AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS PART I

1. TRANSACTION CODE: C (A = ADD, C = CHANGE, D = DELETE)

PAF

2. DOCUMENT CODE: 5

3. COUNTRY ENTITY: TA/Bureau RDA 1

4. DOCUMENT REVISION NUMBER: PD-AAQ-861 [ ] AN 36173

5. PROJECT NUMBER (7 digits): 931-1156

6. BUREAU/OFFICE: A. SYMBOL: TAB; B. CODE: 08

7. PROJECT TITLE (Maximum 40 characters): Evaluation of Vampire Bat Control Program

8. PROJECT APPROVAL DECISION — ACTION TAKEN: [ ] A = APPROVED, D = DISAPPROVED, DE = DEAUTHORIZED

9. EST. PERIOD OF IMPLEMENTATION: YRS. 01 QTRS 1

10. APPROVED BUDGET AID APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C GRANT	PRIMARY TECH. CODE D LOAN	E. 1ST FY 78 F GRANT	E. 1ST FY 78 G LOAN	H. 2ND FY ___ I GRANT	H. 2ND FY ___ J. LOAN	K. 3RD FY ___ L GRANT	K. 3RD FY ___ M. LOAN
(1)				60					
(2)									
(3)									
(4)									
			TOTALS	60					

A. APPROPRIATION	N. 4TH FY ___ O. GRANT	N. 4TH FY ___ P. LOAN	Q. 5TH FY ___ R. GRANT	Q. 5TH FY ___ S. LOAN	LIFE OF PROJECT T. GRANT	LIFE OF PROJECT U. LOAN
(1)					60	
(2)						
(3)						
(4)						
TOTALS					60	

11. PROJECT FUNDING AUTHORIZED (ENTER APPROPRIATE CODE(S)) 1 - LIFE OF PROJECT; 2 - INCREMENTAL, LIFE OF PROJECT

	A. GRANT	B. LOAN
	1	

C. PROJECT FUNDING AUTHORIZED THRU FY 79

12. INITIAL PROJECT FUNDING ALLOTMENT REQUESTED ($000)

A. APPROPRIATION	B. ALLOTMENT REQUEST NO. ___ C. GRANT	D. LOAN
(1)		
(2)		
(3)		
(4)		
TOTALS		

13. FUNDS RESERVED FOR ALLOTMENT

TYPED NAME (Chief, SER/FM/FSD)

SIGNATURE

DATE

14. SOURCE/ORIGIN OF GOODS AND SERVICES: [ ] 000 [ ] 941 [ ] LOCAL [ ] OTHER ___

15. FOR AMENDMENTS, NATURE OF CHANGE PROPOSED

FOR PPC/PIAS USE ONLY	16. AUTHORIZING OFFICE SYMBOL	17. ACTION DATE MM DD YY	18. ACTION REFERENCE (Optional)	ACTION REFERENCE DATE MM DD YY

AID 1330-8 (7-76)

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

PART II

ENTITY: TA/Bureau

PROJECT: Evaluation of Vampire Bat Control Program

PROJECT NUMBER: 931-1156

I hereby authorize grant funds not to exceed $60,000 (evaluation and utilization) for an economic study to evaluate the results of the previous Vampire Bat Control Program. Special emphasis will be placed on the benefits to small farmers and to other livestock owners. This one time funding is a small activity from FY-1978 funds will cover a 15 month implementation period.

MS Belcher

Marjorie S. Belcher
Acting Assistant Administrator
for Technical Assistance

Date: NOV 11 1977

Clearance:

TA/AGR/ESP, K. Brundage KB
TA/AGR/ESP, W. Merrill W. Merr.
TA/AGR/LS, N. Raun NSR
TA/PPU, K. Milow KM
LA/DR, J. Balis JB

Proposed Evaluation of the Vampire Bat Control Program

Technical Assistancé Bureau
Office of Agriculture
Washington, D. C.
August 18, 1977

RELEVANCE OF PROPOSED WORK TO AID

Statement of the Problem

Vampire bats (Desmodus rotundus) as well as other pests (rodents, birds, etc.) adversely affect food supplies of LDC's by destroying or significantly reducing agricultural production capacity. Attempts to increase agricultural production capacity without adequate protection to both animals and humans from vampire bats, particularly those carrying the paralytic rabies, is a hopeless task. With that in mind, in 1967, AID negotiated a PASA agreement with the Denver Wildlife Research Center of the Bureau of Sport Fisheries and Wildlife (now the Fish and Wildlife Service) to initiate a program of developing alternative means of controlling vampire bats in LDC's. The need was obvious--to develop control methods that are safe, effective, economical, and adaptable to the social and economic conditions of the areas where such damage problem exists. For example, it has been estimated that livestock losses alone total one million head of cattle annually in Latin America due to spread of rabies by vampire bats, resulting in direct and indirect economic losses of $250 million annually (3, pp. 152-154).

Personnel of the Denver Wildlife Research Center have been involved in this program since 1968, working first in a laboratory setting in Palo Alto, Mexico, with Mexican government counterparts (co-workers) to develop treatment methods for livestock. After satisfactory topical treatments of the vampire bats and systemic treatments of the cattle with diphenadione as the selected anticoagulant drug were developed in Mexico, several LDC's were selected for field tests of these treatment processes.

The topical treatment involves using a mist net around the corral at night to capture the vampire bats and spread the anticoagulant paste on the backs of the bats before releasing them. The bats return to their nesting area (e.g., cave, well, hollow tree) and through the "grooming" process, other bats absorb the paste. Death is caused by hemmorhaging. Estimates are that one vampire bat treated topically will cause the death of 20 other bats in the cave.

The systemic or intra-ruminal injections method involves injecting the anticoagulant drug into the rumen of the bovine. The recommended rate is 1 mg of diphenadione per kilogram of weight of the animal or 2 ml/100 kg of Motomco Suspension Vampiracida Difenadiona. The anticoagulant is quickly absorbed into the bloodstream, but is not dangerous or harmful to the animal, as long as used in the recommended dosage. The dosage passes out of the system in 3 days. However, within that 72-hour period, if a vampire bat bites the bovine animal, fatal hemmorhaging occurs in the bat within 48 hours.

Nicaragua has been the international leader in implementing a vampire control program. In 1974, the Government of Nicaragua allocated $200,000 for personnel and administration costs, including initial outlays for four 4-wheel drive vehicles and chemical and veterinary supplies. A group of 20 men were trained to work in teams to assist in the vampire bat control program. The program has the full support of the Ministry of Agriculture and has been implemented on a nation-wide basis. The program has not moved as rapidly in other Latin American countries, but some teams have been trained and treatment programs initiated in Brazil (mainly the northeastern sector), Colombia (primarily in the States of Cesar, Guajira, and Sucre), in Mexico, Ecuador, Bolivia, Panama and Honduras, and the Island of Trinidad.

It is evident that much interest has been shown by developing countries in Central and South America in the techniques for controlling vampire bats. However to promote continuing support by the countries affected and to obtain the support of the international lending agencies it is important to obtain data on the social and economic effects of the project.

Background on Vampire Bats

Vampire bats (Desmondontidae) are the only family of bats which subsist solely on the blood of other vertebrates. In addition, they are vectors for the rabies virus. Desmodontidae live only in Latin America and consist of three genera: Desmodus, Diphylla, and Diaemus. The Desmodus rotundus species is the most abundant vampire bat in Mexico, and Central and South America. Its geographic range extends from the 27° parallel north latitude in northern Mexico along both coasts of that country and includes the hot and humid zones down to 33° parallel south latitude, extending along the Pacific Coast in Chile and on the Atlantic Coast in Uruguay and the extreme southeastern tip of Brazil (2, p.3)(Figure 1). The Desmodus rotundus bats feed either on livestock or birds, whereas the other two--Diphylla and Diaemus--feed almost entirely on the blood of birds.

Vampire bats prefer a relatively stable microclimate for all seasons of the year, with a relative humidity of 45 percent and a temperature around 22° C (72° F). However, they are found from sea level to 3,000 meters altitude. They live in the rock crevices, tunnels, caves, hollow trees, mines, abandoned houses and dry wells. Vampire bats primarily feed on cattle and horses, although they will attack poultry, hogs, and sheep also. The female of the species produces one offspring each year. The lifespan of the species is longer than 12 years.

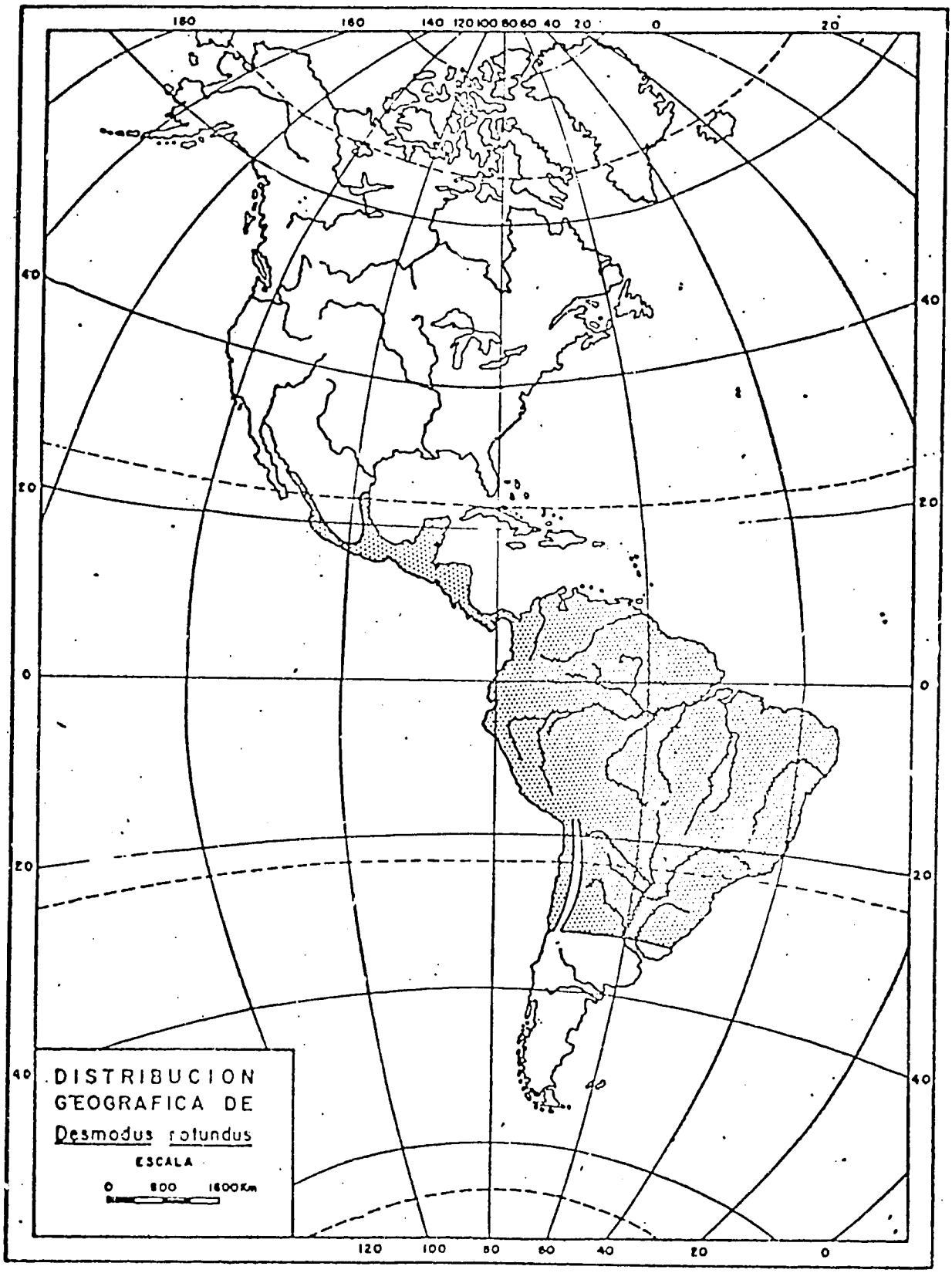

Figure 1: Shaded Area Represents Habitat of Desmodus rotundus Species of Vampire Bat in Central and South America.

Potential for Effective Utilization of Evaluation Study Results in Developing Countries and Suggested Extension Strategies

Currently there is some hesitation or foot-dragging by some of the Latin American countries in implementing a national effort to control vampire bats. Due to limited budgets, other priorities and lack of understanding as to the economic and social significance of both livestock and human losses, many of these government agencies have only addressed the vampire bat problem on a limited basis, primarily when there has been an outbreak of paralytic rabies causing heavy cattle losses.

Results and recommendations generated by this evaluation study should provide the impetus to elevate the vampire bat control program to a higher priority status. The two treatment methods have been proven to have high success rates in Nicaragua, Trinidad, and in parts of other countries. Thus, the primary hurdle is the actual employment and training of specialist teams, purchase of veterinary drugs and supplies, and providing transportation to enable these teams to provide more effective protection of both livestock and humans from vampire bats. Providing realistic information on the results of the evaluation study to local livestock groups through the extension programs of the Ministries of Agriculture and/or other Agricultural and Rural Development agencies should help emphasize the need for effective vampire bat control programs. This in turn likely would result in recognition of the economic and social importance by rural people and others, and a greater desire by local people to participate in the control program.

Developing Country Participation in Proposed Evaluation

Preliminary contacts with Ministry of Agriculture officials in Nicaragua indicate that the Government of Nicaragua and AID/Nicaragua officials would cooperate closely in the study. That country's government has had very favorable publicity and has gained a higher level of confidence among the livestock producers due to the program. Thus, they are willing to provide not only all available data on the program, but also office space and equipment support, secretarial assistance, and transportation support for the evaluation phase of this program.

Although no contacts have been made with the governments or AID missions of the other countries to be included in the evaluation, no difficulty is anticipated in obtaining the

cooperation and support of the Ministry of Agriculture officials and the Rural Development Office personnel of AID to obtain the data needed for evaluation purposes from those countries. Such contacts will be made as soon as this proposal is approved.

Preliminary Assessment of the Environmental Efforts

This evaluation and the likely results and recommendations resulting therefrom should have no adverse environmental effects, either long-term or short-term. Conversely, the evaluation itself and implementation of its recommendations should enhance the environment of the Latin American countries where the vampire bat is a predator of both livestock and humans. Thus, the economic viability of small livestock producers and the quality of life of both rural poor people and urban poor people should be improved by this evaluation project.

The vampire bat (Desmodus rotundus) species is the only bat species that sucks blood of livestock and humans for its diet. The Denver Wildlife Research Center, through contract with AID, has developed two species specific treatment methods using the anticoagulant, diphenadione. Both the topical method using the anticoagulant paste, and the intraruminal injection method on livestock using the anticoagulant drug, affect only those bats which feed on livestock.

Due to some misunderstanding based on an isolated incident in Costa Rica, the World Wildlife Fund passed a resolution at its December 1976 International Congress in San Francisco. The intent of that resolution on the "Use of Anticoagulant Chemicals to Control Vampire Bats" is to urge a ban on all topical methods of application of anticoagulant chemicals to control vampire bats. Evidently, the World Wildlife Fund is not familiar with the controlled treatment methods being employed by well-trained technicians in those countries where the vampire bat control program has been implemented.

As a minimum, this evaluation study should provide additional information on any possible adverse environmental effects of using the anticoagulant drug, diphenadione, for control of vampire bat populations in heavily infested areas of Latin America. It should also document known beneficial and adverse environmental effects, both on the natural environment, as well as on livestock and human populations.

Human Rights

More widespread implementation of the vampire bat control program throughout Latin America will benefit small livestock producers, and the urban and rural poor. The results of this proposed evaluation should help to educate even more LDC government officials, as well as local community leaders of the benefits of the vampire bat control program. If that happens, human rights of all people, not just the upper income classes, will be enhanced.

SCIENTIFIC ASPECTS OF PROPOSED WORK

Specific Objectives

1. Evaluate direct and indirect economic benefits, and the distribution of these benefits among various groups from the vampire bat control program.

2. Evaluate social, environmental, and quality of life impacts both before and after the Vampire bat control program was implemented in selected Latin American countries and the Island of Trinidad.

3. Evaluate effects on small livestock producers and others in rural areas who have not directly participated in the vampire bat control program.

4. Estimate a benefit-cost ratio of the vampire bat control program to date and extrapolate future benefits and costs, assuming the program is implemented nationwide in additional LA countries.

Rationale, Assumptions, Theories, and Hypotheses

The rationale for this study is that much of the physical data collected by those LDC government agencies involved in the vampire bat control program have not been analyzed and evaluated in an economic framework. Since there is no systematic method of reporting vampire bat bites on livestock, as well as on humans, in many of the countries involved, it has been difficult to obtain and analyze data on economic losses to producers as well as social and quality of life effects on humans in the vampire bat infected areas. It is the intent of this proposed evaluation to develop a systematic method of reporting, recording, analyzing, and evaluating such data.

The basic premise or assumption of this proposed evaluation is that the vampire bat control program has been effective in reducing livestock losses and in reducing adverse effects on human populations in those countries and/or parts of countries where the program has been implemented. What is not documented is the extent of the economic, social, environmental and quality of life effects of the control program, and the cost benefit in implementing the results of the research. It is the intent of this study to develop such estimates.

Literature Review

There has been no previous economic evaluation of the vampire bat control program. Neither has there been any thorough economic evaluation of the losses suffered due to vampire bats. Generally, the entire literature on bats in general, and vampire bats in specific, focuses on the physical and biological side of the problem and control program.

An UN/FAO survey team in 1966 studied the paralytic rabies problem in Latin America and indicated some of the human and livestock losses associated with vampire bats (1). A 1969 FAO report documents some of the paralytic rabies death losses associated with vampire bats (2,pp. 8-9). The 1966 FAO survey estimated that as many as one million head of cattle died annually in Latin America from rabies transmitted by vampire bats (3, p. 152). The direct economic losses (as of 1965) were estimated at more than $100 million. Adding indirect losses, including malnutrition, the annual total economic losses in Latin America were estimated to be $250 million (3, p. 154).

A more recent AID publication traces the history of vampire bat control methods and discusses the new chemical techniques for vampire bat control. That report also annotates the $250 million annual losses from paralytic rabies caused by vampire bat bites (4, p. 1).

Constatine documents some of the viruses and diseases, including foot and mouth disease and yellow fever, and rabies, which are transmitted by vampire bats (5, pp. 351-353). Humans have been infected by rabies from vampire bats. Persons infected with rabies by vampire bat bites develop a paralytic form of the disease as do cattle, horses, and other animals (5,p. 368). Obviously not all vampire bats carry the rabies virus. Many human , particularly children, have been bitten and fed upon by vampire bats during night time hours. In fact, some children have been fed upon on successive nights by the vampire bats. Although the individuals do not contract rabies, certainly the continued loss of blood, and the social and human welfare implications associated with vampire bat bites cause adverse consequences. Eighty-nine human deaths due to rabies caused by vampire bats were recorded in Trinidad during the period 1925-1937. Indications are this number was grossly underestimated. Five deaths were recorded in Argentina in 1965 (5, p. 373).

Gonzalez and Mitchell have discussed the vampire bat control program in Nicaragua and present physical data to show that an effective vampire bat control program using both the topical treatment of bats and the intrarument injection of cattle, has resulted in a greater than 90% reduction in bat bites (6, p. 256).

Thompson, Mitchell, and Burns presented some vampire bat treatment control information from three Mexican ranches, which showed a reduction of 93% in bat bites (7, p. 807).

Thomspon, Elias, and Mitchell reported on a study to determine the effects of vampire bat control on milk production. The treatment program resulted in a 16% increase in milk from a 28 cow herd in Nicaragua; however, milk production did not significantly change in a 58 cow dairy herd in Ecuador. Indications are that the herd in Ecuador had a higher level of sanitation and other good management practices in effect, with a higher level of milk production before the treatment program, than did the dairy operation in Nicaragua (8).

Other information on control methods and treatment programs is presented in the series of Annual Reports published by the Denver Wildlife Research Center in cooperation with AID and the Ministry of Agriculture of the participating countries. However, the major emphasis of these reports are the technical aspects of the program and little or no economic information is presented (9).

Piccinini has obtained voluminous data on vampire bat treatment programs in northeastern Brazil and has run various types of regression analyses and statistical tests (Sign, t, Z, Chi-Square, and F) to show the effectiveness of these control programs. His analysis indicated a 99.4% reduction in numbers of vampire bats 2 years after the control program was implemented (10, p. 3). Again, this publication presents no economic results.

General Experimental Design

Sampling and Interview Procedures

A geographically stratified random sample of 120 livestock producers will be selected in two major cattle regions in Nicaragua. Sixty of these producers will be personally interviewed in the Boaca-Chontales Region in the central highlands and 60 producers will be interviewed in the Managua-Masaya-Carazo-Granada-Rivas Region along the Pacific Coast.

Sixty of the personal interviews will be with small producers, those having less than 10 head of cattle, and 60 of the personal interviews will be with large producers, those having more than 100 head of cattle.

Twenty of the interviews with livestock producers in each region (10 small and 10 large producers) will be with those who have not participated in the vampire bat control program, but who may have received indirect benefits from their neighbor's participation in the program. A summary table indicating the number of personal interviews to be taken is shown below:

	In Vampire Bat Treatment Program		Not in Vampire Bat Treatment Program		Total
	Pacific Coast	Central Highlands	Pacific Coast	Central Highlands	
Small (<10 head)	20	20	10	10	60
Large (>100 head)	20	20	10	10	60
Totals	40	40	20	20	120

One sample of livestock producers to be interviewed will be randomly selected from the list of names and addresses of those who have participated in the vampire bat control program administered by the Ministry of Agriculture in Nicaragua. The Ministry maintains these lists by Department (State) and by month and year of visit. The number of cattle examined and number treated are recorded for each farm.

The second sample of non-vampire bat control program livestock producers to be interviewed will be randomly selected from a list developed through visits with extension agents of the Ministry of Agriculture, the National Agricultural Bank, and through contacts with mayors and other leaders of the communities in the two regions. One difficulty which must be overcome is that some of the producers on this second sample list will be those who refused to participate in the vampire bat control program for various reasons--lack of confidence in the treatment process, fear of losing cattle due to the treatment, and possibly for cultural or other attitudinal reasons. It may be that some of these producers may not wish to be interviewed about the indirect effects of the vampire bat control program on their operation.

Two different questionnaires or survey forms will need to be developed: one (Survey Form A) for those producers who have participated in the program, and the other (Survey Form B) for those producers who have not participated in the program. Survey Form A will have questions oriented at getting at adverse effects of vampire bat bites on cattle and other livestock (horses, pigs) including death losses due to paralytic rabies. Information on gain rates, birth rates, extraction rates and cattle market values would be useful for analysis purposes, if such data can be obtained. Related impacts, such as effect on value of hide due to punctures, bat bites on humans, and the quality of life aspects (fear of bats) will be obtained. Improvements or changes in the above parameters after treatment will also be obtained for both the short run (30 days after treatment to 2 years) and the long run (2 years or more after treatment). At least some of these producers became involved in the treatment program in 1974.

Survey Form B will have questions structured to get at any indirect effects on the nonparticipating producers. Some of these effects will depend on the proximity of their farms to those farms which have participated in the vampire bat control program. Similar questions on extraction rates, gain rates, cattle market values, hide values, physical and quality of life effects on humans will also be included in the survey form.

The Survey Form A will be structured so that a comparison can be made between those farms where the following treatments occurred: (1) vampire bats were captured and treated; (2) cattle were examined and injected; and (3) vampire bats were captured and treated and the cattle were given the systemic injection. For producers interviewed on Survey Form B, an analysis will be made between the proximity of their farm to those treatment farms for each of the above three treatments, assuming sufficient data can be obtained for such analysis.

The personal interviews will be taken during the dry season in Nicaragua, which is from December until early June. If the proposal is approved for funding, the questionnaires will be developed and field tested, probably in early January 1978, with the producer interviews being done in February and March 1978. Three or four Nicaraguan University students will be hired and trained to do the interviewing. They will work under the supervision of the in-country national assistant and the U.S. graduate student who will also be located in-country. The principal investigator also will do some of the personal interviews.

Obtaining of Other Information

Data will be obtained from Ministries of Agriculture in other countries and the Island of Trinidad. Personal visits will be made with extension specialists in vampire bat-infested areas, and with the specialist team personnel who are involved in the treatment programs.

Data on human bat bites and rabies deaths also will be obtained, if available, in each of these countries. Data on hide values and effect of vampire bat punctures on hide values will be obtained.

An attempt will be made to obtain additional information on the effects of the vampire bat control program on dairy herds, specifically on milk production. If possible, experiments will be undertaken on milk production involving weighing the milk before and after treatment of the dairy cattle in vampire bat-infested areas.

The phased plan of work is presented as an appendix to this proposal.

Specific Research Methodologies and Techniques

Much of the research methodology, i.e., experimental design and data collection, has been discussed in the previous section. Specifically, visits will be made to Denver, to AID/Washington, to the AID Missions

in selected Latin American countries, and to the Ministries of Agriculture in those countries to obtain both R & D costs and program implementation costs. These costs will include all technical assistance costs for U.S. and other direct-hire personnel, laboratory costs, costs to train teams of specialists, salaries, transportation costs, and costs of veterinary drugs and supplies needed to implement the program.

Data from the personal interviews as well as from other sources (e.g., government statistics, slaughterhouse data, dairy processing plant data, AID file data, and reports of previous studies) will be obtained on livestock extraction rates, slaughter weights, milk production by dairy herd, hide values, and related information.

Visits will be made to the National Ministries of Health as well as to clinics and hospitals in those areas of vampire bat infestation to obtain data on human bat bites and cases of paralytic rabies among humans. Agricultural extension specialists and other knowledgable individuals (University agricultural faculty members, mayors of towns, recognized leaders in small communities, etc.) will be contacted to obtain economic, social, and environmental quality information relating to both vampire bats and the vampire bat control program.

Data on livestock treatment programs will be analyzed by use of linear and multiple regression analyses. Statistical tests (t, F, and Chi-Square) will be utilized to determine if the vampire bat treatment program has had significant effects on the welfare of the local people.

Market values and other economic data will be used to evaluate the effects of the program. Using all available economic variables, a benefit-cost analysis technique will be used to develop a B/C ratio of the effect of the vampire bat control program.

Social, environmental, and quality of life effects will be categorized and described. Qualitative measures will be used as measurement variables where quantitative data are not available.

LITERATURE CITED

1. United Nations Development Program, "Report of the Preparatory Mission to Latin America," DP/SF/310/Mex 16, March 14, 1966.

2. FAO, Report to the Government of Brazil on the Ecology of Vampire Bats and their Relationship to Paralytic Rabies, Report to the Government of Brazil, FAO No. TA 2656, Rome 1969.

3. Centro Pan Americano de Zoonosis, Primer Seminario Internacional Sobre Rabia Para Las Americas. Scientific Publication No. 169, published by World Health Organization, Washington, D.C., 1967.

4. AID, Controlling Vampire Bats, Technical Series Bulletin No. 9, Agricultural Technology for Developing Countries, Office of Agriculture, Technical Assistance Bureau, AID, Washington, D.C., August 1973.

5. Constantine, Denny G., "Bats in Relation to the Health, Welfare, and Economy of Man," Chapter 7 in Biology of Bats, Volume II, edited by William A. Wimsatt, Academic Press, New York, 1970.

6. Gonzales, Rodrigo and G. Clay Mitchell, "Vampire Bat Programs in Latin America," published in Proceedings of the 7th Vertebrate Pest Control Conference, University of California, Davis, 1976.

7. Thompson, R. Dan, G. Clay Mitchell, and Richard J. Burns, "Vampire Bat Control by Systemic Treatment of Livestock with an Anticoagulant," published in Science, publication of the American Association for the Advancement of Science, Volume 177, pp. 806-808, 1 September 1972.

8. Thompson, R. Daniel, Donald J. Elias, and G. Clay Mitchell, "Effects of Vampire Bat Control on Bovine Milk Production," to be published in Journal of Wildlife Management, October 1977 issue.

9. Denver Wildlife Research Center, Vampire Bats: Rabies Transmission and Livestock Production in Latin America, series of Annual Reports from 1969 through 1975, published by Fish and Wildlife Service, U.S. Department of the Interior, Denver, Colorado.

10. Piccinini, Rogerio Serrao, "The Use of Diphenadione (2-diphenylacetyl-1,3 indandione) for Vampire Bat Control in Endemic Rabies Areas, Northeastern Brazil," unpublished M.S. Thesis, Department of Epidemiology and Preventive Medicine, University of California, Davis, June 1977.

Evaluation of Vampire Bat Control Program
Budget Estimate
(October 1, 1977 - December 31, 1978)

1. Personnel		$30,000
2. Travel and Per Diem		17,000
3. In-Country Interviews		6,000
4. Other Direct Costs		7,000
	Total	$60,000

TIME SCHEDULE FOR EVALUATION PROJECT

October 1, 1977	Initiate project.
October - December 1977	Review of literature. Contact AID Missions and host country governments in countries involved. Contact AID and Denver Wildlife Research Center personnel to obtain vampire bat project cost data. Visit Ministry of Agriculture officials in Nicaragua to arrange for office space, secretarial support, and transportation support. Arrange for Nicaraguan resident or citizen to be in-country assistant for secondary data collection and analysis. Obtain secondary data in Nicaragua. Arrange for U.S. graduate student, fluent in Spanish, to locate in Nicaragua for 6 months, beginning January 1978.
January - March 1978	U.S. graduate student establish office in Nicaragua. Develop personal interview questionnaires and draw sample of livestock producers. Field test questionnaire. Hire and train up to four in-country interviewers. Take up to 120 personal interviews with small and large livestock producers in two regions in Nicaragua. Personal visits with Ministry of Agriculture and National Agricultural Bank extension specialists throughout Nicaragua to obtain social and economic information on vampire bat program. Obtain data from Ministry of Health in Nicaragua on bat bites of humans.
April - June 1978	Statistical and economic analyses of secondary and primary data from Nicaragua. Trips to other countries selected (Brazil, Colombia, Bolivia, Panama, Ecuador, Trinidad, Mexico, and Honduras) to visit Ministry of Agriculture and AID officials on vampire bat program. Obtain data on cattle examined and treated and post-treatment results. Obtain social and quality of life data, if available.

TIME SCHEDULE FOR EVALUATION PROJECT (cont'd)

July - September 1978	Write draft of evaluation report. Continue obtaining data from new vampire bat control programs underway in 1978 in other Latin American countries. Analyze those data and incorporate into report.
September 30, 1978	Submission of review draft of report to AID.
October - December 1978	Review and comments by AID personnel, Denver Wildlife Research Center personnel, and others. Present seminar in AID/Washington if requested. Make revisions and preparation of final report.
December 31, 1978	Submit final report to AID.

AID 1-150-1X (7-71)

PIO/T

DEPARTMENT OF STATE
AGENCY FOR
INTERNATIONAL DEVELOPMENT

PROJECT IMPLEMENTATION ORDER/TECHNICAL SERVICES

1. Cooperating Country: TAB

2. PIO/T No. 931-1156.11-3188970

3. [X] Original or Amendment No. ____

4. Project/Activity No. and Title: Evaluation of Vampire Bat Control Program

DISTRIBUTION

5. Appropriation Symbol: 72-11 81021.3

6.A. Allotment Symbol and Charge: 843-31-099-00-20-81

6.B. Funds Allotted to: [X] A.I.D./W [ ] Mission

7. Obligation Status: [ ] Administrative Reservation [ ] Implementing Document

8. Funding Period (Mo., Day, Yr.): From 12/1/77 To 3/1/79

9.A. Services to Start (Mo., Day, Yr.): Between 10/1/77 and 12/31/77

9.B. Completion date of Services (Mo., Day, Yr.): 3/1/79

10.A. Type of Action: [X] A.I.D. Contract [ ] Cooperating Country Contract [ ] Participating Agency Service Agreement [ ] Other

10.B. Authorized Agent

Estimated Financing $1.00=		(1) Previous Total	(2) Increase	(3) Decrease	(4) Total to Date
11. Maximum A.I.D. Financing	A. Dollars	–	60,000	–	60,000
	B. U.S.-Owned Local Currency				
12. Cooperating Country Contributions	A. Counterpart				
	B. Other				

FUNDS RESERVED BY [illegible] 11-15-77

POSTED SER/FM/CSD

13. Mission References

14. Instructions to Authorized Agent

The Contract Office is authorized to prepare a 15 month contract with Oklahoma State University to provide the services specified in this PIO/T. This PIO/T provides funding for the full contract period, for this evaluation project.

Detailed scope of work and budget breakout is contained in Appendix "A"

"Article # Voucher Identification. In each instance of voucher (SF1034) submission made by the contractor for payment hereunder, the following identification data will appear on the face (cont. p. 6)

15. Clearances – Show Office Symbol, Signature and Date for all Necessary Clearances.

A. The specifications in the scope of work are technically adequate
TA/AGR/ESP, W.Merrill [illegible] Date 8/24/77
TA/AGR/LD, N.Raun [illegible] Date 8/24/77

B. Funds for the services requested are available
TA/PPU, M.Mozynski [illegible] Date 11/14/77

C. The scope of work lies within the purview of the initiating and approved Agency Programs
TA/AGR, L.Hesser [illegible] Date 8/24/77

D. TA/PPU M. Croit [illegible] 4-Nov 77
TA/PPU, J. Durman [illegible] 8/31 Date

E.
TA/AGR, D.Clark [illegible] Date 8/24/77
TA/AGR, K.Brundage [illegible] Date 8/24/77

F.
LA/DR, J.Balis [illegible] Date

16. For the cooperating country: The terms and conditions set forth herein are hereby agreed to

Signature and date:

Title:

17. For the Agency for International Development
Signature: Kenneth Milow
Title: Chief, TA/PPU Program Division

18. Date of Signature: 11/14/77

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SCOPE OF WORK

19. Scope of Technical Services

A. Objective for which the Technical Services are to be Used Determine the economic, social, environmental and quality-of-life benefits of the TAB assisted Vampire Bats Control Program as related to AID, LDC, and livestock producer costs.

B. Description

Since 1967, AID has funded a program with the Denver Fish and Wildlife Service to develo Vampire Bat Control Methods that are safe, effective, economical and adaptable to the social and economic conditions throughout Latin America where Vampire bats transmit paralytic rabies to both humans and animals. Topical and systemic treatment processes have been developed & field tested in several Central and South american countries. Although various technical evaluations have been completed for the project no evaluation of the actual and potential economic and social effects of the project has been carried out. Contractor will document through secondary data and primary data collection and analysis, the extent of the economic, social, environmental and quality-of-life benefits of the Vampire Bat Control Program in terms of: 1) AID research and development costs, 2) LDC program implementation costs, 3) benefit to the economies of participating LDC's, and 4) costs and benefits to Large and Small livestock producers, as well as benefits to the rural population in general in terms of economic and social well-being.

(Cont. p. 4)

C. Technicians

(1) (a) Number	(b) Specialized Field	(c) Grade and/or Salary	(d) Duration of Assignment (Man-Months)
1	Senior agricultural Economist		4 MM
1	Junior agricultural Economist		6 MM
Various	Statistical laboratory personnel		4 MM
1	Field Research associate (local hire)		6 MM
4	Field interviewers (local hire)		8 MM

(2) Duty Post and Duration of Technicians' Services

Stillwater, Oklahoma with TDY's to latin american countries with bat control programs, to Denver and Washington, D.C.

(3) Language requirements

Spanish for certain technicians as agreed by AID Manager.

(4) Access to Classified Information

None

(5) Dependents ☐ Will ☒ Will Not Be Permitted to Accompany Technician

D. Financing of Technical Services see budget, page 14 of attachment

(1) By AID - $ 60,000 (2) By Cooperating Country –

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20. Equipment and Supplies *(Related to the services described in Block 19 and to be procured outside the Cooperating Country by the supplier of these services)*

A. (1) Quantity (2) Description	(3) Estimated Cost	(4) Special Instructions
Office Materials and Supplies	$ 500	

B. Financing of Equipment and Supplies

(1) By AID – $ 500 (2) By Cooperating Country –

21. Special Provisions

☐ A. This PIO/T is subject to AID (contracting) (PASA implementation) regulations.

☐ B. Except as specifically authorized by AID, or when local hire is authorized under the terms of a contract with a U.S. Supplier, services authorized under this PIO/T must be obtained from U.S. sources.

☐ C. Except as specifically authorized by AID/W, the purchase of commodities authorized under this PIO/T will be limited to the U.S. under Geographic Code 000.

☒ D. Other *(specify)*: prior to making any visits to LDC's, the contractor will review his plans with TA/AGR. He will keep AID missions in countries to be visited fully informed of proposed visits, ask them to provide any advice they wish regarding timing & content of visits and to participate if they desire, and will inform the mission of the outcomes of consultations. He will make his own appointment and logistics arrangements directly. Upon completion of any project funded travel, a copy of the trip report will be provided to the TA/AGR Project Manager. Hire of local personnel is permissable. Also contractor will obtain prior clearance from interested Regional Bureaus and USAIDs to be visited.

22. Reports by Contractor or Participating Agency *(Indicate type, content and format of reports required, including language to be used if other than English, frequency or timing of reports, and any special requirements)*

Final evaluation report in addition to administrative reports required by contract. Contractor shall submit copies as follows:

1. TA/AGR/ESP:25 copies
2. TA/PPU/EUI: 3 copies
3. Such reports shall include a title page showing the title of the report, project title as set forth in this contract and the contract number. One copy of each report shall be clearly typed or printed on white paper so it may be photographed to produce a micro film master. Technical reports shall be accompanied by an-author-prepared abstract.

The contractor will include, as part of the final report, recommendations regarding data requirements, generation techniques, and evaluative methodologies needed for analysis of socio-economic costs/benefits which should be considered for incorporation in the design of similar agricultural intervention projects. Such recommendations should provide a basis for assessing costs/benefits and if necessary modification of the project design during implementation of future activities.

Periodic progress reports following field work as noted in block 19.

23. Background Information *(Additional information useful to Authorized Agent and Prospective Contractors or Participating Agency; if necessary cross reference Block 19.C(4) above.)*

Proposal for Evaluation of Vampire Bat Control Program (attached) and the estimated budget therein.

24. Relationship of Contractor or Participating Agency to Cooperating Country and to AID

A. Relationships and Responsibilities A TA/AGR/ESP staff member will be designated to serve as the AID activity manager in accord with normal AID procedures.

B. Cooperating Country Liaison Official Oklahoma State University: James Osborne, Head, Dept of Economics, Stillwater, Oklahoma.

C. AID Liaison Officials Chief, TA/AGR/ESP, Chief TA/AGR/LD and/or Director, TA/AGR.

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LOGISTIC SUPPORT

25. Provisions for Logistic Support

A. Specific Items *(Insert "X" in applicable column at right. If entry needs qualification, insert asterisk and explain below in C. "Comments")*

	IN KIND SUPPLIED BY		FROM LOCAL CURRENCY SUPPLIED BY		TO BE PROVIDED OR ARRANGED BY SUPPLIER
	AID	COOPERATING COUNTRY	AID	COOPERATING COUNTRY	
(1) Office Space					X
(2) Office Equipment					X
(3) Housing and Utilities					X
(4) Furniture					X
(5) Household Equipment *(Stoves, Refrig., etc.)*					X
(6) Transportation in Cooperating Country					X
(7) Transportation To and From Country					X
(8) Interpreter Services/Secretarial					X
(9) Medical Facilities					X
(10) Vehicles (official)					X
(11) Travel Arrangements/Tickets					X
Other: (specify) (12)					
(13)					
(14)					
(15)					

B. Additional Facilities Available From Other Sources

NONE

☐ APO ☐ PX ☐ COMMISSARY

☐ OTHER (specify, e.g., duty free entry, tax exemption)

C. Comments

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		1. Cooperating County TAB	2.a. Code No. 931-1156.11-3188970
FORM SYMBOL	TITLE OF FORM	2.b. Effective Date	2.c. [X] Original OR Amendment No:
	PIO/T	3. Project/Activity No. and Title	

Indicate block numbers.

Use this form to complete the information required in any block of a PIO or PA/PR form.

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The evaluation will include a stratified random sample of 120 livestock producers in Nicaragua, 50% to be small producers (under 10 head of cattle). A part of the sample will be producers that have not participated directly in the Vampire Bat treatment Program. Data also will be obtained from official government sources in other countries that have participated in the program and from informal interviews with extension agents and personnel implementing the control programs in the various countries. Countries to be visited may include, but are not limited to, Nicaragua, Brazil, Panama, Ecuador, Colombia, Bolivia, Mexico and Trinidad. Particular consideration will be given to: (a) Trinidad, where base line studies have been kept on alternate methods of bat eradication costing up to $10 per bat have been kept since the 1930's; (b) Brazil, where controlled trials have reduced cattle deaths in specified areas from 10 per thousand head to less than 1 per thousand; (c) Mexico, which has had an active control program since 1973; and (d) Honduras where the contractor already has operations which can gather comparative data with little additional cost. Visits also will be made to the Denver Fish and Wildlife Service and to Washington, D.C. to interview personnel involved in implementing the program. A progress report will be made to A.I.D. following the completion of field work.

The time schedule for the Evaluation and an estimated budget are included as part of the attached evaluation proposal. Also, additional detail of the evaluation is included in the attached proposal.

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of the voucher: Contract: AID/ta
Project 931-1156.11
Project Office TAB/AGR

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