, accurate, and complete information as required by this Request. The penalty for making false statements in applications to the U.S. Government is prescribed in 18 U.S.C. 1001.

Applications offering less than 60 days for acceptance by the Government from the date set for receipt will be considered nonresponsive and will be rejected

1. Receipt of Applications

   Applications must be received at the place designated by the date and time specified in the covering letter.

2. Preparation of Applications

   You are requested to submit an application directly responsive to the terms, conditions, specifications, and clauses of this RFA. Applications not conforming to this RFA may be categorized as not meeting the minimum requirements of the Government, thereby eliminating it from further consideration. Applications should be submitted in two separate parts (a) technical and (b) cost. The documents required in this RFA should be submitted in an original and seven (7) copies. Alternate applications may be submitted as provided for on page 7, item 7 of this section.

   a. Technical Content of Applications

      The technical portion of your application will be the critical item of consideration in selection for an award under this Cooperative Agreement. It should be specific, complete, and presented concisely. Since U.S. Government resources anticipated at this time will be less than the total amount estimated to complete the project described in this RFA, the ability of the applicant to identify additional resources which could be applied toward this project will have a significant bearing on the final award - in the sense that it will

permit more objectives to be achieved than otherwise could be achieved with U.S. Government resources alone. Consequently, your application should cover only those objectives of the request that you expect to be able to meet within anticipated resources.

The section on vaccine development of your application must set forth, in detail for a scientific peer review, your conceptual approach, methodologies, and techniques for accomplishing the stated objectives through the use of vaccinia viruses as the vector for genes expressing animal disease antigens. (Other vectors could be considered if they offer equal or greater advantages than the vaccinia virus.) It must have a definitive plan outlining the project activities proposed for achieving said objectives.

The application must define the technical resources and expertise of both the institution and the professional personnel proposed. The information covering the capabilities of your institution should spell out clearly the pertinent work experience and accomplishments in developing, testing and conducting programs and training activities of the type required under this Cooperative Agreement.

The academic training, specialized skills, professional competence, and relevant achievements in the development of animal vaccines using biotechnology of the personnel to be assigned should be provided as well. The proposal should identify selected positions on the research team which could be reserved for LDC scientists - post-doctoral fellows and/or masters/PhD candidates - who would be available for subsequent LDC participation in field trials or other related work with these vaccines.

The proposal must describe your procedures used for compliance with: a) the National Institutes of Health Guidelines for Research Involving Recombinant DNA Molecules; b) procedures issued by the USDA, EPA, or other appropriate Federal agency, regarding testing of genetically engineered organisms; A.I.D.'s environmental procedures; and d) such other Federal guidelines and procedures as may apply during the course of the research to be undertaken.

It is important that the technical portion of the application furnish verifiable, objective evidence of prior success in this type of research based primarily on published research results. As a minimum, a listing

of organizations must be provided for or with whom similar activities have been performed, including the name and telephone numbers of the cognizant technical representative.

The applicant must demonstrate to the satisfaction of A.I.D. that it has the management skills, staff, facilities, laboratories and financing necessary to provide the effort described within this request.

For each individual involved in the various required disciplines (including microbiology and molecular biology, immunology, biochemistry, and epidemiology), include the amount of time each will devote to the program activities. Provide biographical sketches and pertinent bibliographies on all professional personnel, both technical and managerial, to be assigned to this project. Indicate the total staff which will be required and explain how you propose to administer the Cooperative Agreement. The core research could include a staff of at least five post doctoral level scientists in the areas stated above.

Provide a description of subcontract/subrecipient relationships with other organizations that will be necessary for the completion of the scope of activities. Indicate whether or not you have existing relationships with these other organizations or the method you propose to establish the necessary relationships.

b. Cost Content of Application

The cost portion of the application must provide in detail the total proposed costs for implementation of the activities to be accomplished under this Cooperative Agreement. (See Appendix A). It shall include whatever schedules are felt necessary to support and/or explain your proposed costs. It should contain as a minimum:

(1) A detailed analysis of level of effort including specific personnel, proposed compensation rates, and amount of time proposed;

(2) Details of all direct cost items, including the portion currently funded by your institution and indicate how A.I.D.'s funds will expand your current activities directed to the control of animal diseases in the developing world;

(3) A letter from the cognizant Government Audit Agency stating the latest audited indirect cost rates; the base to which such rates are applied and the method of application. If such a letter is unavailable, submit sufficient financial information to allow an A.I.D. auditor to determine the reasonableness of the proposed rates; e.g., a breakdown of labor bases and overhead pools, the method of determining the proposed rate(s), and annual financial statements.

(4) A copy or reference to codification of your personnel policies and procedures (especially regarding salary, promotion, leave, differentials, etc.). Indicate whether your personnel policies and procedures have been reviewed and approved by any agency of the Federal Government. If so, provide a name, address, and telephone number of the cognizant reviewing official; and

(5) Indicate whether or not your institution's accounting system has been approved by any Government Agency; if so, provide name, address, and telephone number of the cognizant auditor.

c. Applicant's Responsibility

Applicant must submit sufficient evidence of responsibility for the Agreement Officer to make a determination of responsibility. The information submitted should substantiate that the Applicant:

(1) Has adequate financial resources or the ability to obtain such resources as required during the performance of the agreement;

(2) Is able to comply with the required scope of activities, taking into account all existing commitments, commercial as well as governmental;

(3) Has a satisfactory record of performance; and

(4) Has a satisfactory record of integrity and business ethics.

d. Business Management Information

(1) List the three (3) largest U.S. Government or other contracts, grants or other cooperative agreements awarded in the past three (3) years which were of a related nature, indicating for each:

(a) Customer
(b) Document Number
(c) Name and Telephone number of cognizant Contracting/Agreement Officer
(d) Description of services/activities

3. Explanation to Applicants

Any explanation desired by an applicant regarding the meaning or interpretation of this solicitation must be requested in writing from the Agreement Officer, allowing sufficient time for a reply to reach all applicants before submission of their applications. Oral explanations or instructions will not be binding. Any information given to a prospective applicant concerning this request will be furnished to all prospective applicants as an amendment to the RFA if such information is necessary to applicants in submitting applications or if the lack of such information would be prejudicial to uninformed applicants.

4. Late Applications

a. Any application received at the office designated in the Covering Letter of this RFA after the closing date and time specified for receipt will not be considered unless received before the award is made, and

(1) It was sent by registered or certified mail not later than the fifth calendar day prior to the date specified for receipt of offers (e.g., an offer submitted in response to a solicitation requiring receipt of offers by the 20th of the month must have been mailed by the 15th or earlier);

(2) It was sent by mail (or telegram if authorized) and it is determined by the Government that the late receipt was due solely to mishandling by the Government after receipt at the Government installation; or

(3) It is the only application received.

b. Any modification of an application, except a modification resulting from the Agreement Officer's request for "best and final" offer, is subject to the same conditions as in a. (1) and a. (2) of this provision.

c. A late modification resulting from the Agreement Officer's request for "best and final" offer received after the time and date specified in such request will not be considered unless received before award and the late receipt is due solely to mishandling by the Government after receipt at the Government installation.

d. The only acceptable evidence to establish:

(1) The date of mailing of a late application or modification sent either by registered or certified mail is the U.S. Postal Service postmark on the wrapper or on the original receipt from the U.S. Postal Service. If neither postmark shows a legible date, the application or modification shall be deemed to have been mailed late. (The term "postmark" means a printed, stamped, or otherwise placed impression that is readily identifiable without further action as having been supplied and affixed on the date of mailing by employees of the U.S. Postal Service.)

(2) The time of receipt at the Government installation is the time-date stamp of such installation on the proposal wrapper or other documentary evidence of receipt maintained by the installation.

e. Notwithstanding a, b, and c of this provision, a late modification of an otherwise successful application which makes its terms more favorable to the Government will be considered at any time it is received and may be accepted.

f. Applications may be withdrawn by written or telegraphic notice received at any time prior to award. Applications may be withdrawn in person by an applicant or his authorized representative, provided his identity is made known and he signs a receipt for the application prior to award.

5. Disclosure of Information

Applicant is advised that, pursuant to the Freedom of Information Act, the public is entitled to request information from Agency files. As a general rule, information will be disclosed, except:

a. Information submitted in response to a solicitation prior to award of an agreement or other instruments, or amendments thereto.

b. Information properly classified or administratively controlled by the Government.

c. Information specifically exempted from disclosure under the Freedom of Information Act.

Upon issuance of the Cooperative Agreement resulting from this solicitation, the Government will disclose, use or duplicate any information submitted in response to the solicitation to the extent provided in the Cooperative Agreement and as required by the Freedom of Information Act.

6. Award of Cooperative Agreement

A.I.D. anticipates the award of a Cooperative Agreement to that responsible applicant whose application, conforming to this request offers the highest quality program (as evaluated against the technical selective criteria) within the limitation of available funds. It is anticipated that funds totalling up to $5.0 million will be available. The Agreement is expected to be awarded for a period of five calendar years from date of award. The agreement will be incrementally funded, subject to the availability of funds. Contributions by an institution to the cost of the program are encouraged and will be considered in such terms as decided by the Agreement Officer.

Academic and technical training in the field of biotechnology for animal vaccines of LDC personnel in addition to those participating in the research effort is likely, but requests for such training will be handled through separate arrangements.

7. Alternate Applications

If you desire to submit an application on other terms (such as alternatives to the use of vaccinia virus as a vector) which you believe are advantageous to the Government, considering cost or other factors, you should submit, in addition to a responsive application, an alternate application reflecting such advantages. An application directly responsive to this request must be submitted before consideration can be given to an alternative application. Alternate applications must be received before the closing date.

8. Authority to Bind Applicant

The offeror's application is to identify the individual(s) having authority to enter into binding agreements on behalf of the institution. It is to identify the person(s) to be contacted both during the period of evaluation of applications and for negotiations leading to the agreement award. This information is to include: Name, title, address, phone number.

9. Authority to Obligate Government

The Agreement Officer is the only individual who may legally commit the Agency to the expenditure of public funds. No cost chargeable to the proposed agreement may be incurred before receipt of either a fully executed agreement or a specific, written authorization from the Agreement Officer.

10. Organizational Conflicts of Interest

The applicant must complete and submit as part of the cost portion of its application the "Organizational Conflicts of Interest Representation" shown as Appendix B to this Section.

11. Non-Discrimination in Federally Assisted Programs

The applicant must complete and submit as part of the cost portion of its application the "Assurance of Compliance" shown as Appendix C to this Section.

12. Patent Rights - Improved Animal Vaccines Through Biotechnology

Based on the Determination of the Administrator of the Agency for International Development (A.I.D.), dated December 20, 1983, in accordance with 35 U.S.C. 202(a)(ii), that exceptional circumstances exist which require that, in the case of invention rights under A.I.D.'s Improved Animal Vaccines through Biotechnology project, the right of each contractor in that project to retain title to any such inventions will be restricted in order to better promote the objectives and policies of The Patent and Trademark Amendments of 1980 (35 U.S.C. Sec. 200 et seq., P.L. 96-517) and the objectives and policies of the Foreign Assistance Act of 1961, as amended, by ensuring that A.I.D. obtains sufficient rights in such inventions to meet the needs of the Improved Animal Vaccines Through Biotechnology project.

AVRFALT1:8/25/86:Revised 04/13/87

APPENDIX A

GRANTEE/RECIPIENT ANALYSIS
PROGRAM COST PROPOSAL

You are requested to submit to the Government a proposal of estimated costs by line item with supporting information, adequately cross-referenced, suitable for detailed analysis. The information should be submitted in the following format and accompanied by detailed supporting documentation.

A copy of the most current U.S. Government Indirect Cost Agreement must accompany your submission.

Cost Elements	Basis for Estimate	Estimated Amount
1. Salaries (Detail in Attachment):		
a. U.S. Personnel:		
Home Office Professional	_____ work months	$
Home Office Nonprofessional	_____ work months	$
Field Staff Professional	_____ work months	$
Field Staff Nonprofessional	_____ work months	$_____
Total	_____ work months	$
b. Cooperating or Third Country Nationals:		
Field Staff Professional	_____ work months	$
Field Staff Nonprofessional	_____ work months	$_____
Total	_____ work months	$
2. Consultants (Detail in Attachment):		
a. Consultant Fees (Domestic)	_____ work months	$
b. Consultant Fees (Overseas)	_____ work months	$_____
Total	_____ work months	$
3. Fringe Benefits	Base: _____ Rate _____ %	$_____
4. Overhead:		
a. Home Office (On-campus)	Base: $_____ Rate _____ %	$_____
b. Field Staff(Off-campus)	Base: $_____ Rate _____ %	$_____
5. Travel (Detail in Attachment):		
a. Domestic		$_____
b. International		$_____
6. Allowances (Detail in Attachment):		$_____
7. Other Direct Cost (Detail in Attachment):		$_____
8. Equipment (In excess $500 each):		$_____
9. Materials and Supplies:		$_____
Estimated Total Program Cost (1)		$_____

(1) Of the Estimated Total Program Cost, indicate the amount of U.S. dollars to be spent for local financing.

Organizational Conflicts of Interest Representation

1. The applicant represents, to the best of its knowledge and belief, that:

   This award does / / or does not / / involve an organizational conflict of interest.

2. The term "organizational conflict of interest" means that a relationship exists whereby an applicant (including its chief executives, directors, and proposed consultants) has interest which:

   (A) may diminish its capacity to give impartial, technically sound, objective assistance and advice or may otherwise result in a biased work product, or,

   (B) may result in an unfair competitive advantage. It does not include the "normal flow of benefits" from the performance of assistance instruments or contracts.

3. The term "applicant" means any person, firm, unincorporated association, joint venture, partnership, or corporation on contract with the United States of America.

4. If the applicant indicates that there are organizational conflicts of interest in the "Organizational Conflicts of Interest Representation", the applicant shall provide a statement which describes in a concise manner all relevant facts concerning any present or planned interest (financial, contractual, organizational, or otherwise) relating to the work to be performed in the proposed Agreement and bearing on whether the applicant has a possible organizational conflict of interest with respect to being able to render impartial, technically sound, and objective assistance or advice, or being given an unfair competitive advantage. The applicant may also provide relevant facts that show how its organizational structure and/or management systems limit its knowledge of possible organizational conflicts of interest relating to other divisions or sections of the organization and how that structure or system would eliminate or neutralize such organizational conflict.

ASSURANCE OF COMPLIANCE WITH LAWS AND REGULATIONS GOVERNING NON-DISCRIMINATION IN FEDERALLY ASSISTED PROGRAMS

_____(hereinafter called the "Applicant")
(Name of Applicant)

hereby assures that no person in the United States shall, on the bases set forth below, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under, any program or activity receiving financial assistance from A.I.D., and that with respect to the grant for which application is being made, it will comply with the requirements of:

(1) Title VI of the Civil Rights Act of 1964 (Public Law 88-352, 42 U.S.C. 2000-d) which prohibits discrimination on the basis of race, color or national origin, in programs and activities receiving Federal financial assistance;

(2) Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794), which prohibits discrimination on the basis of handicap in programs and activities receiving Federal financial assistance;

(3) The Age Discrimination of Act of 1975, as amended, (Public Law 95-478) which prohibits discrimination based on age in the delivery of services and benefits supported with Federal funds;

(4) Title IX of the Education Amendments of 1972 (20 U.S.C. 1681, et. seq.) which prohibits discrimination on the basis of sex in education programs and activities receiving Federal financial assistance (whether or not the programs or activities are offered or sponsored by an educational institution); and

(5) A.I.D. regulations implementing the above nondiscrimination laws, set forth in Chapter II of Title 22 of the Code of Federal Regulations.

If the Applicant is an institution of higher education, the Assurance given herein extend to admission practices and to all other practices relating to the treatment of students or clients of the institution, or relating to the opportunity to participate in the provision of services or other benefits to

such individuals, and shall be applicable to the entire institution unless the Applicant establishes to the satisfaction of the A.I.D. Administrator that the institution's practices in designated parts or programs of the institution will in no way affect its practices in the program of the institution for which financial assistance is sought, or the beneficiaries of or participants in such programs.

This assurance is given in consideration of and for the purpose of obtaining any and all Federal grants, loans, contracts, property, discounts or other Federal financial assistance extended after the date hereof to the Applicant by the Agency, including installment payments after such data on account of applications for Federal financial assistance which were approved before such date. The Applicant recognizes and agrees that such Federal financial assistance will be extended in reliance on the representations and agreements made in this Assurance, and that the United States shall have the right to seek judicial enforcement of this Assurance. This Assurance is binding on the Applicant, its successors, transferees, and assignees, and the person or persons whose signatures appear below are authorized to sign this assurance on behalf of the Applicant.

_____
(Applicant)

BY (Signature) _____ TITLE _____

TYPED NAME _____ DATE _____

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

PHASE II - ANAPLASMOSIS AND BABESIOSIS

SECTION II - WEIGHTED CRITERIA FOR SELECTION OF RECIPIENT (RFA)

AVSECTII:8/25/86:Revised 04/14/87

170

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY
PHASE II - ANAPLASMOSIS AND BABESIOSIS

Section II - Weighted Criteria for Selection of Recipient

Information relevant to these criteria may be presented within the normal format of your proposal in response to this Request for Application (RFA). Consideration for agreement award will be limited to those offerors falling within a competitive range from a technical standpoint. The technical criteria are presented by major category, with relative order of importance indicated by approximate weighting, so that Applicants will know which areas require emphasis in the preparation of applications.

The criteria presented below have been tailored to the requirements of this particular RFA. Applicants should note that these criteria: a) serve as the standard against which all technical proposals will be evaluated; and b) serve to identify the significant matters which applicants should address in their technical applications.

Description	Points
Total Number of Points	100
A. General Quality and Responsiveness of Proposal, Technical Approach, and Adequacy of facilities	50
1. Research Design	(30)
a. A protocol for animal vaccine development and testing which demonstrates an adequate understanding of the scope of work and its relationship to measures for global animal disease identification and prevention, including vaccines already available for anaplasmosis and babesiosis.	
b. A program for effective international collaborative research which includes in addition to vaccine development, veterinary epidemiology and provision for dealing with the economic, ecological, sociopolitical and cultural aspects of livestock disease and its control.	

2. Research Facilities (20)

a. Adequate animal facilities and research laboratories to carry out the project.

b. Facilities which meet the required Federal standards for research involving recombinant DNA molecules and testing of genetically engineered organisms.

c. Facilities and procedures for the management and use of laboratory animals that satisfy the requirements of the Animal Welfare Act, 1970.

B. Key personnel should have the Following Qualifications and Experience of Personnel 30

1. Demonstrated multidisciplinary technical competence in development of animal vaccines using biotechnological approaches. (14)

a. Animal vaccine research design and implementation, vaccine evaluation, field trials, and publication of results.

b. Experience in research on animal vaccines pertinent to the needs of developing countries

2. Knowledge of A.I.D. project development, implementation, and evaluation procedures (1)

3. Collaborative relationships as necessary for the goals of this project with Animal and Plant Health Inspection Service of USDA; USDA/ARS Plum Island Animal Disease Center; National Institutes of Health; other U.S. institutions and LDC national and international institutions involved in the development of vaccines using biotechnology methods. (2)

4. Successful experience in LDC institutional resource development, including training. (3)

5. Extensive experience with animal health problems and disease prevention measures used in the developing countries and awareness of methods for integrating these into ecological, sociopolitical, and cultural frameworks. (3)

6. Advisory experience, availability for overseas work, foreign language capability. (3)

7. Management, communications, negotiating, coordinating experience and skills. (4)

C. Institutional Organization and Management Capabilities should include: 20

1. Adequate administrative, managerial, and institutional capability to plan, implement, coordinate, and evaluate project activities, and to ensure compliance with the relevant Federal and International Guidelines and Regulations. (15)

   a. Animal vaccine development and testing.

   b. Implement international research projects requiring inter-institutional coordination and collaboration to accomplish project objectives within the indicated ecological sociopolitical and cultural frameworks.

   c. Develop and maintain an international research and information network on biotechnology in animal health, including those in the LDCs, developed countries, and the international agricultural research centers.

2. Demonstrated long-term organizational interest and involvement in research on infectious diseases, animal biologics and other animal disease prevention measures, especially measures to control the diseases targeted by this project. (5)

AVSECTII:S&T/AGR:CMullenax:8/25/86:Revised 04/14/87

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

PHASE II - ANAPLASMOSIS AND BABESIOSIS

SECTION III - PROJECT DESCRIPTION

SECIIITC:9/04/86:Revised 04/08/87

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY
PHASE II - ANAPLASMOSIS AND BABESIOSIS
SECTION III - PROJECT DESCRIPTION

Table of Contents

		Page
A.	Summary	1
B.	Background	1
C.	Long-Term Goal, Immediate Purpose and Specific Objectives Objectives of the Cooperative Agreement	2
	1. Long-Term Goal	2
	2. Immediate Purpose	2
	3. Specific Objective of the Proposed Cooperative Agreement	2
D.	Implementation	4
	1. Project Components	6
	a. Research Activities	6
	b. Training	6
	c. Networking and Technology Transfer	7
	2. Subcontracts and Consultants	8
	a. U.S. Public and Private Institutions, and Consultants	8
	b. LDC National and International Institutions	9
	3. Countries and/or AID Missions Known to Desire Collaboration with Phase II of the project	9
	Summary Table	10
	4. Technical Specialities Required	11
E.	Annual Work Plan	11
F.	Reports	12
	1. Annual Technical Progress Reports	12
	2. Travel Reports	12
	3. Training Activities	13
	a. Participant Training Form 1381-4	13
	b. Annual Summary Training Report	13
	4. Technical and Research Reports for Publication	13
	5. Annual Activity Reports	14
	6. Annual Expenditure Reports	14
	7. Quarterly Reports	14

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY
PHASE II - ANAPLASMOSIS AND BABESIOSIS

SECTION III - PROJECT DESCRIPTION

Table of Contents

Page 2

G. Substantial Involvement Understanding 14
1. Work Plan 14
2. Work Plan Revisions 14
3. Field Visits 14
4. Field Activities 15
5. Consultants 15
6. Participants 15
7. Principal Investigator 15
8. Subcontracts 15
9. Compliance with Guidelines 15

H. Level of Effort (person months by year) 17
1. Project Staff and Subcontracts 17
2. Functional Area 18

Appendix A - Participant Data Form (PDF)

S&T/AGR:SECIIITC:9/03/86:Revised 04/08/87

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY
PHASE II - ANAPLASMOSIS AND BABESIOSIS

Section III - Project Description

A. Summary

The Agency for International Development (A.I.D.), Bureau for Science and Technology, Office of Agriculture (S&T/AGR) proposes an amendment to the Improved Animal Vaccines Through Biotechnology project at an estimated cost to S&T/AGR of up to $5,000,000 for the development of genetically engineered vaccines against anaplasmosis and babesiosis which will, if possible, provide long-term, sterile immunity using vaccinia virus as a living vector. This amendment will provide funds for up to a five-year cooperative agreement for research to develop these vaccines and to test them in containment facilities; to disseminate the scientific findings to the less developed countries (LDCs); to train LDC participants at the graduate and postdoctoral level and provide in-service and on-the-job training; and to establish a network of participating scientists.

For the duration (five years) of this Cooperative Agreement, the Recipient shall undertake a program directed toward developing and testing genetically engineered animal vaccines for the control of anaplasmosis and babesiosis. The Recipient must have experience with, and be involved in ongoing research, including epidemiologic surveys, on the target diseases, the use of the vaccinia virus as a gene vector and/or other appropriate molecular biology approaches.

B. Background

The hemoparasites *Anaplasma species* and *Babesia species* cause significant livestock losses in, respectively, 66 and 115 countries around the world. Total annual dollar losses, worldwide, due to livestock deaths (but not including production losses in enzootic areas) from these two diseases are estimated at over $400 million. Losses in the United States due solely to anaplasmosis are estimated to be in the neighborhood of $60 million to $100 million per year. Production losses in areas where these diseases are enzootic are calculated to equal or exceed death losses in non-enzootic areas. It is likely, therefore, that total annual losses worldwide exceed U.S. $1 billion.

Existing vaccines are not as effective as would be desirable, especially in less developed countries where infrastructure deficiencies prevent proper management of vaccines in general. A vaccine is needed which will provide sterile immunity, even in enzootic areas to prevent the production losses which occur when these hemoparasites recrudesce and produce anemia in the host animal.

There is evidence in the current research literature that, through genetic engineering, it may be possible to produce a vaccine which will provide sterile immunity. The purpose of this project is to develop and test such a vaccine. It would, ideally be a vaccine based on the expression in vaccinia virus of the genes for one or more antigens of Anaplasma and Babesia which are capable of inducing broad heterologous, long-term immunity in susceptible livestock.

C. Long-Term Goal, Immediate Purpose, and Specific Objectives of the Cooperative Agreement

1. Long-Term Goal - The broad, long-term goal of this cooperative agreement is to increase the incomes of the poor and to expand the availability and consumption of food -- while maintaining stability and efficiency of food production, ensuring good economic returns to investments in livestock, and providing the technology to reduce livestock mortality and morbidity due to anaplasmosis and babesiosis.

2. Immediate Purpose - The immediate purpose of this cooperative agreement is to use the biotechnological skills of the U.S. scientific community in collaboration with LDC scientists to develop new or improved vaccines for the control of anaplasmosis and babesiosis in the developing countries and to test these vaccines on a limited number of animals under contained conditions.

3. Specific Objective of the proposed Cooperative Agreement

The specific objective of this Cooperative Agreement is to provide financial assistance over a period of five years to stimulate and support the Recipient's R&D activities in the development and testing of new or improved genetically engineered vaccines for the prevention of anaplasomsis and babesiosis in livestock primarily through the use of vaccinia virus as the gene vector (although other appropriate vectors could be considered also). Through this assistance, it is expected that the Recipient will expand its resource

base in molecular biology and its research collaboration with U.S., LDC, and international institutions to decrease the incidence of animal losses due to disease. The assistance is intended to strengthen the resource base of the Recipient so that the Recipient may:

a. Accelerate the development of improved animal vaccines using biotechnology and testing of the vaccines developed under contained conditions;

b. Provide technical advice and assistance to LDCs in performing epidemiologic surveys, the use of biotechnology, and the testing of products resulting from biotechnology;

c. Undertake, or establish and supervise, early in the project (the second year is suggested) epidemiologic surveys as may be necessary in Latin America and the Caribbean, Africa, and Asia and Near East to determine the best geographic locations, ecological situations, and livestock populations for the realization of the vaccine field trials which are anticipated as a future extension of this Phase of the project. Such surveys should also seek economic data relative to losses due to anaplasmosis and babesiosis which will serve as a baseline for determining the economic impact of the use of improved vaccines.

   During the course of the epidemiologic work, a subproject should be established to determine the relationship, if any, in stable enzootic areas, between antibody titers in individual animals and the periodic occurrence of parasitemia and reduced packed cell volumes. The epidemiological surveys should be undertaken in collaboration with LDC institutions and should serve, in addition, as the first phase of training of personnel who might later assist with the field trials where these are undertaken.

d. Provide academic training at the Recipient institution, and technical training at the recipient institution and in LDCs through hands-on experience; and

e. Establish or strengthen and maintain an existing international network of scientists involved in molecular biology. A component, of such a network would be the production, selection, and distribution of publications and scientific journals to LDC scientists and institutions.

D. Implementation

The Recipient of the cooperative agreement will participate in, oversee, and monitor a complex program of research; train scientists at the graduate and postdoctoral levels, and provide technical in-service and on-the-job training; disseminate the research findings; establish or strengthen an existing network of scientists and institutions working in animal vaccines; and provide general technical assistance to LDCs.

It is essential that the Recipient not only have technical expertise in the area of biotechnology as applied to the development of animal vaccines, but also have demonstrated experience in research implementation and management in LDCs. Such experience is essential to maximize the efficiency and effectiveness of the project, to ensure that important linkages between project activities are developed and maintained, and to ensure that research and program support activities are coordinated with other organizations which are funding and conducting similar activities. Two activities which are funded by A.I.D. are shown below:

- A three-year research activity at a cost to S&T/AGR of $870,000 to develop a vaccine using the vaccinia virus as a vector to control rinderpest. It is being implemented under a cooperative agreement between the S&T/AGR and the University of California/Davis, School of Veterinary Medicine. Subcontracts will be signed with the Plum Island Animal Disease Center, California Biotechnology, Inc., and a research facility in a developing country; e.g., Kenya.

- An USAID funded research project in Zimbabwe to develop a vaccine to control heartwater - a disease which kills cattle, sheep and goats and currently costs Zimbabwe at least $6.0 million per annum to control by dipping. This project is funded under a cooperative program between the Veterinary Research Laboratory of Zimbabwe and the University of Florida.

The research group involved in this effort at the Recipient institution must demonstrate, on the basis of prior success (as indicated primarily by published work), its proficiency in these areas of research. It must be familiar with all U.S. and international regulations dealing with biotechnology and genetically engineered products.

The composition of the research group should ensure adequate expertise in the areas of microbiology and molecular biology, genetic engineering, immunology, biochemistry, and epidemiology, as related to veterinary science.

In order of decreasing priority (for the purpose of this research project) the diseases for which the described vaccine(s) is sought are Anaplasmosis and Babesiosis. The main thrust of this project is to utilize vaccinia virus as a living vector of the genes expressing those antigens which produce the broadest spectrum of heterologous immunity possible. The ideal vaccine will produce sterile immunity, even in enzootic areas, to these hemoparasitic diseases.

The aspiration to achieve sterile immunity is based in part on recent data (Palmer et al. 1986) which indicates that a specific immunogen (AM 105) isolated from a single strain of Anaplasma marginale cross-reacted with antibodies from other strains, was capable of producing resistance to clinical infection on challenge with the homologous strain, and, more importantly, appeared to prevent the carrier state in two of five vaccinated and challenged calves. James and Levy (1980) also reported sterile immunity to Babesia bovis following immunization with cell-free soluble antigens and needle challenge.

Denominating two diseases rather than only one anticipates the possibility in the event of undue delays in progress with a given disease, of proceeding on a contingency basis with work on the succeeding disease. It is not necessarily proposed initially that work proceed simultaneously on both diseases, although it is expected that vaccines will be developed and proven effective in contained trials for the named diseases during the course of the project.

The proposal presented by the Recipient must include sufficient detail in the research protocol to permit its evaluation by external reviewers.

In summary the scope of work which the Recipient institution is expected to undertake includes the following three (3) types of interrelated activities designed to strengthen its and developing countries' capabilities in the development and use of biotechnology (particularly vaccinia virus) in the following

areas: 1) development of safe and efficacious vaccines appropriate for use under conditions found in the developing world; 2) training of LDC scientists; and 3) networking and technology transfer.

1. Project Components

a. Research Activities will Include the following:

(1) Development or improvement of methods for propagating the etiologic agents in the laboratory.

(2) Development of DNA probes or other improved methods for quantifying antibody levels and hemoparasite persistence in host animals for both Anaplasma and Babesia.

(3) Identification of the antigen(s) which provides the strongest, most persistent, and complete immunity to each disease, the genes expressing these antigens, and the related nucleotide sequencing.

(4) Development of DNA probes and monoclonal antibodies as necessary for antigen and gene identification or isolation.

(5) Transfer of the antigen-expressing gene to vaccinia virus (or other vector)

(6) Field surveys and epidemiological studies conducted in LDCs during years 2 and 3 of the project to identify appropriate areas for the conduct of future field trials.

(7) Testing of developed vaccine(s) in U.S. laboratories and under contained conditions in the U.S. and LDCs.

(8) Develop, publish and disseminate journal articles covering research activities.

b. Training

Training programs in molecular biology and vaccine development and testing of varying intensity, duration, depth and emphasis will be designed and implemented at the Recipient institution and at LDC national and international institutions with the assistance of the Recipient's scientists.

The training program will include:

(1) Postdoctoral and/or graduate degree work in molecular biology. Three graduate degree or postdoctoral fellowships will be awarded annually - one from each region; i.e., Africa, Asia and Near East, and Latin America and the Caribbean.

(2) In-service and/or on-the-job training courses at the Recipient's and/or cooperating institution(s).

(3) Workshops/seminars, intensive short courses, field or U.S. internships, and collaborative specialization programs with universities or research institutions to foster the development of expertise among developing country scientists.

c. Networking and Technology Transfer

Early in the course of the project the Recipient will establish and maintain a network for information exchange on areas related to the work of the project with relevant scientific, development, and commercial institutions from developed and developing countries and regional and international organizations.

The network should be designed to accomplish the following:

(1) Bring to light as early as possible all new research techniques and advances which may hasten the development and utilization of biotechnology methods and products having the potential for resolving problems in livestock production.

(2) Serve as the basis for on-going transfer of technology so that, concomitantly with progress in the project, the project output becomes known and, to the degree possible, incorporated into the body of knowledge and research efforts of public and private institutions in order to enhance their research and to obviate the need to transfer [illegible] massive body of technology at the end of [illegible]

(3) Keep interested organizations and agencies informed and interested in the hope that they can and will assist in the extension effort and wide-scale utilization of any products arising from the project.

(4) Produce, selectively collect, and disseminate publications and scientific journals to LDC and international organizations.

(5) Hold meetings and workshops for scientists involved in molecular biology and animal vaccine research.

(6) Provide technical assistance to LDC institutions.

The design, development, and operation of this mation network will be the responsibility of cipient institution. Periodic meetings and kshops should be programmed as the need arises, her for dissemination of information or for the rch for solutions to problems impeding research ogress. It is anticipated that one international nd, at most, three regional and/or roblem-oriented meetings will be held annually.

contracts and Consultants

US Public and Private Institutions and Consultants

The Recipient will also identify the areas of research in which there is need for collaboration in the research work to be undertaken requiring subcontract(s) with U.S. public or private institutions and/or consultants. The proposed program shall describe in detail the qualification of the consultants and the U.S. institutions(s). The contribution(s) of the latter to achieve the objectives of the Cooperative Agreement must be indicated. Priority is to be given to minority and women-owned firms, historically Black colleges and universities and minority controlled private voluntary organizations (PVOs).

b. LDC National and International Institutions

Over the life of the Cooperative Agreement the Recipient will collaborate with at least three LDC institutions, one in each region (i.e., Africa, Asia and Near East, and Latin America and Caribbean) and may do this through subcontracts.

The Recipient will identify LDC institutions for collaboration in the research work to be undertaken and describe the proposed program in detail including research to be undertaken and staff to be provided.

The subcontracts or other contractual arrangements could provide for the following:

(1) Research on vaccine production;

(2) Epidemiological Surveys;

(3) Testing under contained conditions of vaccines produced;

(4) Training of technicians and scientists; and

(5) Regional responsibility for the functioning of the information network.

3. The countries and/or AID missions known to desire collaboration under this project are listed in the Table on page 10. This Table lists by country those LDCs with laboratory/containment facilities for testing: which have the capability for future field testing and are interested in epidemiology; where existing projects of complementary nature are being funded; and those desiring training for their scientists.

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY - PHASE II

ANAPLASMOSIS AND BABESIOSIS

Countries and/or AID Missions Known to Desire Collaboration with the Project

Country	Area of Capability or Interest							
	Laboratory/ containment testing		Epidemiology or field testing		Existing projects of complementary nature		Desire training for national	
	Yes	No	Yes	No	Yes	No	Yes	No
Asia & Near East								
Indonesia	x		x		x		x	
Jordan	x		x		x		x	
Morocco		x	x		x		x	
Pakistan	x		x		x		x	
Sri Lanka	x		x		x		x	
Thailand	x		x		x		x	
Africa								
Cameroon		x	x		x		x	
Gambia		x	x		x		x	
Ghana	x		x			x	x	
Madagascar	x		x		?		?	
Mauritania	?		x		x		?	
Somalia	x (being developed)		x		x		x	
Sudan	possibly		x		x		x	
Zimbabwe	x		x		x		x	
Latin America & Caribbean								
Belize		x		x		x	x	
Bolivia		x	x		x		x	
Costa Rica (CATIE)	?		probably		?		?	
Ecuador		x	x		x		x	
Honduras		x	x		x		?	
Mexico	x		x		x		x	
Panama		x	x		?		?	
Peru	x		x		x		x	

186

4. Technical Specialties Requested

The following list includes technical specialties and range of disciplines which are expected to be needed, in addition to key personnel, to implement the project. All specialties listed may not be used and some specialties obviously overlap. However, the Recipient's demonstrated ability to provide the specialties listed will be one basis for evaluation of proposals.

- Food Animal Veterinary Medicine, including Nutrition
- Therapeutics, Medicine, and Surgery
- Chemistry, Biochemistry, Molecular Biology
- Microbiology (Bacteriology, Virology, Mycology, Immunology and Vaccine Development)
- Pathology
- Epidemiology, including an economic component
- Neurology
- Genetic Engineering

E. Annual Work Plan

Within thirty (30) days from the effective date of the Cooperative Agreement, the Recipient will prepare and submit to the Office of Agriculture, Bureau for Science and Technology, (S&T/AGR) three (3) copies of a draft work plan which outlines the schedule of activities for the first year of the project. Based upon collaborative review, a final work plan will be agreed upon within thirty (30) days of the submission of the draft work plan.

A similar annual work plan, subject to the collaborative review process described above, shall be submitted sixty (60) days prior to the completion of each project year over the remaining four (4) years of the Cooperative Agreement, and will summarize progress to date and describe the activities anticipated to be accomplished during the next project year. Such work plans will include the field sites and be divided into separate project components identified under sections D.1. and 2. on pages 6 - 9 above. The work plan must make provision for complying with all relevant regulations dealing with biotechnology and genetically engineered biological products.

The annual work plan shall include the following information:

- A list of activities to be undertaken during the year, including testing at the various locations.
- A statement of how the activities relate to the outputs and research priorities.
- A projected beginning time frame for the activities to begin.
- A projected ending time frame for the completion of the activity.
- A projected expenditure of person-months of input for each activity.
- The projected stage of research at the end of the work plan or the projected outputs at the end of the work plan.
- Statement indicating the provisions for complying with all relevant regulations dealing with biotechnology and genetically engineered biological products.

F. Reports

1. Annual Technical Progress Reports - Within thirty (30) days after the completion of each project year, the Recipient will submit to S&T/AGR three (3) copies of an annual technical progress report, in a mutually-agreed-to format, which details the accomplishments of the preceding twelve (12) month period. A final report which analyzes the research findings and results of the entire project (the format and distribution of which will be collaboratively determined), will be prepared within sixty (60) days after the completion of the final project year. Each annual technical progress report will detail the accomplishments and progress of each field site or sub-contractor individually, as well as provide a consolidated account of project activities as a whole.

2. Travel Reports: Within thirty (30) days after the completion of each international trip authorized in writing by the A.I.D. project manager, the Recipient will submit three (3) copies of a report which summarizes the accomplishments of the trip to S&T/AGR.

Each travel report will contain, but not be limited to, the following information:

- Logistical information; i.e., type of activity, geographical area of activity, dates of TDY, and team composition;

- Objective of the TDY, including scope of work, as appropriate;

- Activities performed while on TDY;

- Summary of any technical reports resulting from the TDY;

- Summary of identifiable techniques or information which could be utilized in this project; and

- Summary of future potential needs of, or opportunities for, assistance to LDCs and missions, including possible networking potential.

3. Training Activities

a. The Recipient will complete A.I.D. Form 1381-4 for all A.I.D.-sponsored participants in training in the United States and in third countries. (See Appendix A - AID 1380-94 (4-77) Notice - Participant Training Notice for additional information.)

b. An annual summary training report will be submitted covering activities undertaken under and in conjunction with this project, including the numbers of trainees by gender, nationality, training site, type of training activity, duration and purpose of the training.

4. Technical and Research Reports for Publication:

Journal articles and other external publications are encouraged. Manuscripts should be submitted to S&T/AGR project manager prior to submission to a publisher as well as a copy of the resulting publications.

5. Annual Activity Reports: An annual activity report of the recipient's international activities will be prepared. These reports will also address regulatory issues related to the project. Although principally a technical document, it nevertheless must include pertinent statistics on quantitative information regarding the project, especially those activities described in Section D, 1, a, b, and c, pages 7 to 9 above. A minimum of five copies should be submitted to S&T/AGR Project Manager within 90 days of the end of each project year.

6. Annual Expenditure Reports: The recipient will submit an annual expenditure report by project line item and components; e.g., research, training, networking and technology transfer. The format will be collaboratively developed by the S&T/AGR project manager and the principal investigator at the recipient institution.

7. Quarterly Reports

Quarterly reports will be submitted thirty days after the end of each quarter. These reports will include, but not be limited to, a brief description of any program and budgetary deviations from the annual work plan, current status of the research and budget, and future activities to be undertaken during the next quarter.

G. Substantial Involvement Understanding

The Recipient of the Cooperative Agreement is to understand that substantial involvement by the Agency for International Development (A.I.D.), is anticipated. Participation and collaboration by A.I.D. is expected, in particular, as follows:

1. Work Plan - A.I.D. will be consulted during the development of the annual work plan and have the right of final approval of all areas of the work plan where A.I.D. resources are included.

2. Work Plan Revisions - A.I.D. will be consulted and have right of approval for revisions of the annual work plan which involves the use of A.I.D. resources.

3. Field Visits - A.I.D. will be involved in clearance of field visits to LDCs funded by S&T/AGR, other A.I.D./W Offices, and USAID overseas field missions.

140

4. Field Activities - A.I.D. will be involved in the selection of sites, methodologies and strategies to be used in field activities funded under this Agreement.

5. Consultants - A.I.D. will be involved in the selection of consultants hired by the Recipient of this Cooperative Agreement.

6. Participants - Where A.I.D. funds are used, the mission providing support or S&T/AGR will be involved in the selection of technical trainees or scientists for participation in training courses or graduate or postdoctoral training.

7. Principal Investigator - A.I.D. will approve the selection of the principal investigator and any alternate.

8. Subcontracts - A.I.D. will approve the terms of reference of the subcontracts issued under the Cooperative Agreement.

9. Compliance with Federal guidelines and Regulatory Procedures - The recipient will implement this research activity in accordance with:

   (a) The National Institutes of Health Guidelines for Research Involving Recombinant DNA Molecules;

   (b) Procedures issued by the USDA, EPA, or other appropriate Federal agency, regarding testing of genetically engineered organisms;

   (c) A.I.D.'s environmental procedures; and

   (d) Such other Federal guidelines and procedures as may apply during the course of research.

   Additionally, the cooperator cannot commence testing in any foreign location until written approval for such testing is obtained from A.I.D. and the Government of the country where testing is planned. Testing shall be conducted in accord with all applicable regulations of that country.

   In addition, however, and prior to commencement of any such testing, the cooperator shall make a judgement and communicate the same to A.I.D. as to whether the regulations, procedures and/or facilities of the country in question are adequate to ensure testing in an environmental sound manner. In the event such

judgement is that they are not, the cooperator and A.I.D. will consult and agree on the conditions to be applied to the testing which will have such environmental effect.

Reports submitted under this activity to A.I.D. will address regulatory issues as above related to the activity.

The above specific involvement is in addition to the normal program monitoring by A.I.D. project personnel of the Recipient's program and the other administrative requirements established by the Standard Terms and Conditions of Cooperative Agreements.

H. Level of Effort

In the proposal, the Recipient is to indicate the level of effort in person months per year which will be required to implement the project activity. The following format is to be used:

1. Project Staff and Subcontractors

Staff	Person-Months by Year 1	2	3	4	5	Total
Research Staff						
Senior Principal Investigator						
(List additional scientists to be funded under this Cooperative Agreement)						
Total Research Staff						
Staff Support						
(List all support staff who will be funded under the Cooperative Agreement)						
Total Staff Support						
Consultants						
Total Consultants						
Subcontractors						
Total Subcontractors						
Grand Total						

2. Level of Effort by Functional Area

Functional Area	A.I.D. Funding		Recipient Funding	
	Person months	Funding	Person Months	Funding
Research				
Training				
Networking				
Technical Information and Transfer				
Subcontract(s)				
Total Program				
Administrative				
Grand Total				

AVSECIII:8/25/86:Revised:04/08/87

AID 1380-94 (4-77)

DEPARTMENT OF STATE AGENCY FOR INTERNATIONAL DEVELOPMENT OFFICE OF INTERNATIONAL TRAINING	PARTICIPANT TRAINING NOTICE	
SUBJECT Participant Data Form (PDF)	REFERENCE HB 10, CHAP.	NOTICE NO. 86-8 5/16/86
	CANCELLATION DATE	Page 1 of 2 Pages
	SUPERSEDES Amends 84-3 dated 1/24/84	

Participant Data Form (PDF)

The increasing size of the A.I.D. Participant Training Program and the strong attention being given to it by Agency leadership and the U.S. Congress require sound record keeping to provide current and complete information on participants. Central and regional bureaus and A.I.D. Missions have all been directed to maintain current participant records and to provide correct participant documentation to the Office of International Training (S&T/IT) (Administrator's Cable to Mission Directors of May 22, 1985 and Memo to AA's on May 21, 1985).

Despite these directives, however, S&T/IT is experiencing considerable difficulty in maintaining accurate records in the Participant Training Information System (PTIS). In addition, enrollment of some participants in the Health and Accident Coverage (HAC) Program has been seriously delayed due to the late submission of the Participant Data Form (PDF) or because forms are submitted without all the required information.

It is imperative that the PDF (A.I.D. Form 1381-4) be completed for all A.I.D.-sponsored participants in training in the United States and in third countries. All items on the form are to be completed, including project and PIO/P numbers, except for those items designated "AID/S&T/IT Use Only" and "Codes" All PDF forms must be submitted within 30 days. If not submitted within that time frame, S&T/IT will take action to report contractors out of compliance with Agency regulations.

When a contractor or grantee is responsible for completing this form, the appropriate Mission or AID/W project officer must ensure that the contractor has all of the information required, including the project and PIO/P numbers. Data on the PDF are organized into four parts:

- Part One - For administrative data that are largely available from training documents received prior to the arrival of the participant for training.

- Part Two - Contains program data which should be available no later than the day the participant arrives in the United States or in a third country for training. Both the white and yellow copies of the PDF should be submitted as soon as sufficient information is available to complete Parts One and

Two, but in all cases within 30 days after the arrival of the participant. The white copy enrolls the participant in the Participant Training Information System (PTIS) which is the central repository for records of all A.I.D.-sponsored participants and must be submitted to:

Office of International Training (S&T/IT)
Statistical Unit
Agency for International Development
Washington, D.C. 20523

The yellow copy enrolls the participant in the Health and Accident Coverage (HAC) Program if the training is in the United States and must be submitted to:

AID Health & Accident Coverage (HAC)
Program
8720 Georgia Avenue
Silver Spring, Maryland 20910

In order to allow sufficient time to prepare the HAC enrollment I.D. card for presentation to the participant upon arrival in the United States, it is important that the participant be enrolled prior to arrival. (HAC is not available to participants trained in third countries.)

- Part Three - Reserved for program changes. A notation of the item being changed, such as Item 22, "Insurance Entitlement End Date," should be shown in the space to the left of Part Three. Changes must be submitted within 30 days of the event necessitating the change.

- Part Four - Termination/departure information which is crucial for the proper operation of the both the PTIS and the HAC program. Part Four of the PDF must be completed and submitted within 30 days of the completion and/or termination of the participant's program and departure. Periodic analysis of the PTIS reveals participants who are still in U.S. training long after the estimated completion date has passed. In some cases these participants have returned home but S&T/IT has not been informed, while in other cases their programs have been extended, but again, S&T/IT has not been informed. Apart from invalidating Agency statistics, erroneous status information can result in visa extension problems and nonpayment of HAC claims. Careful reporting will enable contractors to ensure accurate PTIS data and help avoid lengthy data justifications.

  Program changes and terminations on the blue copies of the PDF are to be submitted to both S&T/IT and the HAC Program Administrator. Please do not submit the PDFs to the A.I.D. Cashier's Office.

If there are any questions about these procedures, contact Judy McKeever in S&T/IT at (703) 235-1984.

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY

PHASE II - ANAPLASMOSIS AND BABESIOSIS

SECTION IV - COOPERATIVE AGREEMENT FORMAT

SECIVFOR:8/25/86:Revised 3/13/87

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY
PHASE II - ANAPLASMOSIS AND BABESIOSIS

SECTION IV -COOPERATIVE AGREEMENT FORMAT

_____
_____
_____
_____
_____
_____

Subject: Cooperative Agreement No. _____
Improved Animal Vaccines through Biotechnology
Phase II - Anaplasmosis and Babesiosis

Dear _____:

Pursuant to the authority contained in the Foreign Assistance Act of 1961, as amended, the Agency for International Development (hereinafter referred to as "A.I.D.") hereby provides to_____ (hereinafter referred to as "_____" or "Recipient") the sum of _____Dollars ($_____) in support of Phase II of a project "Improved Animal Vaccines through Biotechnology - Anaplasmosis and Babesiosis" as described in the Attachment 2 entitled "Program Description".

This Cooperative Agreement is effective and obligation is made as of the date of this letter and shall apply to commitments made by the Recipient in furtherance of program objectives through the estimated completion date of _____. Funds disbursed by A.I.D., but uncommitted by the Recipient at the expiration of this period shall be refunded to A.I.D.

The total estimated amount of the program is $_____, of which $_____ is hereby obligated. A.I.D. shall not be liable for reimbursing the Recipient for any costs in excess of the obligated amount. However, subject to the availability of funds, and program priorities at the time, A.I.D. may provide additional funds during the Cooperative Agreement period up to a maximum of $_____. It is anticipated that the obligated amount will be sufficient to fund the activities through _____.

This Cooperative Agreement is made to the Recipient on condition that the funds will be administered in accordance with the terms and conditions set forth in the Attachment 1, the Schedule; Attachment 2, the Program Description; and Attachment 3, the Standard Provisions, which have been agreed to by your organization.

Please acknowledge receipt and acceptance of this Cooperative Agreement by signing all copies of this Cover Letter, retain one set for your files, and return the remaining copies to this Office, being sure to return all copies marked "Funds Available".

Sincerely yours,

Jay M. Bergman
Agreement Officer
A/N Science and Technology Branch
A.I.D./W Projects Division
Office of Procurement

Attachments:

1. Schedule
2. Program Description
3. Standard Provisions

ACKNOWLEDGED:

_____

BY: _____

TYPED NAME: _____

TITLE: _____

FISCAL DATA

PIO/T No.:
Project No.:
Project Name:

Appropriation No.:
Allotment No.:
Budget Plan Code:

Total Estimated Amount: $
This Obligation: $

Technical Office
Funding Source:
E.I. No.:
DUNS No.:
LOC No.:

200

SCHEDULE

A. Purpose of Cooperative Agreement:

The purpose of this Cooperative Agreement is to provide support for Improved Animal Vaccines through Biotechnology, Phase II - Anaplasmosis and Babesiosis project, as more specifically described in Attachment 2 of this Agreement entitled "Program Description."

B. Period of Agreement:

1. The effective date of this Agreement is _____ and the estimated expiration date is _____ as shown in the Financial Plan below.

C. Amount of Agreement and Payment:

(For fully funded agreements use the following:)

1. A.I.D. hereby obligates the amount of $ _____ for the purpose of this Cooperative Agreement.

2. Payment shall be made to the Recipient in accordance with procedures set forth in Attachment 3 - Standard Provision No._____ entitled "Payment - _____.

- or -

(For partially or incrementally funded agreements use the following in lieu of the above:)

1. The total estimated amount of this agreement for the period shown in B. 1. above is $_____.

2. A.I.D. hereby obligates the amount of _____ for program expenditures during the period set forth in B.2 above and as shown in the Financial Plan below.

3. Payment shall be made to the Recipient in accordance with procedures set forth in Attachment 3 - Standard Provision No. _____ entitled "Payment - _____."

4. Additional funds up to the total amount of the Agreement shown in C.1. above may be obligated by A.I.D. subject to the availability of funds, program priorities at the time, and requirements of the Standard Provisions of the Agreement entitled "Revision of Financial Plans."

D. Financial Plan:

1. The following is the Financial Plan for this Agreement, including local cost financing items, if authorized. Revisions to this Plan shall be made in accordance with Standard Provision of this Agreement, entitled "Revision of Financial Plans".

2. Without the prior written approval of the A.I.D. Agreement Officer, the Recipient may not exceed the Grand Total set forth in the budget, nor may the Recipient adjust the costs for any individual line item by more than 15 percent of such line item.

3. Notwithstanding the effective date of this Cooperative Agreement, and subject to the Standard Provision entitled "Allowable Costs and Payment", costs incurred on or after _____ shall constitute allowable costs under this Cooperative Agreement.

E. Substantial Involvement Understanding

It is understood and agreed that A.I.D. will be involved in the following: approval of personnel and consultants, field visits and international travel, subgrant awards, workplans and sites, revision of workplans, participants selected for training, and compliance with guidelines of National Institutes of Health for research involving recombinant DNA molecules, Animal and Plant Health Inspection Service regarding testing of genetically engineered organisms, and other Federal Agencies as A.I.D. shall deem appropriate.

F. Reporting:

1. Financial Reporting

a. Financial reporting requirements shall be in accordance with the Standard Provision of this Agreement entitled " Payment - _____".

b. The original and two copies of all financial reports shall be submitted to A.I.D., Office of Financial Management, Program Accounting Division (FM/PAD), Washington, D. C. 20523. In addition, five copies of all financial reports shall be submitted to the Technical Office specified in the Cover Letter of this Agreement.

2. Program Performance Reporting

a. The Recipient shall submit semi-annual program performance reports, and a final report, which briefly presents the following information:

(1) A comparison of actual accomplishments with the goals established for the period, the findings of the investigator, or both. If the output of programs or projects can be readily quantified, such quantitative data should be related to cost data for computation of unit costs;

(2) Reasons why established goals were not met; and

(3) Other pertinent information including, when appropriate analysis and explanation of cost overruns or high unit costs.

b. Between the required performance reporting dates, events may occur that have significant impact upon the program. In such instances, the Recipient shall inform A.I.D. as soon as the following types of conditions become known:

(1) Problems, delays, or adverse conditions that will materially affect the ability to attain program objectives, prevent the meeting of time schedules and goals, or preclude the attainment of project work units by established time periods. This disclosure shall be accompanied by a statement of the action taken, or contemplated, and any A.I.D. assistance needed to resolve the situation.

(2) Favorable developments or events that enable time schedules to be met sooner than anticipated or more work units to be produced than originally projected.

c. If any performance review conducted by the Recipient discloses the need for change in the budget estimates in accordance with the criteria established in the Standard Provision of this Agreement entitled "Revision of Financial Plans", the Recipient shall submit a request for budget revision.

d. Five copies of each program performance report shall be submitted to the Technical Office specified in the Cover Letter of this Agreement.

3. Special Reports

The Recipient shall provide special reports as requested by the A.I.D. Agreement Officer, the A.I.D./W Project Officer _____, or the USAID/_____.

G. Overhead Rate:

Pursuant to the Standard Provision of this Cooperative Agreement entitled "Negotiated Overhead Rates - Nonproject Organizations Other than Educational Institutions", a rate or rates shall be established for each of the Recipient's accounting periods during the term of this Agreement. Pending establishment of final indirect cost rates for the initial period, provisional payments on account of allowable indirect costs shall be made on the basis of the following negotiated provisional rate applied to the base which is set forth below.

Type	From	TO	Rate	Location	Applicable to

H. Title to Property:

I. Authorized Geographic Code:

J. Special Provisions:

1. The Standard Provisions contained in Attachment 3 to this Agreement (Form AID 1420-52 (2-82) are modified as set forth in the November 1984 Attachment to A.I.D. Forms 1420-51, -52, -53, and -54, entitled "Alterations in Grant", which is attached hereto and made a part of this Agreement. References to "Grant" and "Grantee" in the Standard Provisions are hereby changed to "Cooperative Agreement" and "Recipient" respectively.

2. The following Standard Provisions set forth in Attachment 3 of this Agreement are deleted:

5. OMB Circular A-122 reserves the sections on bid and proposal costs and independent research and development costs. A.I.D. and the Recipient hereby agree upon the following treatment of these costs, pending such time as the Circular is amended to include them.

   (a) Bid and proposal (B&P) costs. B&P costs are the immediate costs of preparing bids, proposals, and applications for potential Federal and non-Federal grants, contracts and agreements. B&P costs incurred for the preparation of requests for specific projects and programs are acceptable for recovery as indirect costs. However, proposal costs incurred in the attempt to obtain unrestricted funds are to be treated as fund raising and must be included in the organization's direct cost base. These B&P costs do not include independent research and development costs which are covered by Attachment B, Paragraph 33, of OMB Circular A-122. (FPR 1-15.603.2.)

   (b) Independent Research and Development (R&D) costs are for R&D conducted by an organization which is not sponsored by Federal or non-Federal grants, contracts or other agreements. Independent R&D costs must be included in the organization's direct cost base for allocation of its proportionate share of indirect costs. The costs of independent R&D, including its proportionate share of indirect costs, are unallowable under A.I.D. agreements.

SECTION IV - Attachment 2

Program Description

The Program Description to be incorporated into the Cooperative Agreement shall include the Program Activities described in the technical portion of the Recipient's application.

S&T/AGR:SECIVFOR:Rev.8/08/86

Improved Animal Vaccines Through Biotechnology

Phase II

Anaplasmosis and Babesiosis

Project Number 936-4178

APPENDIX VIII - Glossary of Terms

S&T/AGR:10/31/86:Revised 3/12/87

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY
PHASE II: ANAPLASMOSIS AND BABESIOSIS

Glossary of Terms

Ambient Temperature	Unmodified environmental temperature
Anaplasmosis	Rickettsial disease
Antigen	Class of substance that stimulates production of antibodies
Babesiosis	Protozoal disease
DNA	Deoxyribonucleic Acid (Inside the nucleus of every cell are spiral molecules called DNA (Life))
Enzootic	Chronically present and active
Etiologic	The factor or agent which causes disease
Long-term Sterile Immunity	The ability to prevent the carrier state of the disease
Parasitemias	The presence of parasites in the blood or blood cells
Pathogen	Disease producing organism
Protozoal	One celled animals
Recrudesce	Break out or become active again
Rickettsial	Bacteria-like microorganisms of the genus <u>Rickettsia</u>, causing diseases in man and animals

IMPROVED ANIMAL VACCINES THROUGH BIOTECHNOLOGY
PHASE II: ANAPLASMOSIS AND BABESIOSIS

Glossary of Terms (continued)

Spp.	Species of plant or animal
Subunit Vaccine	A Vaccine which is composed of only the antigen or parts of the antigen which trigger the immune response. This is in contrast to a vaccine which is composed of the entire pathogenic organism
Titers	The amount of antibody present in the blood of animals which have been exposed to an antigen (immunogen).

S&T/AGR:10/24/86:Revised 3/12/87