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PD-AAF-105-B1
122p

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C. 20523

LAC REGIONAL

PROJECT PAPER

REDUCTION OF VERTEBRATE PEST CROP LOSSES

LAC/DR:79-16

Project Number:598-0584

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT PAPER FACESHEET

1. TRANSACTION CODE: [ ] A ADD, C CHANGE, D DELETE

PP

2. DOCUMENT CODE: 3

3. COUNTRY/ENTITY: LAC Regional

4. DOCUMENT REVISION NUMBER: [ ]

5. PROJECT NUMBER (7 digits): 598-0584

6. BUREAU/OFFICE: A. SYMBOL: LAC; B. CODE: 3

7. PROJECT TITLE (Maximum 40 characters): Reduction of Vertebrate Pest Crop Losses

8. ESTIMATED FY OF PROJECT COMPLETION: FY 83

9. ESTIMATED DATE OF OBLIGATION: A. INITIAL FY 79; B. QUARTER 3 (Enter 1, 2, 3, or 4); C. FINAL FY 81

10. ESTIMATED COSTS ($000 OR EQUIVALENT $1 =)

A. FUNDING SOURCE	FIRST FY B. FX	FIRST FY C. L/C	FIRST FY D. TOTAL	LIFE OF PROJECT E. FX	LIFE OF PROJECT F. L/C	LIFE OF PROJECT G. TOTAL
AID APPROPRIATED TOTAL						
(GRANT)	(310)	(–)	(310)	(750)	(100)	(850)
(LOAN)	( )	( )	( )	( )	( )	( )
OTHER U.S. 1.						
OTHER U.S. 2.						
HOST COUNTRY					135	135
OTHER DONOR(S)						
TOTALS	310	–	310	750	235	985

11. PROPOSED BUDGET APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. GRANT	PRIMARY TECH. CODE D. LOAN	E. 1ST FY 79 F. GRANT	E. 1ST FY 79 G. LOAN	H. 2ND FY 80 GRANT	H. 2ND FY 80 J. LOAN	K. 3RD FY 81 L. GRANT	K. 3RD FY 81 M. LOAN
(1) F14	100	000		310		–		540	
(2)									
(3)									
(4)									
TOTALS				310		–		540	

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)					850	
(2)						
(3)						
(4)						
TOTALS					850	

12. IN DEPTH EVALUATION SCHEDULED: MM 01 YY 81

13. DATA CHANGE INDICATOR. WERE CHANGES MADE IN THE PID FACESHEET DATA BLOCKS 12, 13, 14, OR 15 OR IN PRP FACESHEET DATA BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET

2 1 NO 2 YES

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE: John Balis

TITLE: John Balis, Chief
Rural Development Division
Office of Development Resources

DATE SIGNED: MM 05 DD 30 YY 79

15. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM 06 DD 01 YY 79

AID 1330-4 (3-78)

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT IDENTIFICATION DOCUMENT FACESHEET

TO BE COMPLETED BY ORIGINATING OFFICE

1. TRANSACTION CODE ("X" appropriate box): [X] Original [ ] Change [ ] Add [ ] Delete

PID — DOCUMENT CODE 1

2. COUNTRY/ENTITY: Latin America - Regional

3. DOCUMENT REVISION NUMBER:

4. PROJECT NUMBER: 598-0584

5. BUREAU: a. Symbol: LA; b. Code: 3

6. PROPOSED NEXT DOCUMENT: a. [X] PRP [ ] PP b. DATE mo. 11 yr. 77

7. PROJECT TITLE - SHORT (stay within brackets): Reduction of Vertebrate Pest Crop Losses

8. ESTIMATED FY OF AUTHORIZATION/OBLIGATION: a. INITIAL FY 79 b. FINAL FY 79

9. ESTIMATED COST (life of project) ($000 or equivalent, $1 =)

FUNDING SOURCE	AMOUNT
a. AID APPROPRIATED	799
b. OTHER U.S.	
c. HOST GOVERNMENT	
d. OTHER DONORS	
TOTAL	799

10. ESTIMATED COSTS AID APPROPRIATED FUNDS ($000)

a. Appropriation (Alpha Code)	b. Primary Purpose Code	c. Primary Tech. Code	First Year FY d. Grant	First Year FY e. Loan	All Years f. Grant	All Years g. Loan	11. Other U.S. Funding Source	Prior Years	All Years
FN	100S	000	799		799				
		Total	799		799		Total		

12. Sector Purpose Codes: 024 | 029 | 070 | 080 | 098

13. Special Concerns Codes: BR | BS | EQTY | ENV | TNG

14. Supporting Purpose Code: 200S

15. Project Goal (stay within brackets):

To increase farm gate income for the farmer while reducing the incidence and risk of serious crop losses and to reduce agricultural commodity costs for the consumer.

16. Purpose:

To develop technologies which may be used by participating countries to reduce crop losses by rodents and other vertebrate pests both prior to harvest and during post harvest maintenance on small farms.

17. Planning Resources Requirements:

AID and contract staff travel: $10,000

18. Approved: Signature

Title: Associate Assistant Administrator LAC/DR

Date Signed: mo. day yr.

19. Disapproved: AID/W, or Field Mission Director, Date of Disapproval: mo. day yr.

AID 1330-2 (1-78)

AUG 16 1979

ACTION MEMORANDUM FOR THE ASSISTANT ADMINISTRATOR (LAC)

FROM: LAC/DR, Marshall D. Brown

Problem: Authorization of LAC Regional Reduction of Vertebrate Pest Crop Losses Grant for $850,000; FY 79 obligation is $310,000.

Discussion: The purpose of the project is to develop cost effective technologies which can be used by LAC countries to reduce farm crop losses caused by rodents and birds. The project will establish a vertebrate pest control field unit in Haiti which will engage in research for the adaptation and development of vertebrate pest management techniques in response to national and small farmers needs and perform limited extension and outreach activities for introducing control practices. The field unit will be established in Haiti to serve Haiti and the Dominican Republic and will be accessible to other countries in the Caribbean. At the end of the project a capability will exist in Haiti and the Dominican Republic for identifying and evaluating vertebrate pest losses and for designing and implementing control programs.

The Grantee will be the Denver Wildlife Research Center (DWRC) of the U.S. Department of Interior under a PASA with A.I.D. The total cost of the four year project is $850,000 which will finance one long-term specialist ($226,300); support costs for one field unit ($113,400) including a vehicle; training ($69,400), research analysis related to field testing at Denver ($255,200); and DWRC overhead costs and contingencies ($185,700). The Governments of Haiti and the Dominican Republic will contribute $97,000 and $38,000, respectively, for laboratory, office space, counterpart personnel assigned to the project, and in-country training costs.

The DAEC reviewed and approved the project on June 21, 1979, with the following modifications to the Project and PP: (1) reduction in the number of field units from two to one and reduction in Life of Project funding from $1,200,000 to $850,000; (2) addition of a condition precedent to disbursement for activities for other than long-term technical assistance which requires the signing of memoranda of understanding between the DWRC and the GOH and the GODR, respectively, describing host country financial contribution and responsibilities under the project, the DWRC activities and responsibilities, and the project monitoring responsibilities of each USAID; (3) addition of a section which describes the current state of the art regarding vertebrate pest control techniques and estimated costs of each applied technology when they have been calculated; (4) addition of benefit/cost calculations of rodent control programs based on data from the Philippine experience; (5) evaluation of DWRC's institutional capability to implement the project; (6) inclusion of scopes of work for the short and long-term technical assistance advisors; and (7) addition of a detailed equipment and vehicle list.

The Initial Environmental Examination recommending a Negative Determination was approved on April 12, 1979. The Project is included in the FY 79 Congressional Presentation for $599,000.

Recommendation: That you sign the attached Project Authorization and Request for Allotment of Funds (PAF), thereby authorizing AID/W to negotiate a PASA with the Denver Wildlife Research Center of the Department of the Interior.

Attachments: TAB A - PAF

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

ASSISTANT ADMINISTRATOR

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

Name of Country : LAC Regional

Name of Project : Reduction of Vertebrate Pest Crop Losses

Number of Project: 598-0584

Pursuant to Part I, Chapter 1, Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the use of not to exceed Three Hundred Ten Thousand United States Dollars ($310,000) (the "Authorized Amount") to help in financing certain foreign exchange and local currency costs of goods and services required for the project described in the immediately following sentence. The project consists of the establishment by the Denver Wildlife Research Center of the U.S. Department of Interior ("DWRC") of a vertebrate pest control field unit in Haiti which will engage in research for the adaptation and development of vertebrate pest management techniques in response to national and small farmer needs and will perform extension and outreach activities for dissemination of control practices in Haiti and the Dominican Republic (the "Project").

I approve the total level of AID appropriated funding planned for the Project of not to exceed Eight Hundred Fifty Thousand United States Dollars ($850,000), including the Authorized Amount, during the period FY 1979 through FY 1982. I approve further increments during that period of funding up to $540,000, subject to the availability of funds in accordance with AID allotment procedures.

I hereby authorize the initiation of negotiation and execution of the appropriate documents by the officers to whom such authority has been delegated in accordance with AID regulations and Delegations of Authority, subject to the following essential terms, covenants and major conditions, together with such other terms and conditions as AID may deem appropriate.

A. Source and Origin of Goods and Services

Except for ocean shipping, goods and services financed by AID under the Project shall have their source and origin in the United States or in Haiti or the Dominican Republic, except as AID may otherwise agree in writing. Ocean shipping financed by AID under the Project shall be procured in the United States, except as AID may otherwise agree in writing.

B. Condition Precedent to Disbursement for Other Than Long-Term Technical Assistance

Prior to any disbursement, or to the issuance of any commitment documents under the obligating agreement to finance activities other than long-term technical assistance, DWRC shall, except as AID may otherwise agree in writing, furnish AID, in form and substance satisfactory to AID, copies of signed memoranda of understanding among DWRC, the Governments of Haiti and the Dominican Republic, respectively, and the AID Mission in each such country, setting forth the financial contribution and other responsibilities of each such Government, the activities and responsibilities of DWRC and the Project monitoring responsibilities of each such AID Mission.

Assistant Administrator
Bureau for Latin America and
the Caribbean

8/16/79
Date

Clearances:
GC/LAC:J. Kessler JK/JK date 8/16/79
LAC/DR:N. Parker _____ date _____
LAC/DR:L. Armstrong _____ date _____
LAC/DR:M. Brown _____ date 8/16/79

GC/LAC:GMWilber:pc:8/15/79:x29182

LATIN AMERICA/CARIBBEAN REGIONAL

REDUCTION OF VERTEBRATE PEST CROP LOSSES

PROJECT PAPER

Table of Contents

Page

PART 1. SUMMARY AND RECOMMENDATIONS

A. Facesheet Data 1

B. Recommendations. 1

C. Description of the Project 1

D. Summary Findings 3

E. Project Issues 3

PART 2. PROJECT BACKGROUND AND DETAILED DESCRIPTION

A. Background 4

1. Estimates of Agricultural Crop Losses. 4

2. Present Level of Existing Technology 7

B. Detailed Description 11

1. Introduction 11

2. Technical Assistance 11

3. Training 14

4. Facilities/Field Sites 16

5. Commodities. 17

6. Project Activities 18

7. Project Inputs 19

8. Project Outputs. 20

9. End-of-Project Statement 20

Page

PART 3. PROJECT ANALYSIS

A. Technical Analysis Including Environmental Assessment. 22

1. Background 22

2. Technical Analysis 23

3. Proposed Approach. 25

4. Environmental Assessment 25

B. Financial Analysis and Plan. 26

1. Financial Rate of Return/Viability 26

2. Recurrent Budget Analysis of Implementing Agencies 26

3. Financial Plan/Budget Tables 26

C. Social Soundness Analysis. 30

D. Economic Analysis. 30

PART 4. IMPLEMENTATION ARRANGEMENTS

A. Administrative Arrangements. 33

1. Recipient Countries and Beneficiaries. 33

2. AID. 34

B. Implementation Plan. 34

1. Timetable for Project Implementation 34

2. Disbursement and Procurement Programs. 34

3. Monitoring and Reporting Agreements. 34

C. Evaluation Plan. 35

D. Conditions, Covenants, and Negotiating Status. 35

ANNEXES

ANNEX A - Checklist of Statutory Criteria

ANNEX B - Project Issues

ANNEX C - Activities Chart

ANNEX D - Initial Environmental Examination

ANNEX E - Social Soundness Analysis

ANNEX F - Mission Request and Correspondence

ANNEX G - Scope of Services

ANNEX H - Commodities

ANNEX I - Logical Framework

LATIN AMERICAN CARIBBEAN REGIONAL PROJECT

REDUCTION OF VERTEBRATE PEST CROP LOSSES

PROJECT PAPER

PART 1. SUMMARY AND RECOMMENDATIONS

A. Facesheet

B. Recommendation

1. It is recommended that a four-year project be authorized for vertebrate pest control in the amount not to exceed $850,000 to finance dollar and local currency costs of establishing a field unit in the LAC region. This unit will test and perfect technologies which can be used by LAC countries to reduce crop losses caused by rodents and birds.

2. Project funds will be obligated by a PASA with the Denver Wildlife Research Center (DWRC) of the U.S. Department of Interior to finance long and short-term technical assistance, commodities, training and support services. Participating countries will provide laboratory field and office facilities, and assign counterpart personnel as appropriate.

OBLIGATIONS

	FY 79	FY 80	FY 81	FY 82	TOTAL
AID	$310	$ -	$540	$ -	$850,000

C. Description of the Project

Goal: Improve the standard of living in agricultural areas of participating countries by increases in income and crop productivity.

Purpose: Test and adapt technologies which can be used by participating countries to reduce crop losses caused by rodents and birds.

The project will establish a vertebrate pest control field unit which will engage in research for the adaptation and development of vertebrate pest management techniques in response to national and small farmer needs, and perform limited extension and outreach activities for introducing control practices. The field unit will be established in Haiti to serve Haiti and the Dominican Republic, and will be accessible to other countries in the Caribbean.

Many pest control packages perfected at the Rodent Research Center in the Philippines, can, with appropriate modification, be tested and used in similar agro-climatic areas of the Caribbean region. With access to these earlier research efforts, participating countries in this project will be able to supply relevant and economically feasible practices with minimal upfront basic research.

The field unit will have funds for technical assistance, commodities, training, operations and maintenance. The project budget includes a contingency fund and inflation allowance. Technical assistance includes a long-term technician, short-term consultants, and research support. The unit will have a local staff of field biologist, outreach technicians, and support personnel. Programs for training will include specialized short and long-term training in the U.S. for selected participating country staff. In-country programs will consist of on-the-job training, workshops and seminars for appropriate research and outreach personnel.

The participating countries will provide laboratory and office space, and counterpart personnel. Funds will be provided to adequately equip the facilities with essential laboratory and field equipment to support vertebrate pest research, outreach activities, conduct training seminars and workshops, and program operations. Technical assistance will be provided by a PASA agreement with the Denver Wildlife Research Center (DWRC).

The project training seminar/workshops will be co-sponsored by the participating countries, the USAID/DWRC program, and as appropriate, other international organizations.

Operation and maintenance of the vertebrate pest components within the Ministry of Agriclture will be the responsibility of participating governments.

Outputs expected at the end of the project include:

1) A functionsl field unit to address vertebrate pest control problems and institutional capacity within participating countries to effectively adapt and implement appropriate vertebrate pest control technologies to indigenous conditions.

2) Trained personnel in participating countries actively conducting vertebrate pest research and/or outreach programs utilizing recommended packages of improved technology.

3) Workshops/seminars/on-the-job training programs involving specialists and farmers in the testing of effective control programs.

4) Establishment of active vertebrate pest programs within participating host country agencies which incorporate funds within operating budgets for financing selected activities.

5) Information and results disseminated to all interested countries in the LAC region as well as within participating countries.

Achievement of the project purpose will be indicated by the following end-of-project conditions:

1. Assessment of the incidence and magnitude of losses due to vertebrate pests; and the identification of control technology consistent with this assessment and the particular characteristics of each country (Haiti and Dominican Republic);

2. Creation of an in-country capability in both countries for accurate damage determination, and a capacity to formulate and implement control programs in response to identified problems; and

3. Establishment of a mechanism for disseminating results and recommendations evolving from the project to countries with analogous vertebrate pest problems, or in response to specific requests.

D. Summary Findings

The Project Committee has reviewed the technical, economic, social and financial aspects of the proposed project.

The design, as proposed, is appropriate to achieve the purpose of the project and to make full and efficient use of available resources. The approach is well-suited for vertebrate pest management and maintains a balance of research and practical application of control technology. Direct environmental impacts from the project component are judged to be none or minimal, and the indirect effects are judged to have little or no adverse environmental impacts. The financial plan is designed to address the needs of the project and adequate to obtain the required outputs and achieve project purpose.

The project meets all applicable statutory criteria which are shown in Annex A.

E. Project Issues

Several issues were identified during the AID/W review of the Project Identification Paper (PID). These issues have been addressed and appended hereto as Annex B.

PART 2. PROJECT BACKGROUND AND DETAILED DESCRIPTION

A. Background

1. Estimates of Agricultural Crop Losses 1/

Large portions of the Caribbean and Central and South America are included among those areas of the world which suffer from chronic food shortages. The reasons for this are many, but certainly one important factor is food loss to crop pests. Discussions with agricultural personnel, literature reviews and firsthand observations indicate that depredation of crops by vertebrate pests occur throughout the Central America/Caribbean region and reducing agricultural production and food availability.

Various approaches to increasing production on land already under cultivation appear to have major influences on agricultural vertebrate pest problems. Irrigation, which allows year-round planting in areas formerly dependent upon seasonal rainfall, results in changes of farming practices as well as changes in the behavior of rodent and bird populations. Elimination of the natural scheduling of planting season, coupled with the availability of high-yielding, fast-growing crop varieties, results in a diversified system with crops of different ages in close proximity. Development of canals and impoundments creates additional, favorable habitat for vertebrate pests.

Efforts to increase agricultural production throughout Central America/Caribbean area have involved environmental changes which also influence the type and degree of vertebrate damage problems. A principal means to increase production is to bring new land under cultivation by clearing forest, scrub, or marsh areas. Rodent population eruptions are often associated with such habitat disturbances and new farmers on marginal lands may suffer serious losses during the critical first years of cultivation. Chronic losses may be further accentuated when rodents move from adjacent uncultivated lands to exploit newly available food sources.

1/ A detailed summary of the nature and extent of crop losses to vertebrate pests in Latin America is available in a report entitled "Vertebrate Pests and Latin American Agriculture" by D.J. Elias (Denver Wildlife Research Center), September 1977.

Damage by birds is often more dramatic than that by rodents because of the vast numbers of individuals involved, the relatively short time-span in which damage occurs, and because birds are much more visible than rodents. Grain sorghum, corn, and rice are the crops most frequently damaged by birds. Other crops attacked include wheat, soybeans, cacao, and various fruits. Bird damage occurs primarily in standing crops, but losses in emergent and stored grains are also frequent. Birds often roost in and around storage sites and contaminate the stores.

At present, the extent of pre- and post-harvest crop losses due to vertebrate pests in Central America and the Caribbean is based on estimates by agricultural technicians rather than specific damage surveys. Although the data available are not precise, they imply a problem of sufficient magnitude to elicit concern among agricultural planners and professionals. Estimates of probable annual losses for selected crops in 1976 and 1977 are presented in the following table.

ESTIMATED LOSSES IN SELECTED CROPS DUE TO VERTEBRATE PEST DAMAGE IN C.A. AND THE CARIBBEAN

Percent Pre- and Post Harvest Losses (%)

Country	Crops	Rodents	Birds	Value of Loss $Millions b/
Belize e/	Rice	7	n.a.	.15
C. Rica c/	S. Cane	10	n.a.	4.85
	Rice	20	n.a.	7.80
	Beans	10	n.a.	.66
	Corn	20	n.a.	2.68
Dom. Rep. d/	Rice	7	8	9.70 d/
	Corn	5	4	.60
	Cacao	8	4	10.20 d/
	Grapes c/	n.a.	70	n.a.
Guatemala d/	Corn	10	n.a.	16.63
	Potatoes	10	n.a.	.15
	Cacao	--------20--------		.40
	Vegetables	--------10--------		1.98
Jamaica d/	Cacao	--------10--------		.40
	Stored Food	8	n.a.	n.a.
Honduras e/	Corn	10	n.a.	8.29
Mexico e/	S. Cane	10	n.a.	6.82
Nicaragua e/	Rice	15	n.a.	2.02
C. America e/	Corn	20	n.a.	82.28
Haiti f/	Rice	7	8	3.81
	Corn	5	4	2.95
	Cacao	8	4	1.10

n.a. - not available

a/ When a range was indicated to describe the loss, the lower value was used

b/ Production and value of crop based on information from FAO Yearbooks of Production and Trade, 1977.

c/ DWRC Trip Report for Feb./Mar., 1978 to Paraguay, Dominican Republic and Jamaica.

d/ DWRC Trip Report May/June, 1978 to Guatemala, Dominican Republic and Jamaica.

e/ DWRC, Vertebrate Pests in Latin America, September 1977.

f/ Due to the absence of data, the loss rate is assumed equal to that of the Dominican Republic. Actual rates, especially for post-harvest loss, are probably higher in Haiti.

In Hispaniola, both rodents and birds cause extensive losses in small farm agriculture. Major problems in Haiti involve damage to rice by the rodents, Rattus rattus and Rattus Norvegicus, and damage to rice by the village weaverbird, known locally as "Madame Saga". Rodents and birds also damage corn, sorghum, legumes, and cacao, although damage patterns and species involved are not well defined. As noted above, the Dominican Republic probably loses $20 million annually to rodents and birds in rice, cacao, and corn; and in Haiti the loss would probably be a minimum of $8,000,000.

A basic problem encountered by countries in the Central American and Caribbean area is an absence of personnel trained or experienced in the specialized fields of vertebrate pest research and management. Without these capabilities the countries cannot systematically describe problems, evaluate suitable control agents, judge relative effectiveness of control methodologies, or determine other factors relevant to vertebrate damage situations in major staple crops. Consequently, current control recommendations are generally untested and often unsuitable, especially for the specific needs, pests, crops, field conditions, and cultural practices of the small farmer.

With research and management capabilities individual countries could not only assess their losses and the effectiveness of current control recommendations, but also develop and test new control strategies tailored to their specific needs with the potential for greatly reducing losses and, thus, increasing yield and income.

2. Present Level of Existing Technology

In many developing countries, low agricultural production is only partially the cause of deficit food supplies. Large quantities of food are lost through destruction or contamination by vertebrates, including rodents, granivorous birds and vampire bats. Efforts to reduce food losses must begin with quantitative assessments of the problem, yet, magnitudes are difficult to estimate because losses occur at all levels along the food chain. Once the incidence and extent of natural losses are determined, programs can be designed to counter the causative agents, and must be technically, economically, and socially consistent with regional conditions. Investments will not be made in loss reduction unless there is a reasonable return, either in income, security or quality of life.

Since 1967, the U.S. Agency for International Development (A.I.D.) has funded programs at the Denver Wildlife Research Center (DWRC) to address problems related to controlling vertebrate pest damage to agricultural crops. This pioneering activity has the ultimate aim of perfecting safe, effective, and economical control measures which are suitable and practical for the traditional farm sector of the lesser developed countries.

In many areas of the world, rodent damage to field crops causes severe reduction of human food supply and increases the risks of small farm agriculture. Locally, rodents may visably be the principal factor reducing food supplies. More often, however, they unobtrusively remove an import share of the annual production before and after harvest.

Losses to birds are less well documented than those to rodents. Various species of parrots, parakeets, weavers, blackbirds, seedeaters and waterfowl are among the types of birds known to cause significant damage to agricultural crops. Because of the sporadic wide range and unpredictable flight patterns of these bird species, loss data is more difficult to assess and the tecniques to obtain such information is considerably more complex than those used for rodents.

The A.I.D. centrally funded project with Denver Wildlife Research Center (DWRC) has put its principal focus on research specializing in such fields as toxicology, animal behavior, physiology, bioelectronics, chemistry and economics/statistics. This research at DWRC incorporates field testing and evaluation of differing biological, chemical and physical control techniques. Species, crop, farming methods, environmental factors and a host of other considerations may influence the approach to problem solving. Under the A.I.D. centrally funded project the DWRC uses facilities at Los Banos, Philippines for field research in rodents, and at Khartoum, Sudan for birds.

In the past five years, several countries have entered into bilateral or regional arrangements with DWRC to establish vertebrate control programs. By utilizing the results of the earlier research efforts, and in turn perfecting control strategies through applied and adaptive research and field testing, participating host country institutions are more effective in addressing their specific concerns. Training has become and important component of those initiatives. Bangladesh, the Philippines, Sudan and Indonesia are examples of countries embarking on systematic rodent and bird control measures utilizing DWRC research and technical services. This project represents a first initiative in the Caribbean region.

Based on the research findings at the DWRC and the field research centers in the Philippines and Sudan, several control techniques have evolved. However, a central difficulty in the broad application of vertebrate pest control technology has been the tendency to ascribe minor importance to variations in species and environmental conditions, and to attempt introduction into areas in which different species, crops, and environmental factors are found. On-site testing with the purpose of identifying necessary modifications in control techniques is requisite to a successful program. This affords excellent opportunities for training of local specialists and outreach personnel who will ultimately bear the responsibility for designing and directing national vertebrate pest control programs. Having access to the knowledge gained from these basic research efforts will greatly hasten the design and institutionalization of country vertebrate pest control activities, and enable technicians to advocate relevant and economically feasible practices with a minimum of upfront research.

As a result of the A.I.D. centrally funded project with DWRC, a number of methods and techniques exist which are ready for country specific application. In varying degrees, these basic research findings have ranged from three to eight years in development before recommendations could be made for on-site use. Examples of research perfected by DWRC which can be used immediately in country programs include:

- Radiotelemetry equipment for small rodents and birds:

  Latin American pest species are in size range to permit use of existing miniature equipment and attachments.

- Tracking tile method of rodent activity assessment:

  The technique of using inked floor tiles to determine rodent activity in relation to crop development or to evaluate control methods was developed in the Philippines.

- Capture and marking techniques for rodents and birds:

  Trapping and netting techniques are suitable for pest birds and rodents on Caribbean islands and for some species in Central and South America. Several chemical and physical techniques can be used without adaptation.

- Damage assessment methods:

  Previously developed methods for assessing rodent damage to rice, corn, and coconuts and bird damage to corn and sorghum are suitable for direct use in experimental evaluations in the Caribbean and possibly other areas in Latin America.

- Rodenticide concentration:

  The appropriate dosage levels for numerous economical rodenticides have been determined for Rattus rattus, the major rodent pest in the Caribbean.

- Evaluation of candidate toxicants and repellents for rodents and birds:

  Standard techniques have been developed for preliminary evaluation of candidate chemicals.

The following represent techniques which have been developed at laboratory and field research sites but require appropriate testing for local application:

- **Chemical bird repellent.**

  The repellent methiocarb has broad application in protecting emergent and ripening small-grain crops, but formulations effective on local species must be developed and economically feasible methods of use determined.

- Sustained baiting with chronic toxicants for rodent control in rice, corn and coconuts.

  Suitable methods have been developed in the Philippines and may be suitable for direct use in the Caribbean. Efficacy and economic feasibility must be determined and pilot implementation programs must be evaluated.

- Fright-inducing agent for bird control:

  A fright-inducing chemical, 4-aminopyridine, can effectively cause bird flocks to leave crop fields when as few as 1% of the birds consume bait. Efficacy on Latin American bird pest species must be determined.

- National assessment of vertebrate pest damage to field crops:

  Although methods of damage assessment have been developed for several major crops grown in Latin America, national surveys will require use of sampling designs suited to production practices in each country.

- Rodent trapping for population assessment or laboratory study:

  Certain species of rodent pests in Latin America, particularly gophers, damage small-farm crops in the tropical highlands. Special efforts to adapt suitable trapping techniques will be required.

Food conservation by reducing losses due to vertebrate pests can be achieved through problem identification, training, information, and adapted cost-effective technology based on sound research findings with local institutions. Practices must be utilized on a sustained basis, and be subject to continued refinement in response to new findings and information. This project seeks to initiate this effort in the Caribbean area by testing and perfecting packages of technologies which can ultimately be integrated into national programs.

B. Detailed Description

1. Introduction

This project is intended to address problems related to the reduction of damage by vertebrate pests with special attention placed on crops important to small farmers, who suffer disproportionately more from vertebrate pest incurred losses than any other segment of the farm sector. The major effects of the project will be the training of host government specialists and establishment of appropriate applied research and demonstration programs for vertebrate pest management. The establishment of this capability and the indentification of applicable technologies will be accelerated through cooperations with major external research organizations having expertise in the field, such as the Philippine National Crop Protection Center (NCPC), United Nations (FAO), Panamerican Health Organization (PAHO), and other international agencies.

Emphasis will be placed on observing damage situations and evaluating control practices in farmers' fields rather than on experiment station plots. This focus will lead to a better understanding of the actual needs of farmers, provide a nucleus for problem solving in specific pest situations, and avoid involvement with tangentially related research activities. The basic approach for development of effective vertebrate control methods by DWRC has been successful in reducing pest damage in the United States and other countries, and given the serious nature of vertebrate pest losses on small farms in the LAC region, it is expected that a major reduction of vertebrate pest damage can be achieved.

Locating the field unit in Haiti is suited for this particular adaptive research project because of the number of small farmers involved. The previous experiences of DWRC personnel in other countries with similar crops, pests and farming practices will be extended and adapted under Caribbean conditions. The project will include techinical assistance, training, commodities, conferences and other appropriate activities for vertebrate pest management. A detailed, time-phase chart of planned activities is presented in Annex C.

2. Technical Assistance

Technical assistance will be provided through a PASA contract with the Denver Wildlife Research Center (DWRC). This includes long-term services of a consulate with expertise in vertebrate pest management to be stationed in Haiti for the development of the field unit. Additionally, there will be several person-months of short-term consultants, provided for by DWRC, with specialized expertise such as research planning and evaluation, biometrics, pharmacology/toxicology, vertebrate behavior and physiology, chemical residue analysis, electronics (biotelemetry, remote sensing), and dissemenation techniques to assist the resident technician at the field unit.

The resident technician collaborating with participating country personnel will:

(a) Acquire an in-depth knowledge of vertebrate pest situations throughout his assigned region;

b) Determine adaptive research priorities which will lead to simple, effective, safe, and economically beneficial systems for management of vertebrate pests;

c) Design and conduct studies essential to the development of suitable control procedures. This includes pest population dynamics, food habits, and behavior of pest species as related to the development, evaluation, and safety of existing and proposed new control approaches;

d) Determine distribution and extent of vertebrate pest damage in major small-farm crops as affected by various factors (cropping patterns, growing season, environmental conditions, and cultural practices of the farmers);

e) Develop census techniques to determine relative populations of vertebrate pests before and after application of experimental control procedures;

f) Evaluate traditional control approaches of local farmers for effectiveness, economic benefit, and human and environmental safety;

g) Plan and conduct laboratory and field studies as required for development of vertebrate control methods (including the capture or procurement of animals for research purposes);

h) Plan and conduct field studies designed to evaluate control procedures involving such approaches as chemical agents, mechanical devices, and habitat manipulation as means of alleviating vertebrate damage;

i) Participate in the planning and presentation of training programs designed to establish an indigenous capability in the area of vertebrate damage control;

j) Design and initiate an interim control plan for priority problems identified in each participating country;

k) Participate in scientific meetings as appropriate to confer or present papers in his specialty field, and carry on technical correspondence with cooperators;

l) Participate in the formulation of long-term control planning and strategy.

Short-term DWRC consultants will assist specific activities as needed. Although some flexibility is required, the following needs based on prior experiences can generally be anticipated:

a) A research planning and evaluation expert on a yearly basis to coordinate research activities between the DWRC and the field;

b) A biometrician, behaviorist, and residue chemist to assist in design of studies for evaluation of traditional and alternative control approaches in special problem areas, and in the development of national damage assessment programs. The biometrician will assist in damage assessment methods, population indices, and essential experimental designs;

c) TDY support to assist in field studies involving specialized electronic equipment developed at DWRC. Consultants will also serve as a resource for conferences or seminars and participate in other project activities within the assigned area of the resident technician(s).

In problem areas where highly sophisticated or specialized equipment and skills are required, supporting research will be conducted at DWRC. Again, considerable flexibility is required, but the following needs can be anticipated and be used for project planning:

a) Electronic materials development (biotelemetric transmitters and receivers, field event counters, remote sensing devices);

b) Toxicological studies (oral toxicity, bait acceptance, evaluation of candidate control agents for efficacy and safety), and chemical residue analyses;

c) Behavioral studies.

In addition to the above, the support team in Denver will assist in design of study plans and procure and ship miscellaneous research and office supplies as required.

Counterpart personnel and outreach contacts to be available for the project are outlined as follows:

Haiti:

The minimum counterpart personnel requirement to be funded by the Government of Haiti is:

	Estimated Annual Cost	4-Year Cost
Agricultural Scientist	$6,000	$24,000
Field Technician	4,500	18,000
Laboratory Technician	4,500	18,000
Secretary	Funded under PASA	-
Driver	2,250	9,000
Security Guard	2,000	8,000
Laborer	1,000	4,000
	TOTAL	$81,000

In the outreach function, project personnel would interact with government extension workers, key farmers and TDY personnel from DWRC.

Dominican Republic:

The minimum counterpart personnel requirement to be funded by the Government of the Dominican Republic is:

Agricultural Scientist	1/2 time ($10,000/year)	$20,000
Temporary Labor	$1,000	4,000
	TOTAL	$24,000

Occasional assistance from a secretary and driver. Outreach activities similar to above described for Haiti.

3. Training

Training will be continuous for the duration of the project. As technology and programs develop, training will be expanded to include operational program personnel in each country. They will develop dissemination programs with the assistance of the vertebrate field unit staffs. Transfer of appropriate technology will be accomplished through various channels. Included among these will be:

a) Seminars, conferences, workshops, and field demonstrations;

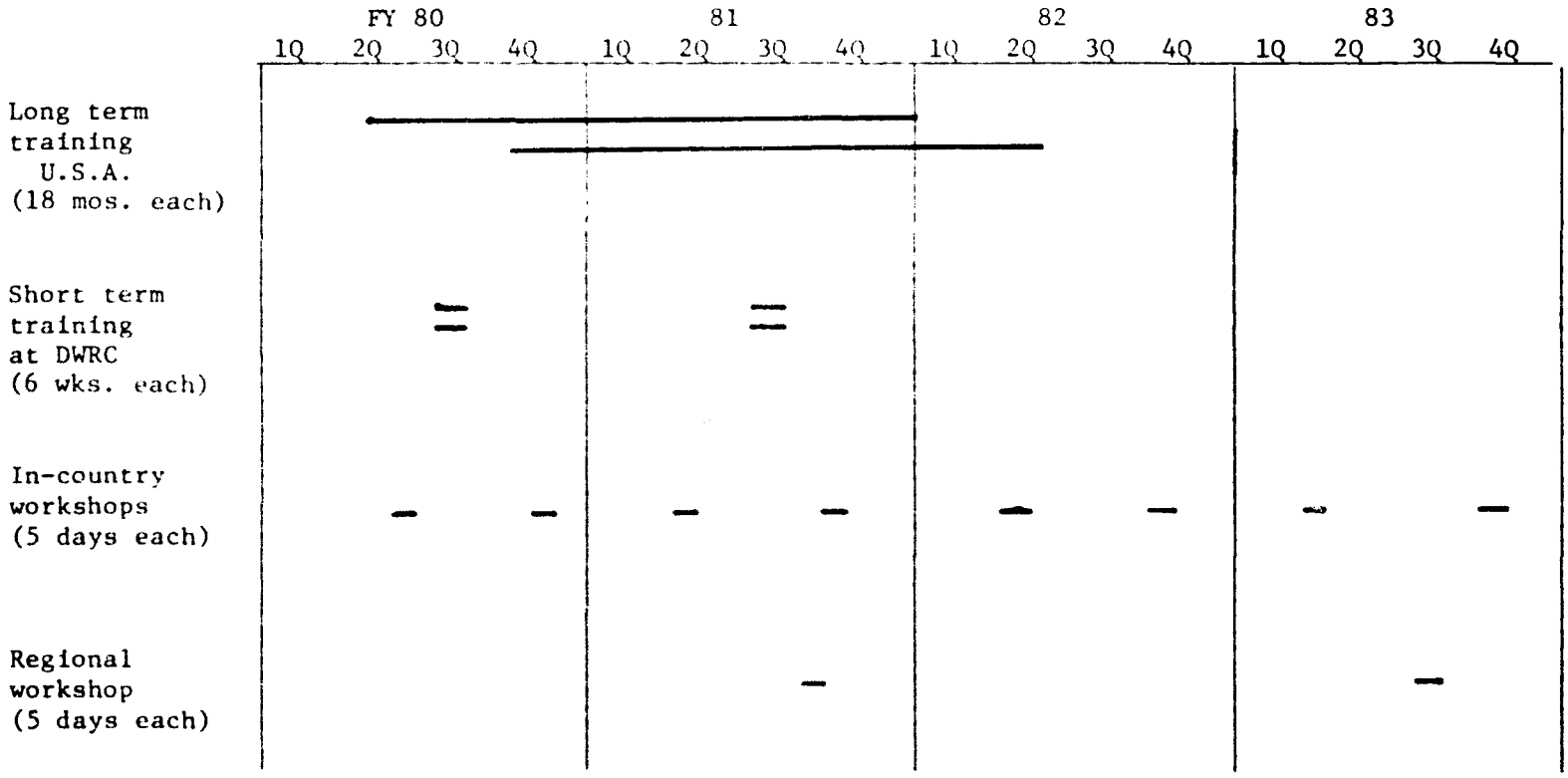
b) Publications (scientific journals, popular publications, extension-type brochures, and leaflets); and

c) Extension programs.

These activities will vary according to local conditions, government agencies, and the audience to be reached (e.g., scientists or farmers).

Several senior local staff members from each country will spend approximately six weeks in the U.S. at the Denver Wildlife Research Center and other appropriate research institutions. Basic objectives will be to allow these individuals to identify with the overall vertebrate pest control field, provide awareness of DWRC technical back-up capabilities by working in laboratories and in the field with DWRC personnel, and receive training in areas related to vertebrate control which are not available in the participating countries. After projects are underway, MS training will be made available for two key personnel at a designated university.

Projected Schedule by
Fiscal Year Training



In addition to academic and technical training provided in the PASA for counterpart personnel, the following kinds of personnel would receive in-country on-the-job training:

Extension Workers
Key Farmers
Trainees from the Caribbean Area
(Dominican Republic, Jamaica
Barbados, and possibly Guyana)

On-the-job training will consist of participation in laboratory and field experiments, field demonstrations, and classroom/laboratory workshops and seminars. Project will indirectly contact larger numbers of farmers by training extension workers who will conduct training and operational control programs in local languages. Select personnel from the Dominican Republic would be invited to participate in training activities described above from Haiti. Conversely, Haitian counterpart personnel would occasionally travel to the Dominican Republic with the Project Technician and interact with Dominican personnel.

4. Facilities/Field Sites

The participating host country will provide the laboratory-office facilities and field sites.

A. Facilities

Haiti:

A combination laboratory-office building will serve as a center for the regional vertebrate pest control project. The small, permanent facility should be between 2,050 and 2,800 square feet in size and single story. The facility should include: three offices; a secretarial/receptionist area; a general laboratory, two animal rooms for rodents and birds; separate storage area for equipment and pesticides; a combination conference/classroom; a small library; two lavatories; an outside concrete pad for cage washing and loading ramp; a roofed display area adjourning the classroom; and a vehicle parking area. The general laboratory should be equipped with standard laboratory benches, built-in cabinets, and a chemical fume hood. Storage areas should contain built-in shelving on at least two walls. Animal quarters should be constructed to facilitate cleaning and must be designed to prevent escape of experimental animals and to limit access of pests from outside areas. Air conditioners will be required in most rooms.

Dominican Republic:

Only minimal requirements necessary for outreach activities. Access to and use of an existing small office for the project technician. Temporary animal holding facilities will be periodically required and occasional use will be made of existing general laboratories and minor field equipment.

B. Field Sites

Haiti:

Although the area of involvement of total field activities will be quite large, the area of testing and evaluating control techniques will be quite small (1-15 hectares per experiment). During the life of the project, it is estimated that no more than 1,000 hectares will be required for testing purposes. Sites required should be representative of the country and the area in relation to habitat type, agricultural crops, and vertebrate pest species. It is anticipated that this would be a no-cost item and would probably involve select fields of key farmer-cooperators and sites on government experimental farms.

Use of rodenticides and avicides in research and training activities will involve small quantities of chemicals; will be in small, controlled experimental areas; and will be monitored by experts.

As new or improved vertebrate pest management systems are adapted and developed, they will be extended to extension workers and farmers. Thus, the impact in terms of acreage and outreach to user groups will be very considerable and extensive.

Dominican Republic:

Sites similar to those described for Haiti but on a much smaller scale will be required. Only a few sites will be required for initial experiments with the intent of involving larger acreages and user groups through government extension channels by the end of the project.

5. Commodities

Major commodity items for establishing each field unit under this project are:

a) Office and training materials includes: typewriters, calculator, camera, film and slide projector;

b) Specialized laboratory and field equipment: food bin, generator, holding and bioassay cages with supporting racks and associated accessories; glassware, chemicals and reagents, scales, binoculars, biotelemetry equipment, traps, nets, cages and related items; and

c) Transportation: One four-wheel drive vehicle.
(See Annex H for details).

6. Project Activities

Specific research and outreach activities to be undertaken during the project will vary somewhat with the problems and situations governing each participating country. However, the general approach to addressing these activities is as follows:

a) Development of damage assessment techniques for rodent and bird damage to principal crops. The ability to measure crop losses is necessary to evaluate effectiveness of candidate control methods and provide an economic base to measure benefits;

b) Identification of principal bird and rodent pests, determination of planting schedules of principal crops receiving damage, and identify the time at which proposed control operations should be applied;

c) Determination of optimum dosages for principal pest species and environmental sound methods of application for vertebrate pest control chemicals presently available;

d) Cooperative efforts with participating agencies to evaluate control practices currently recommended or used by Ministries of Agriculture and/or farmers. This is necessary to provide agencies and farmers with information on how current practices compare with alternate approaches;

e) Systematic testing of new control approaches for use under various pest damage situations. Such approaches may be adapted from findings in other countries or devised under local conditions;

f) Field observations and periodic population surveys for several pest species in each region. This information is important to gain an understanding of fluctuating population densities and periodic pest outbreaks.

Objectives for Denver-based personnel during the project period will include:

a) Screening and evaluation of candidate chemicals for possible field testing on selected pest species;

b) Analysis of basic behavior patterns and physiological functions of selected pest species to provide background information for the development of more effective biological and chemical control approaches;

c) Design of specialized evaluation equipment, (traps, field recorders, experimental bait formulations, sprayers, cages, etc.) and provision of statistical, and technical literature assistance.

As project development proceeds, adaptive research needs for specific problem situations will be continuously reviewed and programs revised, adjusted, or initiated as required. An important aim will be to establish cooperative research ties between agricultural research organizations in each participating country. This will be accomplished through meetings where research results will be exchanged by participating scientists, future needs determined, and planned activities among organizations coordinated. In that the orientation of the program is one of problem solving through adaptive research and practical application of selected techniques, considerable attention will be placed on the methods of developing information for small farmers. Pilot extension activities using proven technologies will be supported by training programs, field demonstrations, and workshops. Short-term technical assistance personnel will be used as required to achieve this objective.

7. Project Inputs

Based on the above project description, the following resources are required to achieve project goals:

a) One long-term consultant with technical expertise in vertebrate pest management methods;

b) Approximately 15-20 person-months of short-term consultation from DWRC to support program activities of the field unit;

c) Supporting services (including facilities and staff) at DWRC which includes behavioral experiments, electronic development for vertebrate studies, analytical services, bioassay and toxicological tests and biochemical studies;

d) Physical facilities, including offices and laboratories at the field unit site;

e) Personnel provided by participating countries for the project, which includes biologists, extension agents, administrative support, and secretarial services;

f) Adequate equipment, supplies, and transportation to conduct field and laboratory studies;

g) Sufficient operating funds for project personnel to cover local travel and procurement for in-country materials and supplies required for field studies;

h) Conferences or workshops for local extension staff and farmers, Ministry of Agriculture personnel and representatives of international organizations.

To achieve and maintain national capabilities in the field of vertebrate pest management, the project will arrange graduate training for at least one individual from each nucleus country and limited short-term training at DWRC for a number of national program personnel.

8. Project Outputs

Based on the above project description and summary of resource required, the following outputs are expected: a) An operational field unit with a capacity to implement vertebrate pest control research and outreach activities;

b) Trained scientists in the participating countries actively engaged in the design and evaluation of vertebrate pest management methodology;

c) Coordinated research activities between DWRC, the established field unit and appropriate agricultural research organizations, within the participating countries and region;

d) Research results leading to the development of simple, effective, cost beneficial, and safe vertebrate pest management methods;

e) Program of training and outreach capability for dissemination of information to farmers within the participating countries;

f) Pest control programs for priority problems implemented in each of the countries with emphasis on small farmer client groups;

g) Formulating of a long-range control strategy based on results of project activities and experiences;

h) Information provided to other LAC countries of adaptive research results based on experiences of the field unit which may be applicable to their respective problems.

9. End of Project Statement

It is anticipated that three general outputs will be forthcoming during the life of the project.

- Assessment of the incidence and magnitude of losses due to vertebrate pests; and the adoption of control technology consistent with the assessment and the particular characteristics of each country (Haiti and Dominican Republic).

- Creation of an in-country capability in both Haiti and Dominician Republic for accurate damage determination; and a capacity to formulate and implement control programs in response to identified problems

- Establishment of a mechanism for disseminating results and recommendations evolving from the project to countries with analogous vertebrate pest problems, or in response to specific requests.

Damage assessment will be undertaken by the DWRC technician and support staff as their primary activity in the initial state of the project and will focus on determining the magnitude and incidences of vertebrate pest damage, and its principal casual agents. On the basis of this information the DWRC technician will design control alternatives which will be tested and/or demonstrated in cooperation with participating technicians and farmers. This testing and demonstration phase of the program will serve to provide opportunity for modifications of control techniques, as a training experience for participating country technicians, and as a demonstration of control technology which can be readily transfered into existing conditions.

The principal output of the project will be to create a capacity within the Haiti and the Dominican Republic for identifying and evaluating vertebrate pest losses, and for designing and implementing control programs. Formal training courses, on the job learning and observation, and participation in seminars and conferences will be the primary means of personnel preparation. One technician from each country will receive training at the MS level in Wildlife Biology, and two from each country will attend specialized short courses at DWRC for specific instruction in vertebrate pest management.

The DWRC technician and support staff and the trained local personnel will establish and conduct the testing/demonstration trails, and organize the learning activities centered around these trials. Extension agents and farmers will participate in the activities which will have as their primary purpose to introduce methods and benefits of pest control. It is not intended that the project perform the function of mass dissemination of control technolgy; however, it is envisioned that approximately 200 extension agents and 60 collaborating farmers will have received in-depth exposure to the vertebrate pest problem and control techniques during the four year project period. In addition, periodic conferences and seminars will be held for members of the national (Haiti and Dominican Republic) and international agricultural community in order

to inform them of the progress of the current project, as well as acquaint them with a broader view of activities and results of other areas and programs. Through these seminars other countries in the LAC sphere will familiarized themselves with the vertebrate pest problem, and the importance and feasibility of its control.

Finally, in addition to the meetings in which results derived from the project will be presented to current and potential users, information will be made available through published bulletins and pamphlets which will be directed toward professional and lay audiences. Through these publications farmers, technicians, and administrators can familiarize themselves with the various aspects and phases of vertebrate pest management technology and benefits.

PART 3. PROJECT ANALYSIS

A. Technical Analysis Including Environmental Assessment

1. Background

Historical evidence suggest that neither the Ministries of Agriculture in the LAC region nor the AID target groups are fully aware of the extent of vertebrate pest damage in the region. As a result, control operations have been largely confined to sporadic poisoning campaigns when pest populations reach plague proportions. This general lack of understanding of the extent of crop losses in the field and during postharvest storage is likely to continue unless adequate damage survey data are available for governments to assess the priority need for work in this area. Until this is achieved, it is probable that many LAC countries will carry out vertebrate pest control programs only on a sporadic basis to reduce animal populations in response to farmer complaints. Without a systematic approach to define problems in terms of crop losses and using research findings to develop effective management programs, vertebrate pest losses are likely to continue unabated and will probably become more intense as agricultural development proceeds.

DSB is supporting development research in vertebrate pest management with worldwide applications under a PASA program with the Denver Wildlife Research Center. This project was initiated in 1967 and has included work on a variety of methods, materials, and control strategies pursued both in Denver and in various field programs. Current field programs supported the DSB are located in Khartoum, Sudan, and Los Banos, Philippines. During the

last program evaluation held in March 1977, the review team concluded, and DSB concurred, that several additional field programs could be undertaken, based on developmental research underway at Denver. However, it was recommended that any new field programs should be supported by missions or regional bureaus, not by DSB. It was also recognized that considerable portions of the domestic research programs supported by the USFWS result in findings relevant to vertebrate pest problems in developing countries, and that the entire research staff of the Denver Wildlife Research Center is available for direct or indirect consultation on AID projects.

The proposed LAC project is designed to apply, adapt, and evaluate vertebrate pest control methods and strategies developed by the Denver Wildlife Research Center. By drawing together the techinical findings of diverse investigations, applying them to specific pest problems suffered by small farmers in Latin America, and by supporting detailed evaluation and analysis of farm-based pilot control programs, the proposed project will complement existing research activities supported by DSB and USFWS.

2. Technical Analysis

The nature and timing of technical assistance is well suited to achievement of project goals. Countries in the Latin America/Caribbean region are in the stage of development where they would benefit from the specific goals set for in this project. For example, rodent damage to rice is probably the most serious vertebrate pest problem in the region and the techniques developed in the Philippines have direct application. In the Philippines, DWRC and Filipino scientists developed a sustained baiting program to keep rodent populations low on small farms throughout the growing season thus reducing losses. The more common control practice is to bait after damage appears or after the farmer has suffered the losses. the sustained baiting program was approved for implementation in 1975 under the Philippine National Rice Production Program - Masagana 99. As part of a loan agreement, the small farmers (average farm size of three hectares) follow a proven baiting recommendation and use specific materials. Annual losses on small farms due to rate damage in the Philippines range from 0-5%, averaging about 5%. Early results indicate that the baiting method reduces losses to below 1% and saves the small farmers of the Philippines approximately $6 million annually.

In Hispaniola, most rice is hand transplanted in a similar pattern as in the Philippines. 60% of 27,800 rice growers in the Dominican Republic have less than six hectares under cultivation. These conditions are very similar to the Philippines and many of these pest control packages perfected in the Philippines can, with appropriate modification, be tested and used in similar agro-climatic areas of the Latin America/Caribbean region.

The Denver Wildlife Research Center (DWRC) has the facilities, equipment, and experienced scientists which make it highly qualified to meet the specialized requirements of the proposed projects. The facility is well equipped with modern, scientific instrumentation, providing the capability for laboratory support for all facets of a vertebrate damage problem. The results of research undertaken by DWRC staff members and cooperators throughout the world are regularly published in scientific and technical journals, progress reports and special publications, often prepared in the language of the concerned country. Nearly 200 publications have resulted from international activities of the DWRC since inception of the program. DWRC has developed resources to address training and communications activities and cooperates with several U.S. institutions in developing degree study programs from selected LDC personnel in vertebrate control programs. In addition, its technicians assist in the development and participation of country training programs such as workshops, short courses, and seminars. Several countries in the LAC region already have demonstrated a capacity for adapting vertebrate control systems and carrying out operational programs. For example, Nicaragua, with assistance from DWRC, initiated a national vampire bat control program in 1974. This was the first national program in the history of that Ministry and it demonstrated remarkable success. Nicaraguans have reduced vampire populations which are preying on their herds and have eliminated vampire-transmitted rabies in the country. Their expertise in vampire bat control has become well known in Latin America and Nicaraguan veterinarians trained by DWRC technicians have given training seminars on bat control in Honduras, El Salvador, Costa Rica and Paraguay.

A vertebrate pest research unit will be initially established in Haiti for the purpose of developing technical expertise in the Caribbean on vertebrate pest management methods. One of the primary goals will be to assist the small farmer with his immediate crop protection needs based on existing applied technology. During the first operational years, emphasis will be on training and extension. Participating country institutional capabilities will be concurrently developed to address integrated vertebrate pest management concerns. It is anticipated that these initial efforts will lead to the development of a self-sufficient research, training, and outreach capability among the participating countries.

The project design, as proposed, is well suited to achieve the purpose of the project and has been carefully planned to make full and efficient use of available resources.

3. Proposed Approach

The most cost effective methods of decreasing the loss of agricultural products due to vertebrate pests will be the criteria by which to judge control alternatives and establish priorities. This approach appears particularly well suited to the vertebrate pest management needs in the LAC region. By focusing attention on measureably reducing crop losses rather than developing technology which is more efficient at "killing vertebrates", the field unit established in this project will contribute to solving basic vertebrate pest problems in a practical, cost efficient manner. By virtue of the fact that large segments of the technology may be an adaptation of methodology developed by other AID-funded programs, outputs should be available in a shorter time period than if the program had to research and develop methods from a less-advanced starting point.

4. Environmental Assessment

An Initial Environmental Examination for the proposed project has been prepared and attached as Annex D. The potential impacts of this project can best be divided into direct and indirect effects. Direct effects that may occur as a result of research and training activities of scientists at the vertebrate pest control field units. These are judged to be none or minimal because: (a) although the regions encompassed by research and evaluation activities will be quite large, the farm areas involved in actual testing or evaluation of control techniques will be small (probably less than a few hundred hectares during the life of the project; (b) much of the activity will involve assessment of the extent of damage, species composition, and evaluation of traditional control approaches, both as to effectiveness and possible negative environmental effects; (c) use of chemicals in research and training activities will involve small quantities, in controlled experiments, confined to small areas, and monitored by experts; (d) field unit research activities will be supported by DWRC which is equipped to make residue and degradation studies of existing and experimental chemicals; and (e) improved vertebrate pest management, emphasizing judicious use of control methods, including pesticides, is one objective of the program.

Indirect impacts are those resulting from changes in traditional vertebrate pest management activities of farmers and operational programs of the Ministries of Agriculture that may occur as a result of research findings and training programs. As new or improved systems are developed, they will be extended to farmers and other users. Thus, the impact on vertebrate pest management activities over the years can be considerable. However, as shown in Annex D, the adverse impact on the environment is judged to be little or none.

B. Financial Analysis and Plan

1. Financial Rate of Return/Viability

The financial analysis is one of a nonrevenue-producing project. Detailed budget summaries are presented in Section 3 - Financial Plan/Budget Tables.

Capital outlays are time-phased to meet short and long-term project objectives. During the first year of operation, major capital outlays will be primarily for purchase of equipment and supplies, vehicles, transportation and shipping expenses, and other expenses relative to transfer of the resident U.S. technician. During the second and third years, major capital outlays will be primarily for field activities and training and program development. In addition, increased TDY activities will be undertaken by DWRC personnel.

A major consideration in project design is the quantity, nature, and timing of technical assistance. High costs for technicians are a major factor, hence, only one long-term technician is programmed for each field unit and approximately 15-20 person-months of TDY assistance are expected. The timing and nature of TDY services will be designed to bring maximum benefit to participating country activities. Projected operating expenses for the PASA services are judged adequate based on Mission and host country discussions and negotiations. Operation and maintenance of most equipment will be primarily the responsibility of the host governments during the entire period of the project.

2. Recurrent Budget Analysis of Implementing Agencies

As described above, the recurrent operating and maintenance costs for the field units appear adequate. Haiti and the Dominican Republic have officially expressed interest in the proposal, and offered cooperation, personnel, facilities and support to the fullest extent possible. Finally, there is a willingness to organize, establish and support agriculturally related research and development programs for vertebrate pest control. On these bases, it is concluded that the implementation agencies do appear to manage their financial resources well and adequate planning and support for this project can be reasonably expected.

3. Financial Plan/Budget Tables

Cost estimates for technical assistance are presented in the following tables. These amounts include a 7.5% contingency to cover anticipated increases in salaries and operational expenses. Excluded from these estimates are funds for emergency and medical travel for the long-term technician which would be provided by AID on the same basis as for direct-hire employees. A well-conceived program for low risk, high return pest control will be welcomed throughout those areas presently

VERTEBRATE PEST CONTROL

SUMMARY

OBLIGATIONS/EXPENDITURES

	FY 79	80	81	82	83	TOTAL
OBLIGATIONS	310.0	-	540.0	-	-	850
EXPENDITURES	46.9	213.5	219.5	214.5	155.6	850

LATIN AMERICA/CARIBBEAN REGIONAL VERTEBRATE PEST CONTROL PROJECT
OPERATIONAL BUDGET

	FY 79 3 mo. (7/1/79 - 9/31/79)	FY 80 12 mo. (10/1/79 - 9/31/80)	FY 81 12 mo. (10/1/80 - 9/31/81)	FY 82 12 mo. (10/1/81 - 9/31/82)	FY 83 9 mo. (10/1/79 - 6/30/83)	TOTAL
Technical Specialist						
Salary/Personnel Benefits	7,600	30,700	32,400	34,200	26,700	131,600
Differential	-	4,900	4,400	4,600	3,600	17,500
Housing/Education	-	15,500	12,400	12,400	9,300	48,600
International Travel (Includes R&R, Home Leave)	1,800	1,500	2,800	3,100	2,600	11,800
Medical/Security Clearances	900	-	-	-	-	900
Transportation of Personal Effects	-	6,200	1,000	3,100	4,600	14,900
Subtotal	10,300	58,600	53,000	57,400	46,800	226,300
Technical Support						
Local Travel/Vehicle Maintenance/Support	-	9,000	8,000	8,000	6,000	31,000
Outreach Personnel	600	2,500	2,500	2,500	1,900	10,000
Secretarial Services	1,200	4,800	4,800	4,800	3,600	19,200
Printing and Reproduction	-	1,200	1,000	1,000	700	3,900
Supplies/Materials/Transport. of Official Effects	10,000	17,600	14,000	4,700	3,000	49,300
Subtotal	11,800	35,100	30,300	21,000	15,200	113,400
Research Analysis at DWRC						
Consultant Services (Salaries/Personnel Benefits)	11,700	47,600	50,700	54,000	42,500	206,500
Consultant Travel	1,500	6,500	7,500	7,500	5,600	28,600
Supplies and Materials	1,300	5,000	5,000	5,000	3,800	20,100
Subtotal	14,500	59,100	63,200	66,500	51,900	255,200
Training						
Local Training	-	4,400	3,700	4,500	3,400	16,000
Technical Training at DWRC	-	3,500	4,200	4,200	3,200	14,800
Academic Training in U.S.	-	4,500	19,300	14,500	-	38,600
Subtotal	-	12,400	27,200	23,200	6,600	69,400
TOTAL	36,600	165,400	173,700	168,100	120,500	664,300
Contingency/Inflation Factors	2,700	12,400	13,000	12,600	9,000	49,700
TOTAL	39,300	177,800	186,700	180,700	129,500	714,000
Overhead (22%)	7,600	35,700	32,800	33,800	26,100	136,000
GRAND TOTALS	46,900	213,500	219,500	214,500	155,600	850,000

SUMMARY
FOUR YEAR FINANCIAL ANALYSIS

Operations	USAID	HAITI	Dominican Republic	Total
Technical Specialist	226,300	-	-	226,300
Technical Support				
Local Travel/Vehicle Maintenance/Support	31,000	4,000	4,000	39,000
Outreach-Counterpart Personnel	10,000	81,000	24,000	115,000
Secretarial Services	19,200	-	-	19,200
Printing and Reproduction	3,900	-	-	3,900
Supplies/Materials/Transportation of Official Effects	49,300	4,000	4,000	57,300
Subtotal	113,400	89,000	32,000	234,400
Research Analysis at Denver	255,200	-	-	255,200
Training				
Local Training	16,000	8,000	6,000	30,000
Technical Training at DWRC	14,500	-	-	14,500
Academic Training in U.S.	38,500	-	-	38,500
SubTotal	69,400	8,000	6,000	83,400
Contingency	49,700	-	-	49,700
Overhead	136,000	-	-	136,000
TOTAL	850,000	97,000	38,000	985,000

plagued by the constant threat of serious crop damage. Perception, acceptance, and diffusion of this new technology, however, will be determined by a variety of socioeconomic and cultural factors which must be considered at all phases of the innovation process. A systematic social soundness analysis was conducted among target groups in the Dominican Republic in an effort to assess the sociocultural feasibility of the project and will serve to suggest potentialities, constraints, and solutions involved in a successful vertebrate pest control program. Results of this social analysis are presented in detail in Annex E.

C. Social Soundness Analysis

The success of this project ultimately hinges on its social, cultural, and economic acceptability to the target populations of Latin America. Small farmers (the projected beneficiaries of the program) clearly perceive vertebrate pests as causing extensive harm to agricultural productivity. Any well-conceived program which is capable of generating low-risk, high return pest control technolcgy will be welcomed throughout those areas presently plagued by the constant threat of serious crop damage. Perception, acceptance, and diffusion of this new technology, however, will occur within a variety of socioeconomic and cultural institutions which must be carefully considered at all phases of the innovation process. Therefore, a systematic social soundness analysis was conducted among target groups in Central America (Guatemala) and the Caribbean (Dominican Republic) in an effort to preliminarily investigate the sociocultural feasibility of the project. Although a number of Latin American countries and diverse target populations will ultimately benefit from activities of the proposed regional vertebrate pest control centers, this study serves to suggest general potentialities, constraints, and solutions involved in a successful vertebrate pest control program. Results of this social analysis are presented in detail in Annex E.

D. Economic Analysis

A detailed economic analysis of the project is not possible at this time primarily because of the absence of reliable estimates of crop losses attributable to vertebrate pests. As discussed earlier, preliminary data and observations compiled by the DWRC indicate that several rodent and bird species cause severe losses throughout much of the region, especially in the rural sector. Generally, the greater impact is on the farmers in marginal agricultural areas. Chronic pre-harvest losses to vertebrate pests occur in many areas are viewed as a risk inherent in the various farming systems. However, the failure to protect crops and livestock prevents the farmer from achieving the full yield potential embodied in many of the new agricultural technologies. The investments in laboratory and field research, and in the training of control specialists, along with the development and strengthening of implementation programs would make practical control methods suited to local needs available to farmers. As one of the outputs of this project, the physical and economic losses will be estimated, and attention will be given to the costs and returns to implementing a vertebrate pest control program.

In that there has been no systematic control program in either Haiti or the Dominican Republic, indicators with respect to the economic feasibility and benefits of vertebrate pest control must come from other areas. Based upon experience under analogous conditions of pre- and post-harvest crop management and handling techniques, inferences can be drawn as to the potential impact a control program will have in the project area. The economic data of interest are at both the micro, or farm level, and at the macro, or regional/national level. Utilizing this information decisions can be made with regard to the feasibility of the program for individual farmers, as well as to place the problem, cost of control and benefits into proper perspective vis a vis other possible agricultural programs.

The data which are used to demonstrate the efficacy of rodent control are from experiences in the Philippines. The following table summarizes the costs and returns to improved and traditional rodent control in paddy rice in 1973 and 1974 from actual farm data.

Average Costs and Returns for Sustained Baiting Programs and Traditional Rodent Control Methods in Paddy Rice in various areas of the Philippines.[a/]

	Pangasinan		Mindoro 1		Mindoro 2	
Task	Treated $/ha	Trad. $/ha	Treated $/ha	Trad. $/ha	Treated. $/ha	Trad. $/ha
Land Preparation and cultural practices	55.7	44.0	91.5	87.5	85.6	93.4
Harvesting	18.4	13.7	57.1	28.6	71.4	35.7
Rat Control	1.9	.3	2.9	.9	3.6	1.3
Total Production Cost	76.0	58.0	151.5	117.0	160.6	130.4
Gross Value of Crop	444.6	332.7	302.1	166.4	378.6	192.9
Profit	368.6	274.7	150.6	49.4	218.0	62.5

a/ Information from DWRC/AID projects.

The two major points to be seen from the above Table are that profits are substantially higher[1/] when improved rodent control technology is used, and that the cost of rodent control is only a small percentage of total production costs (range is 1.9 - 2.5%).

The potential benefits to be gained from a large scale rodent control program are demonstrated in the next Table. The information in the Table is projected from calculated costs and benefits from experimental trials of control methods for rodent damage to rice and corn in the Philippines. Base data are from replicated small farm trials and have been extrapolated to depict the situation when applied to units of area of 10,000 hectares.

1/ The figures from the Table are from observed farm practices, not a controlled experiment. Some of the increase in profit is no doubt due to differences in farming technique other than rat control.

Crop/Rat Species/ Area/Date	Costs[a/] Damage Index: Treated Farms (%)	Damage Index: Untreated Farms (%)	Returns to Rodent Control[b/]: Value of Farm Yield Increase ($)	Cost of Control to Farmers ($)	Net Increase With Effective Control ($)
Rice *Rattus rattus mindanensis* Pangasinan, Philippines 1973	15	5.91	1,400,000	15,700[c]	1,384,300
Rice *Rattus argentiventer* Mindoro Or., Philippines 1974	0.2	4.9	1,357,100	20,000[c]	1,337,100
Corn *Rattus rattus mindanensis* Bukidnon, Philippines 1976	0.86	5.4	314,300	17,900[d]	296,400

a/ No costs to the Government would be entailed except for normal extension activities needed to provide farmers with agricultural production practices.

b/ Projections assume production increased in treated plots are due to the results of rat control treatments and that damaged plants have no economic value. Labor of small farmers is not included as a cost; baiting programs would generally require between 1 and 2 hours/hectare/week.

c/ Cost increment over traditional methods used.

d/ Actual cost -- no traditional methods practices.

PART 4. IMPLEMENTATION ARRANGEMENTS

A. Administrative Arrangements

1. Recipient Countries and Beneficiaries

a) Initially, this project will have its primary base in Haiti and intends to have extensive secondary activity in the Dominican Republic. Control programs will be established and developed simultaneously in both countries, strongly encouraging at all times continuous professional exchange and cooperation. The unit in Haiti will be in the Department de l'Agriculture, des Ressources Naturelles et du Developpement Rural (DARNDR). The key organization in the Dominican Republic is the Departamento de Sanidad Vegetal (Plant Health Department).

The Departamento de Sanidad Vegetal is responsible for crop protection activities in the Ministry of Agriculture, and is currently doing some work in vertebrate pest control. Interest in vertebrate damage to agriculture is high and officials contacted with regard to this project were most receptive to the idea of a regional project.

b) The successful implementation of a vertebrate pest management program depends on the development of key participating country personnel. As discussed elsewhere in this paper, there is a shortage of such personnel in the countries of the LAC region. Hence, vertebrate damage in agriculture has not been given the attention it merits. A second factor important in the seccessful implementation of a vertebrate pest management program is a recognition on the part of the countries themselves, that programs designed to reduce production and post-harvest losses of agricultural commodities is to their national interest, especially for the large numbers of disadvantaged small farmers.

Prior experience in developing countries has shown that practical solutions for vertebrate pest problems can be devised and that the countries concerned are capable of adopting and incorporating the technology successfully in operational programs for client groups within a relatively short time. For example, in the Philippines where operations were almost totally accomplished on small farm systems, field application in large scale pilot projects were instigated during the fourth year of the vertebrate pest project. In Nicaragua, after control techniques were perfected for vampire bats, a country-wide program was fully operational and self-sustaining by the second year.

2. AID

The project is neither complex nor does it involve any unusual administrative features for AID. No additional AID staff commitments are considered necessary. Aside from some initial coordination and negotiating requirements with the participating country, USAID's role will principally be one of monitoring project performance and conducting evaluations. It is noted that in the field unit, the DWRC project personnel will work very closely with USAID personnel of the participating Missions. Normal administrative support and services for the resident U.S. technician, coordination in the delivery of equipment required for the project, coordination of training short courses or special seminars, and arrangements for short-term consultants will be the major items requiring AID involvement.

Secondary USAID policies and procedures will be adhered to in the procurement of goods and services. Monitoring will be accomplished by the Chief, Section of International Programs, DWRC, the AID project officer, the Rural Development Offices of the participating Missions and periodic host government agency reports.

B. Implementation Plan

1. Timetable for Project Implementation

The detailed timetable for project implementation is presented in Annex C.

2. Disbursement and Procurement Programs

Technical assistance for the PASA services with DWRC will be financed by AID utilizing the standard PIO/T procedure. Commodities, training, and support services, including in-country and international travel, rent, maintenance, and utilities for the long-term technicians, will also be financed by AID under the PASA with DWRC from project funds as specified in the Approved Project Paper. Where appropriate, the Office of Rural Development in the USAID Mission of the respective participating countries will serve as the AID representative for the AID/W Project Manager.

3. Monitoring and Reporting Agreements

The project will be monitored directly by the USAID/Washington project manager. Procurement will be the responsibility of the USAID project manager or his designee and purchases will be made under current AID procurement procedures and regulations. Technical assistance will be monitored by the Chief, Section of International Programs, DWRC, and annual progress reports will be submitted to the USAID project manager for review. In addition, supporting research activities of the Supporting Sciences Section, DWRC, will be summarized in its quarterly reports and submitted to the USAID project manager for review. The USAID project manager will be provided copies of all publications resulting from research activities using project funds.

C. Evaluation Plan

Routine evaluations will be conducted at about six-month intervals throughout the project and a major AID project review will occur near the end of the second year of the project. The routine evaluations will be based on the monitoring reports, inspection of physical facilities, evaluation of DWRC progress reports, the proceedings of seminars and workshops, scientific publications, and reviews of the operational budgets and programs of participating country, vertebrate pest activities. The evaluations will determine if project inputs are being provided as planned, that conditions and covenants of the Project Agreements are being met, and that project outputs are being accomplished. The evaluations will be used to recommend alterations of project inputs, if required, to achieve the project purpose.

The AID project review will be a special in-depth evaluation of achievement of established project purposes and progress towards achieving EOPS. Evaluation factors will include policies, quality of research and research personnel, quality of training and training personnel, research and development management, coordination of activities with other agricultural programs and research institutions, and effectiveness of outreach programs, especially towards the small farmer client group.

D. Conditions, Covenants, and Negotiating Status

Since the nature of this project is regional and the fact that minimal financial resource input from host countries is required, no major conditions concerning host government action prior to implementation are required, Most negotiations are to be made through meetings by representatives of DWRC, AID Missions, and appropriate officials of the host governments with negotiated terms and project implementation procedures including financial contributions from recipient countries to be set down in memorandums of understanding between DWRC and the respective host country institution(s). This process can begin immediately after the funds are obligated in the PASA with DWRC.

5C(2) - PROJECT CHECKLIST

Listed below are statutory criteria applicable generally to projects with FAA funds and project criteria applicable to individual fund sources: Development Assistance (with a subcategory for criteria applicable only to loans); and Economic Support Fund.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE?
HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PRODUCT?

A. GENERAL CRITERIA FOR PROJECT

1. FY 79 App. Act Unnumbered; FAA Sec. 653 (b); Sec. 634A. (a) Describe how Committees on Appropriations of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than $1 million over that figure)?	a) Presented on page 314 of FY 79 CP for Latin America and the Caribbean. b) Yes
2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?	Yes
3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?	N/A
4. FAA Sec. 611(b); FY 79 App. Act Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per the Principles and Standards for Planning Water and Related Land Resources dated October 25, 1973?	N/A
5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed $1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project?	N/A
6. FAA Sec. 209. Is project susceptible of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.	Project will be executed as a regional project.

A.

7. FAA Sec. 601(a). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.

Project expects to improve technical efficiency in pest management and control for agriculture within participating countries through training and demonstration.

8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).

Project through U.S. trained technicians, research results and participating country awareness of effective pest control programs can stimulate increased use of U.S. products and services.

9. FAA Sec. 612(b); Sec. 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.

N/A

10. FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?

No

11. FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?

Yes

12. FY 79 App. Act Sec. 608. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar, or competing commodity?

No

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(b); 111; 113; 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained

Project will directly benefit the poor by perfecting scale neutral cost-effective control measures which reduce on-farm crop losses. Training of middle level technical personnel of government will be oriented to those who actively participate with farmers and local farm organizations.

B.1.a.

basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?

b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available: (include only applicable paragraph which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.)

(1) [103] for agriculture, rural development or nutrition; if so, extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, is full account taken of needs of small farmers;

Project intends to perfect cost-effective packages of pest management technology expecially geared to the needs of the small farmer. The program will assist in establishing a institutional base from which to develop effective pest management systems and avail these systems to the small farmer

(2) [104] for population planning under sec. 104(b) or health under sec. 104(c); if so, extent to which activity emphasizes low-cost, integrated delivery systems for health, nutrition and family planning for the poorest people, with particular attention to the needs of mothers and young children, using paramedical and auxiliary medical personnel, clinics and health posts, commercial distribution systems and other modes of community research.

(3) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development;

(4) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is:

(i) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations;

(ii) to help alleviate energy problems;

(iii) research into, and evaluation of, economic development processes and techniques;

(iv) reconstruction after natural or manmade disaster;

B.1.b.(4).

(v) for special development problem, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance;

(vi) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.

c. [107] Is appropriate effort placed on use of appropriate technology?

Yes

d. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least-developed" country)?

N/A

e. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to the Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"?

N/A

f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civil education and training in skills required for effective participation in governmental and political processes essential to self-government.

The project is designed to assist participating governments in developing their own institutional capabilities on pest manatement. To do so, the project emphasizes full full development and utilization of t of the countries' intellectual resources through in-country

(continued at bottom of page)

g. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase or productive capacities and self-sustaining economic growth?

Yes

2. Development Assistance Project Criteria (Loans Only)

a. FAA Sec. 122(b). Information and conclusion on capacity of the country to repay the loan, including reasonableness of repayment prospects.

N/A

b. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?

N/a

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and preparatory training programs. The project based on the social and economic soundness of the technology will assist small farmers increase their income and productivity through improved pest management practices.

B.

3. Project Criteria Solely for Economic Support Fund

a. FAA Sec. 531(a). Will this assistance support promote economic or political stability? To the extent possible, does it reflect the policy directions of section 102? N/A

b. FAA Sec. 533. Will assistance under this chapter be used for military, or paramilitary activities? N/A

Project Issues

1. What is the relationship between this project and the TAB survey on vertebrate pest control in the PID? Is funding for the LA activities under the TAB project still expected to be phased out in FY 78?

The primary emphasis of the DSB PASA activities in Latin America, especially during the last 5 years, was placed on control of vampire bat predation on livestock.. Since 1973, these activities have been funded with DSB utilization monies. The original task of developing safe, effective, and economical means for controlling vampire bats and related extension activities to train personnel and assist affected countries in establishing vampire control programs will essentially be completed in FY 78. Hence, further funding is not anticipated.

Ongoing research activities at DWRC (i.e., toxicology, behavior, etc.) under the DSB PASA will be closely coordinated and directly related to the proposed Latin American regional project. In this vein, the present PASA can be counted on to provide considerable back stopping by Denver personnel during project development activities (i.e., the survey discussed in the PID). This is considered partially a PASA activity because it will assist in an orderly transition from present DSB Latin American activities to the LA RSSA regional programs in FY 1979. The ongoing, AID-funded, vertebrate pest research at Denver will provide new ideas, methods, materials, and procedures to be adapted and implemented by the regional field projects.

2. <u>How does this project relate to the earlier LA regional "Rats, Bats, and Noxious Birds" project? Can any lessons from that project be applied to this one?</u>

The DSB PASA "rats, bats, and noxious birds" originally established in 1967 was considered a worldwide project to research potential control methods for major vertebrate pest problems. Under this PASA, primary emphasis was placed on rodent control research in Southeast Asia, vampire bat control research in Latin America, and bird control research in Africa. The establishment of a research program in Africa was delayed and preliminary work started on a TDY basis. Fieldwork to develop research methodology for bird problems on small farms was temporarily focused in Latin America with emphasis on doves and finches. Cooperative work was undertaken with the Instituto Colombiano Agropecuario in the Cauca Valley of Colombia from 1970 to 1975 and TDY work has been carried on in several other Latin American countries to assess bird damage problems and existing control methods. Major emphasis on bird control research under the worldwide project has continued to be placed on the weaver finch problem in Africa, while the major emphasis in Latin America under the original PASA was placed on the vampire bat control program.

This proposed project is an outgrowth of the activities initiated under the original DSB PASA. A different approach and slightly modified priorities are envisioned as a result of the knowledge, experience, and insight gained under the PASA program. Recent advances in rodent control technology resulting from the work in Southeast Asia, the unprecedented success of the vampire control program, and additional evidence of the

needs of small farmers in Latin America, all lend credence to a new emphasis in vertebrate damage control work in the Latin American region.

Several lessons can be learned from our earlier experience:

a. The criteria used for selection of a host country as well as the project site within the country should be very carefully defined and evaluated. Adequate consideration must be given to each factor. For example, the ability of a host government to support such a program should not be overestimated. This is one reason why a regional program is considered more appropriate.

b. Adequate consideration must be given to such items as access to international travel facilities and access to the AID mission and host government officials.

c. Each country tends to believe that its particular situation is unique and emphasis should be placed on assisting each to develop its own program, designed to fit the particular needs and system, rather than merely attempting a direct transfer of program and methodology design from one country to another.

d. Emphasis should be placed on getting host country personnel into the position of management of the programs as soon as possible with resident U.S. personnel acting in the capacity of advisors, rather than program directors with counterparts as followers.

3. <u>Is sufficient emphasis placed on postharvest losses under the project? Solution for this type of loss might be improved by storage techniques rather than pest control programs. Is the DWRC the best institution for this type of activity?</u>

Postharvest losses are a serious problem. It is important, however, to differentiate between postharvest losses under conditions such as found in large commercial facilities (i.e., warehouses, port facilities, etc.) and postharvest losses at the small-farm level. This project is aimed principally at vertebrate problems occurring at the small-farm level and specifically at damage which takes place in the field. Postharvest losses occurring at the farm level are likely to be caused by the same pests which are causing the preharvest losses. In some cases, animals may make seasonal movements between fields and farm structures. For this reason, postharvest losses will be considered as an integral part of the vertebrate pest problem faced by small farmers. Dependent upon local situations, the relative importance of pre- and postharvest losses will be examined and control methods evaluations will be carried out with the intent to provide a basis for comprehensive loss reduction programs on small farms.

The DWRC is perhaps not the best institution at this time to research postharvest losses occurring in large-scale storage facilities. However, research into these types of problems is assuming more significance at the Denver Center under other funding (non-AID) and any benefits realized from these activities will certainly be available to this project. In most cases, these problems can probably be dealt with through training and

local educational programs. Project personnel would be capable of providing state-of-the-art advice to Missions or project cooperators on large-scale storage problems with vertebrates, but it is considered a minor activity in the proposed project.

4. How and at what time would the field units in the nucleus countries be established? Will these be fully financed by AID? What relationship would they have with existing national research institutes and with host country? What contributions would be expected from them? Why have Nicaragua and Paraguay been tentatively selected?

Details regarding project implementation are discussed in Part 4. Briefly, establishment of the field units in the nucleus countries will begin as soon as the U.S. technicians arrive at post. Specific program activities will have to be developed after intensive review and for the most part will depend upon the needs of each participant country. We have targeted implementation of the Central American and Caribbean units in FY 79 (probably December 1978) with the South American unit to follow in FY 80 (probably December 1979). Guatemala, Dominican Republic, and Peru are proposed as the nucleus center host countries.

The field units will not be fully financed by AID. The U.S. staff, local staff, commodities support, and some improvement of facilities will be funded by AID. The field units in the nucleus countries, as well as the outreach country programs, will be associated with established country programs, probably as units within the Ministries of Agriculture or other appropriate agencies. They will provide basic facilities, logistical

support, and considerable support in cooperative experimental studies. The AID-funded regional project staff will assist in program development in the outreach areas as well as play a major role in the local research programs, while the host country staff will concentrate on development of a strong national program to serve as a regional model. As the project develops, other regional countries will be encouraged and assisted in developing parallel national programs.

Nicaragua and Paraguay were tentatively selected for several reasons, one being their respective geographic locations relative to the proposed outreach areas. Further consideration of several factors has led to the belief that perhaps these countries would not be the most appropriate at this time. Ministry of Agriculture officials from numerous countries in each of the three regions have expressed interest in the program and in having the nucleus centers located in their countries. Information gathered by DWRC personnel during a recent visit to ten Latin American countries has significantly increased our awareness of the vertebrate pest situation in Latin America. Several countries are currently working on or contemplating vertebrate pest control programs. Many have demonstrated a willingness and ability to successfully adapt and utilize new technology in the field of vertebrate pest control.

5. <u>Is it realistic to expect the field unit to serve more than one country? Will the different pest control solutions have to be worked out in each country or will solutions arrived at in one country be applicable in other countries as well? What contributions are expected from nonnucleus</u>

governments? To what extent will people from nonnucleus countries participate in projects during its different stages?

Considering the wide diversity of ecological conditions under which vertebrate damage occurs and the variety of species involved, no single control program or technique can promise success under every condition. We contend that management methods need to be evaluated in each new situation and programs need to be appropriate to local institutions, farming practices, and socio-economic factors as well as being biologically effective. This is especially true in the Latin American area where small farms are found from sea level to 12,000+ feet and from tropical to temperate climatic conditions. Generally speaking, however, it is likely that the same or closely related species will be involved over wide areas. A regional approach will facilitate adaptive research and training of local specialists over a greater area in a shorter period of time than could otherwise be achieved. The effectiveness of this approach is evidenced by the success of the vampire bat research and utilization program.

A major goal of the project is to develop an organization within each participating country, with an ongoing capacity to monitor vertebrate pest situations and to evaluate and adapt technologies to local conditions. We would expect that participating nonnucleus countries would identify an individual(s) as having the responsibility for vertebrate pest control and would support them in activities related to those responsibilities. We would further expect that the countries would utilize project findings to organize or strengthen local programs. Persons associated with the

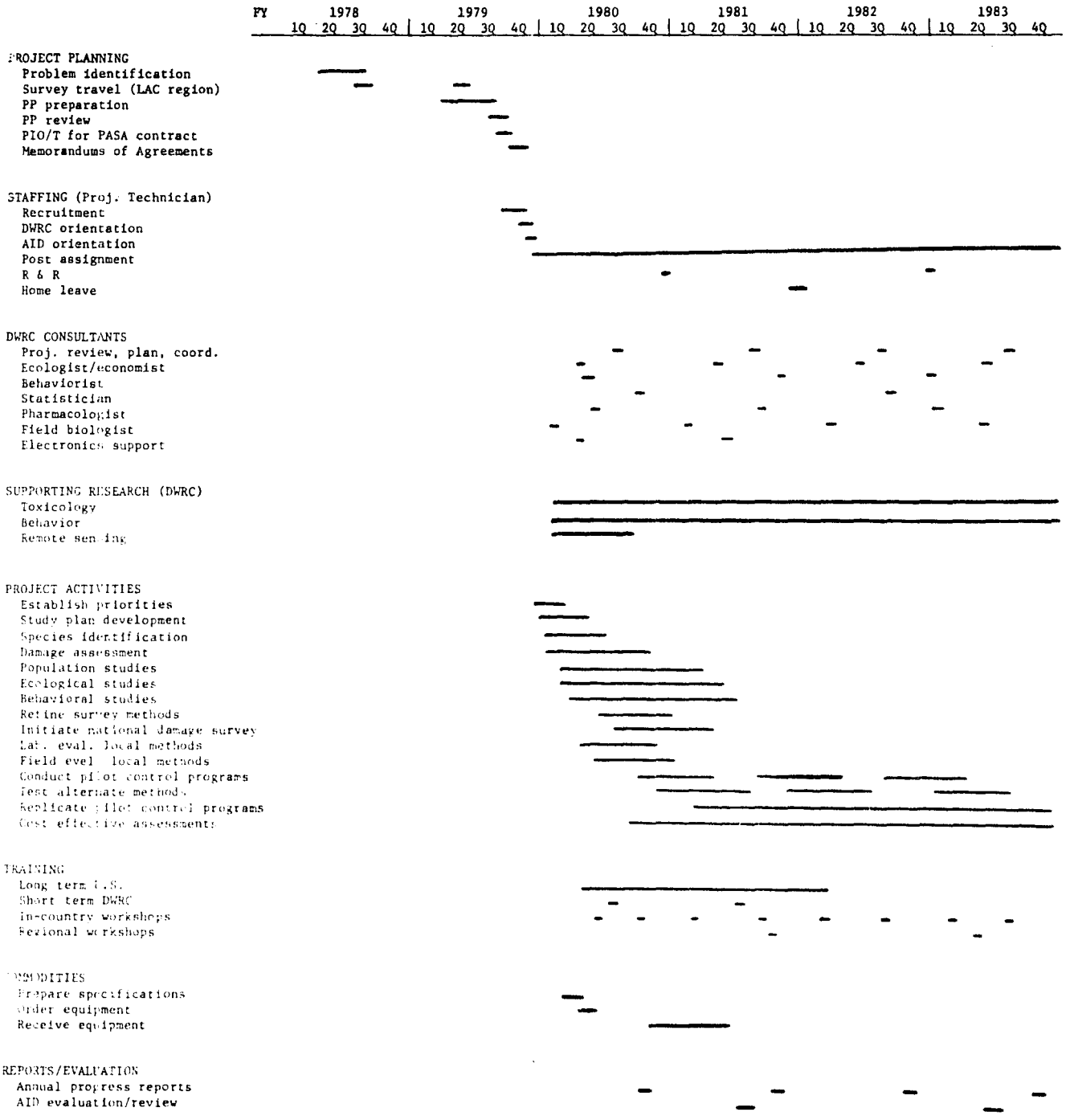
project from the nonnucleus countries would participate in training programs, and cooperate in studies to adapt methodology developed in the nucleus countries to local conditions. Some regional travel and coordination will be required; this approach has worked well in the vampire project.

6. Will implementation of the countries' work plans be fully funded by the the host countries or should some outside support be permissible? What will be the USAID's role in developing and negotiating the work plans?

As discussed elsewhere in this document, vertebrate pest problems in the majority of these countries are poorly defined and related economic information is lacking. This program will assist participating countries in evaluating the economic importance of vertebrate pest problems, outlining needs, and establishing priorities. To the extent that these countries identify vertebrate pest control as a program priority, USAID missions and other development assistance organizations should be encouraged to provide support for training and commodities necessary to implement country programs. A strong liaison with the USAID missions in the regions will be necessary in developing and negotiating the work plans. It is anticipated that USAID missions in the nucleus countries will provide limited administrative support to project personnel.

ANNEX C

PROPOSED ACTIVITIES CHART FOR FIELD UNIT



ANNEX D

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT LAC/DR-IEE-79-19
WASHINGTON, D.C. 20523

ASSISTANT / ADMINISTRATOR

ENVIRONMENTAL THRESHOLD DECISION

Location : Caribbean Islands (Haiti) and second site to be determined

Project Title : Latin American Regional Project: Reduction of Crop Losses Vertebrate Pests - #598-0584

Funding : FY 79 - FY 83 $1,115,750 Grant

Life of Project: Four Years

Mission Recommendation:

Based on the Initial Environmental Examination, the Mission has concluded that the project will not have a significant effect on the human environment and therefore recommends a Negative Determination.

The Development Assistance Executive Committee of the Bureau for Latin America and the Caribbean has reviewed the Initial Environmental Examination for this project and concurs in the Mission's recommendation for a Negative Determination.

AA/LAC Decision:

Pursuant to the authority vested in the Assistant Administrator for Latin America and the Caribbean under Title 22, Part 216.4a, Environmental Procedures, and based upon the above recommendation, I hereby determine that the proposed project is not an action which will have a significant effect on the human environment, and therefore, is not an action for which an Environmental Impact Statement or an Environmental Assessment will be required.

Assistant Administrator for
Latin America and the Caribbean

Date

Clearances:
LAC/DR:Environmental Advisor:ROtto
DAEC Chairman:MBrown

Latin American Regional Vertebrate Pest Control Project

INITIAL ENVIRONMENTAL EXAMINATION

PROJECT LOCATION	:	Caribbean Islands (Haiti) and second site to be determined
PROJECT TITLE	:	Latin American Regional Project: Reduction of Crop Losses to Vertebrate Pests - #598-0584
FUNDING	:	FY 79 - FY 83 $1,115,750 Grant
LIFE OF PROJECT	:	4 years
IEE PREPARED BY	:	Denver Wildlife Research Center, Section of International Programs
DATE	:	February 23, 1977
USAID REVIEW (Date)	:	
ENVIRONMENTAL ACTION RECOMMENDED	:	Negative Determination

CONCURRENCE:

Marshall D. Brown
Associate Assistant Administrator
for Development Resources
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DATE: APR 12 1979

I. Examination of Nature, Scope, and Magnitude of Environmental Impacts

A. Description of Project

The proposed Latin American regional project Vertebrate Pest Control is described in detail in the Project Paper and appendices attached thereto. Briefly, the proposal calls for a grant to assist in the development of an ongoing research capability in Latin America to adapt and/or develop vertebrate pest management technologies suited to the needs of small farmers. The research capability will be established as a vertebrate pest control component within the Ministries of Agriculture of the two nucleus host countries, one in the Central American region and the other in the Caribbean region. Cooperative ties will be established with other research institutes having an interest in vertebrate pest management in the host countries and with Ministries of Agriculture or other appropriate agencies in participating "outreach" countries within the area of influence of the selected nucleus countries.

AID assistance will include technical assistance, commodities, training, local-hire staff, and support for research and outreach activities.

Most research activities will be conducted in farmers' fields. Many of these activites will involve the systematic description and assessment of vertebrate pest problems or the evaluation of the effectiveness of traditional control approaches currently used by Latin American farmers. The use of cultural controls, exclusion barriers, integrated pest management, chemical toxicants and repellents, and other tactics will also be evaluated. When alternative control strategies involve the use of

chemical agents (toxicants and/or repellents) only those compounds that are currently approved for the same or similar uses in the United States and are commonly recognized as safe for humans and the environment will be used. Emphasis will be placed on the safe handling and use of chemical agents, minimizing of residues, and general avoidance of harmful environmental impacts.

B. Identification and Evaluation of Environmental Impacts

The potential impacts of this vertebrate pest management project for Latin America can best be divided into two classes for purposes of identification. The first are the direct effects that may occur as a result of the research and training activities of the scientists at the vertebrate pest control centers in the nucleus countries. Indirect impacts are those secondary effects of changes in the traditional vertebrate pest management activities of farmers and operational programs of the Ministries of Agriculture or other agencies as a result of research findings and training programs. These are discussed separately below and have also been identified and evaluated in the Impact Identification and Evaluation Form (IIEF).

1. Direct Impacts

The direct effects are judged to be none or minimal for several reasons. First, although research activities will encompass broad concepts and be aimed at alleviating bird and rodent damage to crops in large regions of Latin America, the areas involved in testing or evaluation of control techniques will be quite small (probably less

than a few hundred hectares during the life of the project). Second, these research activities will largely involve studies aimed at quantifying the extent of damage, identifying the pest species involved, and evaluating the effectiveness of traditional control approaches. Third, the research and training activities will involve relatively small quantities of chemicals, administered by trained biologists in controlled experiments on small areas. Finally, the research activities will be supported by the Denver Wildlife Research Center which is equipped to make residue and degradation studies of existing and experimental chemicals as well as provide other technical services needed for vertebrate pest control research.

2. Indirect Impacts

The indirect impacts of the project are those resulting from changes in traditional vertebrate pest management activities of farmers and operational programs of government agencies as a consequence of project findings and training programs. As new or improved vertebrate pest management systems are developed, they will be extended to farmers or other users. Thus, the impact on vertebrate pest management activities over the years can be considerable. As shown in the IIEF, however, the adverse impact of the proposed project on the environment is considered to be little or none. Discussion of specific points follow herewith.

A. Land Use

Crop conservation is the critical aspect of this project. To achieve this, it is intended to reduce damage by rodents and other

vertebrate pests in the basic grains and horticultural crops which are predominantly grown on small farms. The project may have an impact on land use by preventing or curtailing an undue expansion of migration to new uncultivated land by providing increased food production from land already under cultivation.

B. Water Quality

Rodenticide or other chemical residues in water or in the silt, etc. at the bottom of bodies of water may be found as a result of the use of some chemical control agents in vertebrate pest management. At present, in most L.A. countries, there is minimal regulation of the kinds and extent of chemicals (especially rodenticides) used, in relation to the potential for contamination of water. For example, endrin is commonly used to spray dikes in rice-growing areas in an attempt to control rodents. Much of the chemical is sprayed directly into the watercourses and water standing in the fields. The proposed activities of the project would enable host government scientists to identify and evaluate such water contamination problems that may be occurring prior to the formation of regulations. Thus, the potential impact here is positive, by reducing current or preventing future contamination of water resources as a result of vertebrate pest management practices.

C. Atmospheric

The use of avicides or bird repellents as sprays or dusts always entails the possibility of drift beyond the target area. Again,

the task of the project scientists (and their supporting research teams) will be to determine the extent of such drift, the potential for harmful impacts, and the methods needed to prevent possible hazards. The overall effect of the project is expected to reduce these problems.

D. Natural Resources--no impacts.

E. Cultural--no impacts.

F. Socioeconomic

The potential impact of project activities on employment may be both positive and negative. New or improved vertebrate pest management technology may be labor intensive as, for example, the prevention of rodent damage to rice by establishing and maintaining bait stations on individual farms throughout the rice cropping season or as in the placement of bait packets in the crowns of tall coconut palms. On the other hand, effective and economical management methods may be found which will eliminate some traditional practices such as a bounty system for rodents killed by hand or the use of bird chasers in cultivated fields. The total impact cannot be accurately predicted at this time. It will depend on such unknown factors as availability and cost of labor for vertebrate pest management systems in the countries involved. An unknown socioeconomic impact is the influence of project activities on the economic status and well-being of the agricultural sector. Similar activities in the Philippines have

resulted in improved productivity of farmers and the reduction of waste of farmers' inputs which results when crops are lost in part or totally to vertebrate pest attacks. Unless there is an overproduction of food with concomitant lower prices (an unlikely prospect), the potential impact for the large agricultural sector should be favorable.

G. Health

The successful management of vertebrate pests should result in a greater production of foods and, possibly, in a greater diversity of food types. Since rodents are often reservoirs or vectors of a variety of diseases, the development of effective rodent control programs will help reduce the incidence of the infirmities frequently transmitted by these pests. If so, the general population should benefit from an improved diet in both variety and nutrition, and from a lowered incidence of some debilitating diseases.

A major consideration is the potential problem of human poisoning by chemical agents used in vertebrate pest control programs. Untrained and unskilled applicators are often exposed to serious risk when handling and applying these materials. Accidental ingestion of toxic baits by children and others must also be considered. In Latin America, the relatively common and haphazard usage of highly toxic, persistent chemicals (e.g., organochlorine insecticides) for rodent and bird control enhances the potential for human poisoning.

This project will develop with the philosophy of discouraging such hazardous and generally ineffective approaches. Chemical control agents will be used but the proposed project would utilize only those chemicals currently approved for the same or similar uses under U.S. regulations. The potential for accidental ingestion of toxic materials is not considered to be serious. The use of such materials in this project will primarily be under laboratory conditions or in agricultural areas. There will be no involvement in urban pest control situations where the risk of exposure to children and others would be much greater.

An important aspect of the research and training activities of the regional centers will deal with these considerations. The safe use of chemical agents, in terms of handling, application, and environmental contamination will be an essential part of the training of program personnel, farm technicians, and farmers.

H. General - Risk/benefit Analysis

Evidence exists which indicates that crop damage by vertebrate pests occurs throughout the Latin American region and may, in some situations, be a limiting factor in agricultural production. Attempts at control are generally ineffective and/or restricted to crisis situations. Often, inadequate materials or methods coupled with unsound applications, yield disappointing results. Most developing countries, at present, devote little attention to the potential environmental impacts of traditional control methods.

The main environmental consideration relates to the impact the project may have on the use of chemical agents by farmers or government agencies. The ultimate impact should be beneficial even though it is possible that activities of the regional centers may ultimately result in the use of greater quantities of rodenticides, avicides, or repellents than at present. For example, when true losses to vertebrate pests are determined and sound management practices are developed, farmers may use these chemicals profitably where none are now employed. However, the potential wider use is expected to be less hazardous to man and the environment than present unguided uses of more hazardous materials. Research conducted in the Philippines has shown that the commonly followed practice of massive rat poisoning campaigns killed many rats but had little effect on reducing preharvest losses. The chemicals commonly used for rodent control in Latin America are chlorinated hydrocarbons, such as endrin and DDT, which are banned in the United States. This project will discourage the use of these chemicals in favor of anticoagulant rodenticides which are considerably safer.

Finally, no chemical will be used or recommended for use in Latin America that is not registered for the same or a similar use in the United States. The preliminary laboratory evaluation of experimental chemicals will be accomplished at the Denver Wildlife Research Center on animals shipped from Latin America.

In summary, the proposed project activities are judged to have minimal adverse environmental impacts, a potential for reducing existing harmful impacts from currently practiced vertebrate control activities, and prevention of future practices with adverse impacts while contributing to the AID goal of increasing agricultural productivity in developing countries. Hence, the risks associated with project activities can be considered to be negligible and to be outweighed by the potential benefits to be derived.

II. Recommendation for Environmental Action

A. Negative Determination is recommended on the bases that:

(1) There is judged to be minimal adverse environmental impacts from project activities.

(2) The approach of the project is consistent with the recommendations and philosophy of the Programmatic Environmental Impact Statement for AID activities in the area of pesticide use and crop protection entitled "Environmental Impact Statement on the AID Pest Management Program."

IMPACT IDENTIFICATION AND EVALUATION FORM

Impact Areas and Sub-areas[1]	Impact Identification and Evaluation[2]
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 importance uses	N
4. Jeopardizing man and his works	N
5. Other factors	
B. WATER QUALITY	
1. Physical state of water	N
2. Chemical and biological states	L
3. Ecological balance	L
4. Other factors	
C. ATMOSPHERIC	
1. Air additives	L
2. Air pollution	N
3. Noise proportion	N
4. Other factors	

[1] See Explanatory Notes for this form.

[2] Use the following symbols:
N - No environmental impact
L - Little environmental impact
M - Moderate environmental impact
H - High environmental impact
U - Unknown environmental impact

D. NATURAL RESOURCES

1. Diversion, altered use of water _____ N
2. Irreversible, inefficient commitments _____ N
3. Other factors

_____

_____

E. CULTURAL

1. Altering physical symbols _____ N
2. Dilution of cultural traditions _____ N
3. Other factors

_____

_____

F. SOCIOECONOMIC

1. Changes in economic/employment patterns _____ L
2. Changes in population _____ N
3. Changes in cultural patterns _____ N
4. Other factors

_____

_____

G. HEALTH

1. Changing a natural environment _____ N
2. Eliminating an ecosystem element _____ N
3. Other factors

_____

_____

H. GENERAL

1. International impacts _____ N
2. Controversial impacts _____ N
3. Larger program impacts _____ N
4. Other factors

_____

_____

I. OTHER POSSIBLE IMPACTS (not listed above)

_____

_____

_____

ANNEX E

LATIN AMERICAN REGIONAL PROJECT
REDUCTION OF CROP LOSSES TO VERTEBRATE PESTS

PROJECT PAPER

SOCIAL SOUNDNESS STATEMENT

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JULY 11, 1978

C. Social Soundness Analysis

The success of this project ultimately hinges on its social, cultural, and economic acceptability to the target populations of Latin America. In numerous regions, small farmers (the projected beneficiaries of the program) clearly perceive vertebrate pests as causing extensive harm to agricultural productivity. Any well-conceived program which is capable of generating low-risk, high-return pest control technology will be welcomed throughout those areas presently plagued by the constant threat of serious crop damage. Perception, acceptance, and diffusion of this new technology, however, will occur within a variety of socioeconomic and cultural institutions which must be carefully considered at all phases of the innovation process. Therefore, a systematic social soundness analysis was conducted among target groups in Central America (Guatemala) and the Caribbean (Dominican Republic) in an effort to preliminarily investigate the sociocultural feasibility of the project. Although a number of Latin American countries and diverse target populations will ultimately benefit from activities of the proposed regional vertebrate pest control centers, this social soundness study serves to suggest general potentialities, constraints, and solutions involved in a successful vertebrate pest control program.

1. Guatemala

a. Social Organization - An Overview

The main Guatemalan target populations are concentrated in the western and central highlands although small farmers inhabiting Guatemala's eastern and far northern provinces also stand to benefit from effective vertebrate

pest control. In this mountainous context, populations are organized into a stratified, pluralistic society characterized by two general value systems: that of the ladino (claiming Spanish heritage and culture) and the Indian (indígenas or naturales) tradition. Mayan Indians, speaking several indigenous languages, make up over 65 per cent of the approximately two million regional inhabitants while ladinos constitute the remainder.

Indian peasants, the majority of the target population, exist at the lowest levels of the socioeconomic scale in rural areas and tend to be small-scale producers. Ladinos, on the other hand, typically reside in the urban areas of the highlands and possess greater per capita wealth, both in terms of land and capital. They tend to be commercial producers, middlemen, professionals, government officials, or merchants. Urban ladinos are literate and participate in the national culture while Indians traditionally tend to reject the dominant ladino values, especially those related to status inequality and material accumulation. Instead, Indian social order is based on solidarity, equality, strict social control, and hostility toward the dominant culture. However, between the extremes of "unacculturated" Indian and the urban, westernized ladino stands an ever expanding segment of rural ladinos, or "halfway ladinos," made up of peasant small-producers and craftsmen who live in predominantly Indian areas. A large percentage of this emerging group is composed of Indians who have recently "passed" by adopting ladino dress, customs, and the Spanish language. Although highland Guatemala is gradually losing its characteristic ethnic dualism (i.e. Indian versus ladino culture), the Indian-ladino value conflict is still

a factor to be seriously considered in the implementation of any rural improvement project.

b. The Highland Rural Economy

The overwhelming majority of the highland population ekes out a living on small landholdings or as landless laborers. Over half of the total Guatemalan population lives in the highlands, 80 per cent of which are considered rural. A deficiency of productive resources among the target population is reflected in a low rural per capita income which for 1975 was estimated at 89 Quetzales (1 Q = U$ 1) compared to a national per capita income of Q 739. Although estimates vary widely, income figures for the target area could be as low as Q 346 for the average annual family income or around Q 70 per capita, an income level substantially below that of other rural districts. Thus, farm-operating capital is severly limited for the target population, an economic reality which must be considered in the planning of any grassroots development project.

Most campesinos (peasants) in the highlands are forced to combine several economic strategies to attain basic needs. In some areas, less than 50 per cent of the household income is derived from agricultural pursuits. It has been estimated that only 20 per cent of the rural popula possesses sufficient holdings to survive solely from agriculture. Many campesinos supplement farm production by engaging in a variety of cash market activities. Emigration to the coast for seasonal agricultural employment on coffee, sugar cane, and cotton plantations is the most important means of supplementing farm income. In any given season

as much as 50 to 70 per cent of the rural highland work force spends three to six months working at loweraltitudes or on the coast. This work, which is characterized by low wages (Q 2 per day) and regulated by ladino overseers, is universally criticized by highland Indians. Commonly, labor contractors are ladino shop owners who extend credit to Indians and then call in the loans to correspond to plantation payments. Peasant household income is further supplemented by handicraft production (weaving, pottery making, and wood working), itinerate trading, small shops, and day laboring in public works projects.

c. Land Tenure and Land Use

A correlate of rural poverty in the highlands is the nature of land use and tenure. On a national level, the per capita land ratio for 1975 was estimated at one person per hectare. In the highland departments, however, the average was only .86 hectares per rural capita. Moreover, the amount of arable and potentially arable land per rural person was figured at only .41 hectares. Land categorized as "good" for crop production amounted to only .1 hectare per rural capita. Furthermore, holdings are highly fragmented being composed of a number of small, dispersed parcels located at different altitudes. Steep-sloping conditions do not make the parcels amendable to cultivation by modern machinery. Although dispersed plots require considerable travel time for the farmer, the scattered pattern reduces risk of total crop failure. Given the varied nature of the terrain coupled with the altitude factor, a poor yield at one level does not imply the same result at another altitude. Also, since crops are planted and ripen according to altitude, cultivation

and harvesting can be accomplished without hiring additional labor.

Despite recent advances in farm income, small producers have barely kept pace with cost of living increases. Fundamental to this perpetual poverty is the skewed land tenure system; ladinos own three times as much land as Indians even in the highlands. Continuous fragmentation of holdings through inheritance further decreases the viability of small farms. Land reform and colonization projects have not proceeded rapidly enough to improve conditions. In an effort to intensify, campesinos have expanded up the steep slopes of the mountains by cutting forests or breaking up grasslands, thus contributing to severe erosion and related ecological problems. This encroachment on formerly non-cultivated land has thrown the peasants into a greater competition with wildlife, especially gophers and birds which are now defined as pests. Spiraling population growth on limited land and the conversion of traditional farming to commercial crops in some regions have led to a breaking up of communally-owned livestock pastures and the selling off of livestock. With less natural animal fertilizer and continuous cropping, soil fertility has declined drastically. This, in turn, has led to a greater reliance on chemical fertilizers which further cuts into the farmers' income. Some observers of Guatemalan highland agriculture believe that a chemical fertilizer shortage would now prove disastrous for the rural population. Finally, small farmers face a lack of infrastructure, inadequate transportation, limited access to low-interest credit, unequal market opportunities, and other institutional deficiencies.

d. Quality of Life Indicators

In accordance with their disadvantaged economic position in Guatemalan society, highland campesinos are characterized by low levels of formal education as well as deficient health and nutritional conditions. Substandard housing, sanitation systems, water supplies and other shortcomings in the highland infrastructure help maintain unhealthy living conditions. Such environmental inputs strongly affect motivation and the perception of change. Realistically, peasants hold few illusions about altering their life given the circumstances under which they must survive.

Although some recent advances have been made in formal education, this important aspect of any society's development remains woefully inadequate. An estimated 60 per cent of the adult population (above 15 years of age) remains functionally illiterate. Among women, the illiteracy rate is even higher. Many of the Indians, especially women, do not even speak Spanish, Guatemala's official language. In the altiplano (highlands), school drop-out and absentism rates are extremely high among Indian children. According to the 1973 census, only 16 per cent of the children enrolling in the first grade finish the sixth year of primary schooling. As many as 90 per cent of the children between seven and 14 years of age do not attend school regularly. Causes for this are numerous: the scarcity of educational facilities, a shortage of teachers, poor curricula, and the need for chidren to work in the home or fields. Young boys, in particular, are assigned the duty of guarding the milpa (corn patch) against bird pests, a chore which can be all time consuming during the agricultural season. Such birds can easily

deplete the year's harvest if left uncontrolled and many peasant families realistically perceive short-run survival to be more important than a vague education for their children,

As is the case in virtually all Third World countries, Guatemala's health and nutrition levels are substandard. Among the Indians, life expectancy is only 49.9 years, i.e. 4.5 years less than among the ladino population. Moreover, Guatemala suffers one of the highest infant mortality rates in the world (79 deaths per 1,000 life births), due mainly to infant mortality among Indians. Studies also indicate a degree of malnutrition and insufficient caloric intake. The estimated 2,000 calories per day fall short of the UN recommendation for the average Guatemalan body size. Theoretically, a diet of 70 per cent corn and 30 per cent black beans (supplemented with chiles (peppers) or other vegetables for vitamin supply) would give the Indians and optimum amount of all vital proteins. However, corn makes up 90 per cent of their diet and is rarely supplemented with animal proteins.

e. Perception of the Problem

Given the extreme diversity of ecological conditions in the Guatemalan highlands, no uniform pattern of pest problems can be delineated. However, campesinos report three major types of vertebrate pests: 1. large Central American gophers (Guatemala: taltusa), 2. rats and mice, and 3. several species of birds who eat grain or destroy germinating crops. The main pests among the latter are locally referred to as zanate, a large grackle, and chocoyo, a parakeet.

The gopher is found primarily in those regions with loose soil while rats, mice, and bird pests affect all communities in varying degrees. In some areas, farmers note that field pests attack sequentially throughout the planting and growing seasons. In the milpa, the grackle begins by attacking freshly germinated seed and pulling out seedlings; then the gopher feeds on the roots and juicy parts of the growing corn-stalk; and finally, the chocoyo does extensive damage to the ears from the time the kernel is forming to near-harvest stage. At any of these phases or in combination, these pests can deplete a field so that it is hardly worth harvesting. Extensive damage from the activity of the taltusa is also reported in coffee, fruit orchards (apple, banana), and sorghum. In addition to crop damage, gopher burrows stimulate hillside erosion. Rats and mice are perceived as damaging stored grains, thatch roofs, and household materials (wooden objects, weaving utensils and cloths).

Field interviews with campesinos reveal a strong felt need to control these pests. They realize that productivity is drastically curtailed and extensive labor costs are involved in protecting fields. In fact, over the centuries, a wide array of traditional methods of control has evolved which aims to reduce loss to vertebrate pests. Any effective pest control project should attempt to improve and incorporate, if feasible, these traditional practices.

f. Traditional Methods of Control

For the control of birds, farmers have used scarecrows and guards, generally young boys who crack whips, throw rocks, yell, sing, use sling-shots and, in recent times, throw firecrackers to disperse the

birds. Perhaps the most effective method of protecting corn ears is that of doubling the stalk so that the ears face downward. In addition to keeping the ears dry (perhaps the main reason), this process prevents the chocoyo from landing on the ear and attacking the husk. In some areas, overplanting and deep planting (with a digging stick) insure at least an acceptable germination and survival rate. Sometimes, the milpa is planted so that corn matures when certain species of birds have migrated to the coastal regions. Other traditional methods of control include selection of corn seed that will yield a tougher, pest-resistant husk, painting the corn ears with calcium paste, planting close to houses and human activity, and stretching bright, flickering plastic strips over the field. Occasionally, corn ears are covered with plastic bags to reduce loss to birds. Very little poison, however, has been used due to cost and uncertainty of success.

Traditional rodent control techniques are equally varied. For the taltusa, semi-professional bounty trappers, called tuceros, can be hired. These are mainly local Indian peasants. However, only larger landholders can afford to hire a tucero who earns approximately Q 2 per day and the right to keep the animal which is either consumed by his family or sold in the market place for about Q 1.50. Many individuals attempt to trap on their own with mechanical traps which can be locally purchased for Q 2.50 to Q3.00. Even this low price, however, is prohibitive for small producers. In addition to using snap and tube traps, the snare method was reportedly used in the past and seems to be employed to a minor extent today. Farmers also attempt to drive away the gopher by destroying its tunnels and den, beating the earth with sticks while making noice, and placing foul smelling

substances (dead chickens, lobsters, and other carcasses) in the dens and burrows.

Rats and mice are combatted with locally available traps and poisons, although farmers universally agree that these methods are ineffective. They realize that effective storage is the best means to prevent post-harvest grain losses and are keen to obtain metal storage bins or 55 gallon drums with lids. Development workers at the Catholic Mission Experimental Farm in San Lucas Toliman contend that cats and periodically organized rat-killing parties (150 rats can be killed within a few hours by the cooperation of 10 to 15 people) are the only effective controls against rat infestation. In this community, there is a demand for cats; according to some, the mere presence of a cat in the house kept rodents away. A few individuals interviewed, however, insisted that cats can be household pests who kill baby chickens and steal food. Cats also have difficulty surviving among the large dog populations typical of all villages.

Despite the wealth of traditional pest control methods, farmers generally agree that they are far from adequate. In fact, widespread pessimism prevails over the possibility of effective control either through mechanical or toxic means. Yet, farmers are convinced of the need for control and would no doubt welcome effective methods. It will be necessary to convince them that an appropriate technology can be developed which is inexpensive, low-risk, and appropriate for actual field conditions. The Guatemalan rural population has demonstrated a willingness to consider new ideas if it can be effectively shown that there is a reasonable chance for success at low cost. However, from the time improved pest control techniques are introduced until their acceptance or rejection by the target group,

there are numerous factors influencing and determining the reaction of the recipients toward both the projected innovations and the change agents. Listed below are some of the real and potential constraints which must be considered in the Guatemalan case.

g. Potential and Real Constraints

1) Perception of Change and the Indian Belief System

In local agricultural development, an innovation is not always readily accepted even if it seems to offer a great deal of advantage over traditional methods. Differences in cultural perception must be considered at all stages of research and project development. This is especially true for Guatemala where indigenous values and beliefs are still viable. Throughout the altiplano, a complex native cosmology which is connected to the Mayan Indian social order defines the human perception of and interaction with the natural milieu. In dealing with established social practices, neither appeals on scientific grounds, economic rationality, nor Western logic can easily pursuade villagers to give up or change traditional life practices.

Across the Mayan area, for example, the belief is prevalent that each person has an "animal spirit companion." The animal spirit world contains literally thousands of inhabitants. It is further believed that an individual and his animal spirit companion share the same fate, and soul. If the animal spirit is harmed, the human companion is likewise afflicted. Bats, which are thought to be a species of field mice that sprouts wings in adulthood, are known to have been worshipped and considered village patron saints. Rats are perceived by some groups as people of another epoch. Some individuals express the belief that it is good to have mice

around the house to clean up bits of food. One folk saying relates the notion that if there is a good harvest of potatoes, there will be few rats in the house while a poor harvest will increase the rat population. Even a ladino farmer, who is a protestant, argued it is a sin to kill little birds, even those preying on his field. These examples demonstrate that the conception of nature may vary enormously between Guatemalan farmers and change agents. This is not to say that there exists a taboo against controlling pests through killing, as is the case in many parts of Hindu India, but to alert the program developers that such belief differences must be taken into account. A relevant case of cultural misunderstanding in development was reported by Peace Corps Volunteers working in reforestation. The PCVs had planted hundreds of trees only to see them quickly uprooted by the Indian population. A belief had developed among the Indian population that planting a tree signalled a human death, and in order to prevent a mass dying, they pulled out the trees.

2) The Role of Change Agents

Not only are there sociocultural factors influencing peasant reaction toward the innovation but toward the agents of change as well. In addition to defining their problems differently, peasants frequently distrust ladinos and outsiders. All too often, government extension agents or bureaucrats who are of urban origins, do not understand subsistence agriculture, and are unable to converse fluently with the local people. Frequently, a condescending, paternalistic attitude and lack of respect for the indigenous culture dooms the project from the outset. Thus, from the very beginning, any program must elicit the farmers' confidence by consulting them at

every phase.

Peasants cannot begin to understand an innovation unless it is simple in technique, shows visible and immediate results, and can be initially carried out on a limited trial basis. In this regard, the means of communication are very important. Every effort should be made to define sources of farmer information (e.g. word-of-mouth, radio, local leaders, demonstrations). All of these, if tuned to peasant needs and kept in a language they understand, show potential as means of innovation education. Linguistic differences in particular pose a major problem. In one highland region, for example, a recent study discovered a general functional vocabulary in Spanish of approximately 90 words. Even among Spanish monolinguals, the folk names of given pests vary enormously and care should be taken to account for regional variation. The use of peasant promotores or guias (leaders), fluent in the respective indigenous languages, should be utilized whenever possible.

Furthermore, every effort should be made to work closely with the various institutes of the Ministry of Agriculture and other development agencies operating in Guatemala. Since the basic model of the proposed project was developed in the Phillipines, it should be remembered that Guatemalan extension is less developed that that of the Phillipines. It might be advisable to work closely with ICTA (agricultural research branch) in farm trials before the technology is passed on to DIGESA (agricultural extension branch). Peace Corps Volunteers working in vertebrate pest control should also be brought into the research development and extension efforts.

3) Cost and Risk Aversion

Serious constraints on the acceptability of new techniques are the cost and the lack of accessibility to capital by small producers. Highland peasants live on the very margins of survival and cannot readily afford even such seemingly inexpensive items as small Q 2.50 traps or poison baits. Although labor shortages may exist during the peak migration period, labor intensive methods may stand a better chance of implementation than capital intensive ones. To cite an example from another world region, for instance, recent government programs in Thailand where bounties were payed for hand-killed rats in rice areas has reputedly met with amazing success in the eradication of these pests. Moreover, corn is not a cash crop for minifundistas (small landholders) but is planted for home consumption. Farmers are thus reluctant to invest extra capital for pest control in corn. Only commercial farmers with moderate to large holdings would be willing to control pests by use of backpack sprayers and toxic substances. Sprayers sell for Q 60 to 80, an impossible investment for peasants. Small farmers who use traps complain that they are frequently stolen.. Also, a major problem exists with pest control in the milpa: as a marginal, non-cash crop, corn is often planted on high slopes at a great walking distance from the village and cultivated only two or three times per growing season. Farmers might be reluctant to invest extensive travel time if they are not assured of a high chance of success in pest control. If inexpensive and effective traps were readily available (e.g. on loan from DIGESA or through cooperatives), frequent trips to the fields might be undertaken to check the traps.

4) Technology Sophistication and Farmer Response

Any proposed program must be geared toward the needs and understanding of subsistence and small farmers rather than large, commercial producers. New ideas and techniques must be presented verbally, visually, and conceptually in such a way that the potential advantages are obvious. Complicated techniques developed under laboratory conditions that cannot easily be grasped by farmers are doomed to failure. Poisons, in particular, should be used with utmost caution given the peasants' inexperience and lack of knowledge about toxic chemicals. Many highland farmers cannot read or follow label instructions and have no understanding of the slow, long-term health damage poisons can induce. Cases have been reported where farmers use double and triple dosages and take no measures to protect themselves or their family members. Pesticide residues have been found in village drinking water. To date, successful use of agro-chemicals has been restricted mainly to commercial farms. No doubt, agro-chemicals hold great potential but must be approached with extreme caution and thorough planning at the small producer level. Farmer education, low costs, and demonstrations of success should be elements of any vertebrate pest program involving toxic substances. It should also be remembered that numerous varieties of rodents and birds are consumed by peasants. Mechanical pest programs are more readily understood and if an intermediate technology of vertebrate pest control which proves inexpensive and effective can be developed, there are no obvious sociocultural barriers to acceptance.

h. Impact on Women

Women benefit directly and indirectly from this program in a number of ways. First, women are in charge of household grain storage. Any effort

to reduce losses to pests, either through consumption or soiling, would allow greater return on their labor and assist them in more adequately feeding their families. In the highlands, corn is frequently stored in attics or simply piled in a corner. Improved storage facilities would be an excellent complement to a vertebrate pest control project. Although young boys generally guard fields against birds, this activity may at times be assumed by girls and women as well. When agricultural diversification takes place, such as growing vegetables and fruit as commercial produce, women frequently assume control of these. Both marketing and horticultural activities are female endeavors. In one community where weaving is a major source of outside income, women complained of rat damage to thread and cloth, as well as damage to the wooden weaving frame. Clothing for Indian women is a major household expense which needs protection from rodent damage. Of course, any input such as rodent control which increases the productivity of women in handicrafts production will mean more capital available for farm improvement. Finally, quality and yield of handicrafts manufacturing can be favorably affected.

2. Dominican Republic

a. Social Structure: An Overview

The social system of the Dominican Republic shares many of the general characteristics of Guatemala and other developing nations in Latin America. A powerful landed and capital-rich elite politically and economically dominates the mass of rural and urban poor, a stratificational arrangement which is the historical outgrowth of a long colonial past. Unlike Guate-

mala, however, the Dominican Republic and other Caribbean countries no longer contain indigenous populations. The Indians were annihilated by Europeans after the conquest and replaced by African slaves brought to work the colonial plantations. The legacy of the former slave-plantation economy finds expression in the modern Dominican dependency on one primary export, sugar, which experiences periodic bust and boom cycles. Racially, the population is predominantly mulatto (73 per cent) while the remainder is Caucasian (16 per cent) and Black (11 per cent). Today's upper class is predominantly composed of descendents of Spanish settlers while the mulatto majority, also Spanish speakers, are descendents of the Spanish colonialists and African slaves. Although the Dominican Republic is not, strictly speaking, a racially polarized society, preference is expressed for lighter skin. Race alone does not restrict an individual in social mobility but there is a tendency for lighter skinned individuals to occupy higher social positions. However, the black segment of the Dominican population has remained essentially rural and lower class. Today, the colonial class system is giving way to a more diversified and fragmented society. A middle class has appeared in the wake of recent industrial expansion, although it lacks cohesiveness and has had little influence on national goals.

b. Beneficiaries

The target group in the Dominican Republic is composed of mulatto and black small landowners or tenant farmers who live in rural areas throughout the country. In 1975, there were over 400,000 such households. This large segment of Dominican society lives on the margins of the money economy,

receives low return on their labor, suffers high unemployment, and occupies the least desirable agricultural land. The immediate family and the local community are the most significant social units for individuals. The rural family system is matrilocal (female-centered) and typically revolves around the matriarch, her unmarried children, married daughters, and their offspring. Consensual marriage (common law union) arrangements are commonplace. Although the Dominican lower class family structure appears disorganized to the outsider, it functions effectively to provide emotional and financial assistance to its members.

Income and employment opportunities of the Dominican small farmer compares in scarcity to that of their Guatemalan counterparts. Half of the rural population has a monthly income of less than RD$ 60 (1 RD$ = 1 U$) per family. Rural income is only about 25 per cent of urban per capita income. Unemployment in rural areas has recently been estimated at 23.5 per cent while underemployment is believed to reach 45 per cent. Moreover, a recent study noted that productivity of Dominican labor in agriculture is among the lowest in Latin America. Seasonal variation in the demand for rural labor results in worker deficiencies during agricultural peak periods and high unemployment rates during off-season slack periods.

To supplement low farm incomes, the members of rural families are forced to seek alternate forms of employment. Thus, in addition to subsistence farming, they work on plantations harvesting sugar cane, engage in itinerant peddling activities, and work in temporary construction jobs, to mention only the more typical forms of off-farm employment. Seasonal migration to the sugar harvest is especially common, although Dominicans

dislike "cane cutting." Furthermore, large contingents of Haitians, who work for lower wages and make less demands on landlords, are imported. A good worker can earn only RD$ 2 per day during the peak harvest period which lasts two to three months.

Over the past two decades, urbanward migration has increased significantly. The number of Dominicans living in urban areas has risen from 929,900 in 1960 to over 2,000,000 in 1975, i.e. 45 per cent of the total population. Rural migrants constitute almost 50 per cent of this urban increase. Emigration to the United States has also increased drastically. Some sources claim that 400,000 Dominicans, many coming as illegal workers, reside in the USA. They remit an estimated thirty million US$ per year, a major foreign income earnings for the national economy. It is not known what impact, if any, this international migration has on the development of rural communities.

b. Land Use and Land Tenure

The Dominican Republic is characterized by great diversity in ecology and topography ranging from coastal lowlands to the highest elevations in the Caribbean. The larger sugar cane plantations and cattle ranches are located in the southeastern region of the country while the arid mountainous southwest is poorly suited for agriculture. The northern district contains excellent agricultural land and possibilities for irrigation, especially in the Cibao Valley, and supports 43 per cent of the Dominican population. Small farmers (with holdings between 1 and 8 acres) are scattered throughout all of these regions and thus operate under highly diverse sets of environmental and climatic conditions.

The Dominican Republic's land distribution system is characterized by a few extremely large farms and a large mass of small, subsistence-type holdings. Of the national total of 304,000 farms, 56 per cent are eight acres or less in size and constitute only 8.2 per cent of the total available farm land. Large landowners hold only one per cent of the total farms but control 39 per cent of the land with an average of 800 acres per farm. Moreover, less than 500 landlords control over one-fourth of the nation's total arable land. The number of intermediate farms is relatively small.

Although the Agrarian Reform Institute has not been able to meet all of its goals, some progress has been made in land redistribution. However, illegal squatting on government and privately-owned land is widespread. Only about 60 per cent of the farms and 77 per cent of the farmland is owner-operated, i.e. held with property titles. Parceleros (recipients of land redistribution) are given provisional certificates from the government that allows them to farm the land indefinitely and pass it on to one heir. There is no virgin land available for colonization. Intensification, better land use, and a more equitable land distribution are the only remaining options for improving the lot of small-scale producers.

c. Quality of Life Indicators

The degree of rural poverty in the Dominican Republic is further reflected in high rates of nutritional deficiencies, morbidity, and mortality. The estimated daily average caloric (1634) and protein (45 grams) intake falls far short of the 2,319 calories and 60 grams of protein recommended by the Secretariat of Health. Families with RD$ 50 per month or less, the category which includes most peasant households, have a daily

per capita caloric and protein consumption of only 1,424 and 28 respectively. Thus, a mere one-fourth of all Dominican children under five years of age have an acceptable nutritional intake. A full 70 per cent of the total population is considered chronically malnurished. In the entire western hemisphere, only Guatemala and Haiti have lower nutritional levels. The Dominican basic diet consists of rice, beans, plantains, and cassava with only limited quantities of meat and milk. Cassava represents the main root crop in the diet while red beans make up the principle legume. For low income families, rice is the main source of protein; meat is only eaten periodically due to high cost.

The rural target group suffers substandard health conditions due not only to poor diet but also because of insufficient sanitational facilities, poor housing, polluted water, and deficient medical care. Infectuous and parasistic diseases are especially rampant causing death in 95.7 cases of 100,000 population. Life expectancy in 1970 was 59 years. In the rural provinces of Azua, Peravia, and San Cristobal, the infant mortality ratio is approximately 127.9 per 1,000 and 19.6 per 1,000 for the category one to 10 years of age. Diarrheal disorders and contagious diseases among children are frequently related to poor sanitation and malnutrition.

The educational system remains deficient for the needs of a developing country, although advances have been made during the 1970s. Fifty per cent of the adult population is still illiterate; in rural areas, this percentage is yet higher. Only seven per cent of the children who begin primary school in rural areas complete the sixth grade. There are many reasons for this, the main one being that only 11 per cent of the schools in rural areas offer six grades. Moreover, there are few trained specialists in

agriculture. It is predicted that in the years 1976 to 1980, only 505 agricultural graduates will be available, a projected deficiency of 43 per cent.

e. Farmer's Perception of Vertebrate Pest Problems

According to interviews with farmers in several Dominican districts, there are three major types of vertebrate pestsproblems: 1. grain eating birds, 2. rats and mice, and 3. the mongoose.

1. Bird pests: The two main bird pest species mentioned by farmers include the so-called Madam Sagá, a type of weaver finch, and the pajaro vaquero, or shiny cowbird. The weaver finch attacks the standing grain, especially rice and corn, while the shiny cowbird is notorious for feeding from livestock troughs. Small pig raisers, with between 10 and 50 head, are especially hurt by feed loss to cowbirds. The cowbird is only now in the process of becoming a widespread problem.

2. Rats and mice: Agricultural commodities in the Dominican Republic are frequently handled in sacks and storage facilities which are far from rodent proof. Swine farmers sometimes buy imported US ground hog feed (100 lb. sacks cost RD$ 8.50) in paper sacks which are especially vulnerable to attacks. Rodents are also found in coconuts and rice. In regard to the latter crop, it is interesting to note that rice flooding is practiced in the Dominican Republic. Thus, the transfer of rodent control methods developed among Philippine rice farmers might prove effective if local variations are considered.

3. Mongoose: The hurón, as the mongoose is locally called, was initially introduced to kill snakes and rats. However, the flesh-eating mongoose has evolved into a pest in its own right, preying on chickens

and chicken eggs. The mongoose proved ineffective in controlling rodents in coconut trees since it is a poor climber.

f. Traditional Methods of Control

As in Guatemala, a number of local traditional methods of control has evolved to cope with vertebrate pests in agriculture. Commonly, young boys guard the fields. They throw rocks, crack whips, and make noises by various means, In extensive fields, however, their efforts are frequently in vain. Furthermore, colored string is stretched over corn fields and the method of doubling corn is employed, although less than in Guatemala. Farmers have been known to burn out the nests of the weaver finch. Metal strips around tree trunks are intended to keep rodents from climbing the coconuts. In the pursuit of birds, a glue is often made from breadfruit and smeared around a stick to serve as a trap for light-weight birds. Semi-professional bird-trappers with wire traps catch large numbers of birds (up to 50 with a small cage) for sale in the market as pets and for consumption. Nets are also very effective: one catch yields regularly 80 to 150 birds. The importance of bird meat in the Dominican diet may be greater than realised. However, all these methods are inefficient in providing sufficient control. During the course of this social soundness study, a rice field was visited where a small boy was guarding against the weaver bird. Twenty per cent of the harvest had already been lost. Only one week later, the birds had inflicted so much damage that the field was no longer worth harvesting. This happened with the guard in the field full-time.

g. Real and Potential Constraints

1) Cost Factor

New technology is frequently far too expensive for peasants, especially where rural credit is difficult to obtain. Dominican peasants are accustomed to producing food with little or no cash expenditure. The average annual cash input for a small plot is no more than a few pesos. Any extra labor, if required, is payed in kind, not in cash. Therefore, care must be taken that new pest control techniques are within the price range of small farmers instead of being geared toward large commercial producers. In many areas, inadequate water supply creates an uncertainty in crop turn-out. Thus, peasants do not consider it worthy to invest heavily in insecticides and fertilizers. Water for spraying pesticides might likewise pose problems. Efforts should be made to work with existing cooperatives to facilitate use of any new technology. Group farming in rice areas is common (involving 10 to 50 farmers). In those cases, cost could be shared thus reducing an extra large burden on any single farm household.

2) Change Agents

A major problem is the lack of qualified personnel in the agricultural sector to carry out development tasks at the local level. Although government agricultural workers may originate from the countryside, they are rarely interested in returning to the rural community. Both research and extension branches of SEA (Secretariat of Agriculture) have increasingly directed their efforts toward small and medium farmers, but with limited success. As in other developing countries, farmers have tended to reject uncertain innovations and follow the time-tested methods of their forebears.

Thus, creative means should be sought out which will facilitate the flow of information between researchers, extension agents, and farmers. Each participant in the development process will need clear and concise information about the new mechanisms of pest control An effective program of pest control will be welcomed and the techniques adopted only if farmers are brought into all phases of planning and implementation. Regional and local demonstrations will need to be held. The Dominican population has shown a propensity to join together if it can be demonstrated that there are reasonable odds for success. In fact, unlike the adoption by individual farmers of new seeds or fertilizer, the effective control of rodents or birds will require the cooperation and joint action of all farmers in a target area.

3) Sophistication of Technology

Given cost constraints and farmers' adherence to known agricultural practices, any new technology must be adapted to local conditions and geared to the farmers' level of education. No amount of high-level planning without careful consideration of farmer attitudes will insure success of a vertebrate pest control project. This means that the program should be thoroughly planned and a convincing case made for the change in question. Obviously, all potential problems cannot be anticipated, but careful preparation with the help of farmers might facilitate acceptance of new techniques. Small-scale, on-the-farm experiments can feed back into research and initiate changes that might be of advantage. In the research and diffusion process itself, the biological and social sciences must be integrated to produce an appropriate technology within the farmers' financial capabilities. Five steps might be followed in such a program:

a) carefully define the pest problem for each target group in terms of economic, social, and environmental conditions;

b) carry out research geared toward developing appropriate technology;

c) join research and extension teams with small farmers to conduct on-farm tests;

d) attempt to dissimilate results to the peasant audience by various means of communication (e.g. radio, field days, demonstrations, films, posters, etc); and

e) continue evaluation of the techniques while feeding back to research unanticipated problems and new results.

Finally, some mention should be made of the problems of agro-chemical use among small farmers in the Dominican Republic. Although major use of agro-chemicals is concentrated on highly commercialized crops, small farmers frequently buy poisons over the counter to combat common pests. However, inexperience with toxic substances and careless handling has led to inadvertent poisoning of humans and farm animals. Grassroots development workers have related cases where children have eaten poisons and died. One man died after applying a highly toxic substance extensively over his skin, thinking it worked like insect repellent. In the late 1960s, a single village lost a number of small children because of pesticides in the village water source. This tragedy sparked editorials in Santo Domingo newspapers calling for greater controls on toxic compounds. Even when poisons are safely put out for rats, farmers complain that chickens and dogs frequently consume the bait and die. In short, chemical methods of pest control should be used only if accompanied by an education program similar to the agro-chemical seminars required in the US and Puerto Rico.

Mechanical traps or nets appear overall safer since they do not pose the dangers inherent in the use of poisons. Since birds are eaten in the Dominican Republic, huge wire traps (such as used in Puerto Rico and Morocco) capable of catching thousands of birds might also contribute to the people's protein intake while controlling crop losses. Group-farming found in some rice areas offers an existing organizational arrangement through which large traps might be set up. Bounty incentives for hand killing of rats might, as in the case of Thailand, prove highly effective.

h. Role of Women

Although traditionally women have had very little opportunity to participate in development programs, there are several reasons why they should be actively brought into this project. Most importantly, women are in charge of all matters directly related to the household. They are concerned with food storage and kitchen gardens, both of which are affected by pests. Of course, any general effort to raise food production in the fields will benefit all household members, including women, economically and nutritionally. Recently, an increasing number of women are participating as savings and credit cooperative directors and members. Their help should be elicited in drawing cooperatives into the vertebrate pest control program. Since male researchers and extension agents frequently overlook the role of women in food production, preparation, and storage, it might be advisable to train some female students as an integral part of the Regional Pest Control Center program.

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ANNEX F

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FM AMEMBASSY PORT AU PRINCE

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UNCLAS PORT AU PRINCE 1314

AIDAC

E.O. 12065: N/A

SUB: PROPOSED LAC REGIONAL VERTEBRATE PEST CONTROL

1. GOH DEPARTMENT OF AGRICULTURE IS HIGHLY RECEPTIVE TO PARTICIPATION IN SUBJECT PROPOSAL AND HAS MADE COMMITMENT TO PROVIDE FACILITIES AND PERSONNEL FOR BOTH CENTRAL LABORATORY AND OUTREACH ACTIVITIES. PHOTOCOPY OF LETTER FROM AGRICULTURE SECRETARY REQUESTING U.S. ASSISTANCE WAS GIVEN TO HANKINS AND DE GRAZIO WHO PROVIDED MUCH APPRECIATED ASSISTANCE IN FINALIZING MAJOR COMPONENTS OF PROPOSED PROJECT.

2. MISSION ENDORSES PROPOSAL AS TIMELY, RELEVANT AND VERY APPROPRIATE TO HAITIAN SITUATION AND CONCURS IN THE ASSIGNMENT OF ONE U.S. TECHNICIAN TO RESIDE IN HAITI AND SERVE ON REGIONAL BASIS. MISSION ALSO ENCOURAGES LAC DR TO APPROVE PROJECT AT EARLY DATE SO THAT IMPLEMENTATION CAN BEGIN IN FY 80.

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Department of State

INCOMING TELEGRAM

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INFO AMEMBASSY PORT AU PRINCE

UNCLAS SANTO DOMINGO 1775

E.9. 12065: N/A
SUBJECT: PROPOSED LAC REGIONAL VERTEBRATE PEST CONTROL PROJECT LOCATED IN HAITI

REF STATE 76797

1. SUBJECT PROPOSAL APPROPRIATE TO DR CONSIDERING CURRENT GODR ACTIVITIES IN THIS AREA. GODR HAS RECOGNIZED SERIOUS FARM CROP LOSSES CAUSED BY RODENTS AND A RDS AND HAS INSTITUTED A VERTEBRATE CONTROL PROGRAM OF THEIR OWN.

2. GODR IS INTERESTED IN SUBJECT PROPOSAL. MAIN DR NEEDS ARE ADVISORY, NOT BUDGETARY, AND GODR WOULD WELCOME THE OCCASIONAL ASSISTANCE OF ASDWRC BIOLOGIST AND HAS WELL QUALIFIED COUNTERPART. GODR ALSO INTERESTED IN COOPERATIVE ASPECTS OF PROGRAM BETWEEN HAITI AND DR.

3. MISSION ENDORSES ACTIVITY AS RELEVANT AND WELL TARGETED TO HELP GODR PROGRAMS THAT HELP SMALL FARMERS AND SUPPORTS LAC APPROVAL OF SUBJECT PROPOSAL. PLEASE ADVISE MISSION ON PROJECT DEVELOPMENTS.
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Department of State

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E.O. 12Ø65: N/A

SUBJ: PROPOSED REGIONALLY FUNDED PROJECT - PEST CONTROL

REF: STATE 42799

PROJECT TECHNICIAN CAN BE ACCOMMODATED WITHIN MISSION MODE CEILING.

JONES

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INFO

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DEPARTEMENT DE L'AGRICULTURE, DES RESSOURCES NATURELLES ET DU DEVELOPPEMENT RURAL

PROJET DE DEVELOPPEMENT AGRICOLE INTEGRE DARNDR/USAID

No. A-2 1 913 Port-au-Prince, le 1er mars 1979

Monsieur le Directeur,

Chaque année, les rongeurs et les oiseaux causent d'importantes déprédations aussi bien dans les entrepôts qu'au dépens de cultures sur pied. Comme conséquence de cette situation, il résulte une diminution considérable du volume des denrées alimentaires, entrant dans la nutrition humaine.

Le Département de l'Agriculture, des Ressources Naturelles et du Développement Rural (DARNDR), conscient de cette situation, organise périodiquement des campagnes d'éradication des pestes. Ces efforts n'ont été qu'un palliatif. La reproduction des déprédateurs s'est révélée plus rapide que leur destruction. Pour les combattre efficacement, il faudrait employer des méthodes de lutte scientifiques qui dépassent les possibilités actuelles du Département.

A la suite d'une analyse de la situation, des contacts ont été faits avec le Bureau de l'ADO de l'USAID, en vue de l'élaboration d'un projet conjoint prévoyant une assistance technique et matérielle de l'AID et l'apport du DARNDR en personnel qualifié et en facilités physiques consistant surtout dans l'emplacement nécessaire à l'installation d'un laboratoire.

Vous trouverez en annexe, une documentation relative à ce projet, y compris le compte rendu d'une séance de travail tenue à Damien, le 12 janvier écoulé, mentionnant les voies et moyens nécessaires à sa réalisation.

Mr. Lawrence HARRISSON
Directeur de la Mission
de l'AID en Haiti
Port-au-Prince.

J'introduis donc officiellement à votre office une requête d'assistance technique de l'AID, permettant la venue en Haiti d'un expert qui étudiera avec le personnel haitien, les modalités d'exécution du Projet.

Je saisis l'occasion pour vous renouveler, Monsieur le Directeur, l'expression de mes sentiments distingués.

Edouard D. BERRCURT
Secrétaire d'Etat

ANNEX G

POSITION DESCRIPTION
(HAITI)

Biologist

INTRODUCTION

The position will be located in Haiti to service several countries within the Caribbean Region as a part of the joint USFWS/USAID program on control of vertebrate pests in developing countries. The primary goal of this program is to increase the human food supply by reducing animal damage to agricultural crops in the Caribbean Region.

It is the incumbent's responsibility to design, direct, conduct, and supervise field and laboratory studies aimed at developing ecologically sound techniques for reduction of losses and long-range management of vertebrate pest problems that exist in the Caribbean Region particularly as related to small farm conditions.

Subject position requires technical capability of biologist to specialize in the development of damage control techniques and determine the effects of the procedures on non-target species and the environment.

ASSIGNMENT

The incumbent is expected to:

1. Acquire a basic knowledge of the vertebrate pest situations and damage control procedures in the Caribbean Region. This will require extensive study on the subject and cooperation with co-workers and other scientists.

2. Plan and conduct studies essential to the development of damage control procedures.

a. Determine population dynamics, food habits, and behavior of pest birds and rodents as related to the development, evaluation, and safety of potential or traditional control approaches.

b. Determine the distribution and extent of damage by vertebrate pests in major crops as affected by crops and cropping patterns, growing season, environmental conditions, and cultural practices of farmers.

c. Develop census techniques to determine relative populations of vertebrate pests before and after application of experimental control procedures, repopulation of cleared areas, and responses of other species to control practices.

d. Evaluate control methods for effectiveness, economic benefit, human and environmental safety.

e. Apply sound biological principles and statistical procedures.

3. Conduct laboratory studies designed to develop and evaluate control methods. These activities include capture or procurement of animals for research purposes, investigations of the effect of lethal and non-lethal agents as well as the development of baits and methods of application.

4. Plan and conduct field studies designed to evaluate control procedures such as chemical agents, mechanical devices, or habitat manipulation as a means of alleviating damage.

5. Plan and conduct adaptive research activities in participating countries which will perfect recommended packages of appropriate, cost effective technology to client groups.

6. Plan and coordinate training programs for adaptive research and outreach to develop the capabilities of indigenous institutions in the participating countries.

7. Plan and participate in workshops/seminars/on-the-job training programs for outreach specialists and farmers in the operation of effective control programs.

8. Document results of individual and cooperative research through administrative reports, publications in appropriate journals or other outlets, and participate in public relations activities relative to the program.

9. Attend scientific meetings as appropriate to this project to confer or present papers, carry on technical correspondence with cooperators, and perform other related duties as assigned.

SUPERVISION RECEIVED

Works under the general supervision of the Chief, Section of International Programs, Denver Wildlife Research Center, who gives general instructions and reviews work for compliance with instructions and adherence to Service policy. Incumbent plans, organizes, and conducts his assigned work within the framework of approved projects with considerable consultation with co-workers, cooperators, and his superior, but proceeds with a minimum of personal directives and instructions by his superior. Incumbent follows established administrative procedures as authorized by the Administrative Manual, by Service policy statements, and by Center policy directives as issued by the Director of the Center. In addition, he will be subject to conditions specified in the General Agreement between the U.S. Department of the Interior and AID, and such regulations as may be issued by the AID Mission in the host country.

GUIDELINES AND ORIGINALITY

The general field of research in developing practical and effective techniques for vertebrate pest management is an expanding one that has received inadequate attention in the LAC region. Appropriate guidelines

are available for similar work on problem species in the United States and in countries where DWRC has had similar experience. These guidelines must be adapted and modified for conditions that will be encountered in the Caribbean Region. Progress in carrying out research/outreach assignments requires ingenuity, originality, and inquisitiveness as well as initiative on the part of the incumbent.

QUALIFICATIONS AND CONTRIBUTIONS

Inasmuch as the incumbent will be a guest of the host country, it is essential that he be a qualified representative of the United States. He must be compatible with foreign nationals and adapt readily to local conditions. He also should have an R-2, S-2 level in French and Spanish.

The incumbent is responsible for performing the duties of this position in accordance with U.S. Government policies and directives. Operation of a Government-owned and/or leased vehicle is required.

DESCRIPTION OF PROPOSED ACTIVITIES OF ONSITE CONSULTANTS TO BE PERFORMED BY DWRC

Project Coordinator

Project coordination would be carried out by the Chief, Section of International Program, Denver Wildlife Research Center. General activities will include: overall technical supervision of all project personnel in Denver and at the field unit; planning and coordination of project activities and liaison with AID (LAC/DR/RD and participating missions) and other U.S. Fish and Wildlife Service entities; and, preparation of budgets, reports, and project summaries.

The Project Coordinator will make at least one visit annually (approximately 2-1/2 weeks) to the field unit to review technical progress, to assist in planning or ongoing work, to conduct annual performance appraisals for field unit personnel, and to assist AID in project eveluation activities as required.

Ecologist/Economic Biologist

During the life of the project, one or more individuals with expertise in ecology/economic biology will make periodic visits to the field unit to assist the long-term technician in planning and conducting appropriate ecological studies of vertebrate pest species, evaluations of environmental effects of control methods and strategies, and economic analyses of traditional and new pest control or management practices.

Ecological studies will include determination of pest population dynamics, description of annual cycles of reproduction and movements of pest species, and assessment of the impact of agricultural practices and pest management activities on pest populations.

Environmental evaluations will include determination of direct and indirect impacts of traditional and new pest control or management practices on nontarget species and compatibility of control procedures with existing or proposed farming systems.

Economic evaluations would include assisting the long-term technician and project counterparts in designing and conducting national surveys of pest damage to small farm crops, estimation of the probable economic limitations for pest management programs in relation to support by individual farmers or government agencies, and determination of costs and benefits of existing or candidate pest control methods or programs.

Behaviorist

Intermittently throughout the project, a specialist in the behavior of animal pests will work with the long-term technician and project counterparts to design and conduct appropriate field and laboratory studies of the behavior of rodent and bird pests. Such studies relating directly to the development or adaptation of control methods would include determination of the feeding behavior of pest rodents and birds, determination of daily activity cycles, evaluation of behavioral responses to candidate chemical or mechanical repellents or devices for appropriate use in reducing crop damage and determining response patterns of pests exposed to candidate bait formulations.

The behaviorist would be directly involved with similar studies in other foreign field projects and in U.S. Fish and Wildlife Service domestic programs, thus making his role in this project one of adapting existing methodology to problem solving rather than devising new techniques.

Statistician

One or more individuals specialized in statistical design and analysis relating to animal damage control research and control methods evaluation will be available for consultation with the long-term technician and other project staff throughout the life of the project. It is anticipated that a statistician(s) would make several field visits during the project for direct consultation on problems involving experimental design and analysis, crop damage assessment, and animal population estimation. Computer facilities, personnel for data analysis, and routine statistical review of study plans, reports, and manuscripts would be available at Denver to support the long-term technician and project counterparts but would not require financial inputs from the project.

Pharmacologist/Toxicologist

It is anticipated that chemical repellents and toxicants will have an important role in reducing crop damage in small farm situations in Latin America, in part because chemical strategies are generally much lower in direct cost than other potential approaches. A specialist in evaluation of vertebrate pest control chemicals will work periodically with project personnel in conducting preliminary laboratory studies to select candidate materials, develop appropriate formulations for field use, and design experiements to determine field efficacy.

The pharmacologist/toxicologist would be directly involved with similar studies in other field projects and in U.S. Fish and Wildlife Service domestic programs, and would serve as the principal project liaison with the private sector for selecting candidate chemicals for evaluation.

He will also be highly familiar with pesticide registration procedures and pesticide safety practices and would provide advice and information to field personnel and host government counterparts as required.

Field Biologist

One or more field biologist will periodically assist the long-term technician and counterpart personnel in designing and conducting field studies and control methods evaluation. This individual(s) would be highly skilled in standard field techniques and methodology and would assist in training counterparts and developing methodology adapted to local conditions. Field activities would include demonstration or development of safe methods for capturing and handling animals for use in laboratory experiments, evaluation or design of appropriate traps, marking, or sign techniques for assessing animal populations, demonstrating or constructing equipment or field cages to be used in preliminary field evaluation of control methods, assisting in crop damage surveys, and demonstrating the preparation of chemicals or formulations in quantities for field use.

This individual(s) would be directly involved in similar activities with other field projects and U.S. Fish and Wildlife Service domestic programs. His role will be one of applying or adapting existingmethodology rather than devising new techniques.

Electronics Specialist

The Denver Wildlife Research Center employs an electronics engineer and technical staff specialized in adaptation of electronic instrumentation to wildlife management problems. Major anticipated application in the LAB project would be the use of miniaturized radio transmitters to track the movement of pest rodents and birds and to determine mortality of target and nontarget species associated with control methods evaluations. Other techniques having possible application depending on local conditions are remote sensing of pest activity or crop damage, use of electrical barriers to protect fields from pest immigration, and use of ultrasound repellency techniques. One or more electronics specialists will work periodically with the long-term technician and project counterparts to determine needs and problems that could be solved through the use of specialized electronic tools. Stock items such as custom-made animal transmitters produced by the DWRC Electronics Laboratory would not require financial inputs by the project.

ANNEX G

TDY SERVICES FROM DWRC

Personnel of the Section of International Programs stationed at Denver provide backstop and TDY services to overseas field units. They are:

John W. De Grazio	Section Chief responsible for supervision and coordination of research activities; organizes or participates in outreach activities for control of rats, bats, or birds as required.
Michael W. Fall	Biologist responsible for outreach rodent control activities as required in Asia, Latin America, and Africa.
Donna J. Scott	Serves as Program Assistant to the Section; responsible for fiscal management activities, travel arrangements, commodity procurement and general coordination with AID/Washington, AID Missions, and International Organizations.
Richard L. Bruggers	Biologist responsible for outreach bird control activities as required in Asia, Latin America, and Africa.
Anneliese Valvano	Secretary to the Section.

In addition, personnel from other Section of the DWRC provide specific expertise and assistance upon request from the Section of International Programs. More than 100 professional scientists are available for consultation, liaison, TDY, and on-going research interchange with field unit personnel.

F-1

COMMODITIES

TECHNICAL SUPPORT

	Year 1	Year 2	Year 3	Year 4	Total
1st Station	23,300	17,000	5,000	4,000	49,300

One 4-wheel-drive vehicle	8,500
Spare parts for vehicle	1,000
Emergency generator (at facility)	3,000
Field supplies (camera, binoculars, traps, nets markers, biotelemetry equipment, etc.)	3,500
Laboratory supplies (microscope, dissecting kits, balances, refrigerator, freezer, holding and bioassay cages, glassware, reagents, chemicals, furnishings, etc.)	20,300
Office supplies (typewriter, calculator, slide projector, file and storage cabinets, office furniture, etc.)	5,500
Shipping costs	7,500
	$49,300

COMMODITIES

RESEARCH ANALYSIS AT DWRC

Year 1	Year 2	Year 3	Year 4	Total
5,000	5,000	5,000	5,000	20,000

Care of laboratory animals and feed	1,500
Analytical services (Residue analysis)	1,000
Chemical supplies	750
Formulation supplies	750
Miscellaneous laboratory supplies (glassware, reagents, population monitors, etc.)	1,000
	5,000/year (4 years)

ANNEX I

AID 1020-28 (1-72)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 79 to FY 83
Total U.S. Funding 850,000
Date Prepared: 7/5/79

Project Title & Number: Reduction of Vertebrate Pest Crop Losses (598-0584)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: To improve the standard of living in agricultural areas of participating countries by increased in income and crop productivity.	**Measures of Goal Achievement:** 1. Increased crop production yields. 2. Increased use of cost-effective production technologies.	1. Participating country Ministry of Agriculture (MAG) statistics. 2. Participating country economic development reports.	**Assumptions for achieving goal targets:** 1. Participating countries' policies include pursuance of consistent agricultural development strategy. 2. Small farmers can and will participate in agricultural development programs. 3. New technologies appropriate to needs of participating countries.
Project Purpose: Perfect practical technologies which can be used by participating countries to reduce farm crop losses caused by rodents and birds.	Conditions that will indicate purpose has been achieved: End of Project Status: 1. Assessments of incidence and magnitude of vertebrate pest losses; and design of control technology responsive to participating country needs. 2. Country capability for accurate damage determination and capacity to formulate,use, evaluate control technology. 3. Mechanisms for disseminating to LAC countries results and recommendations based on project activities.	1. Project survey and monitoring reports. 2. Results of field and adaptive research reports. 3. Participating country MAG reports.	Assumptions of achieving purpose: 1. Technologies perfected in vertebrate pest control are economically and socially acceptable in participating countries. 2. Participating country personnel available in adequate numbers to serve in program. 3. Participating government strategy includes crop protection components with appropriate institutional base.
Outputs: 1. Field unit to test cost-effective vertebrate pest control. 2. Participating country personnel trained. 3. Field studies (damage assessment, population, baiting, ecological). 4. Laboratory studies (biological controls, behavioral, food habits analysis). 5. Outreach programs (extension/farmer training, adaptive research/demonstration	Magnitude of Outputs: 1. A field unit which has developed operational vertebrate programs. 2. Six receive U.S. training with DWRC assistance. 3. Thirty. 4. Ten 5. Technical packages of proven control measures suitable for each participating country.	1. Contractor reports. 2. Participating country MAG reports. 3. Contractor/Participating USAID Mission training reports. 4. Adaptive research reports. 5. On-site evaluations.	Assumption for achieving outputs: 1. Adequate and suitable personnel in participating countries for training. 2. Required inputs provided in timely manner. 3. Participating government and/or Mission support.
Inputs: USG 1. Technical Specialist(s) 2. Technical Support including equipment. 3. Support analyses at DWRC. 4. Training Participating Countries 1. Technical support facilities 2. Training	**Implementation Target (Type and Quantity) ($000)** U.S. FY 79 80 81 82 83 TOTAL 1. 10.1 58.8 53.0 57.4 46.8 226.3 2. 11.8 35.1 30.3 21.0 15.2 113.4 3. 14.5 54.1 63.2 66.5 51.9 255.2 4. - 17.4 22.2 23.2 6.6 69.4 13.6 165.4 173.7 168.1 120.5 664.3 Contingency/inflation factor (7%) 49.7 Contract overhead 136.0 TOTAL U.S. Contribution 850.0 HCs 1. - 27.0 33.0 33.0 33.0 121.0 2. - 6.0 6.0 2.0 14.0 Total Host countries contribution 135.0 TOTAL 985.0	1. Contractor reports. 2. AID disbursement records. 3. Participating USAID Mission reports. 4. Participating country project reports.	**Assumptions for providing inputs:** 1. All External financing in place 2. Participating country commitments in place. 3. Personnel available.

AUG 16 1979

ACTION MEMORANDUM FOR THE ASSISTANT ADMINISTRATOR (LAC)

FROM: LAC/DR, Marshall D. Brown

Problem: Authorization of LAC Regional Reduction of Vertebrate Pest Crop Losses Grant for $850,000; FY 79 obligation is $310,000.

Discussion: The purpose of the project is to develop cost effective technologies which can be used by LAC countries to reduce farm crop losses caused by rodents and birds. The project will establish a vertebrate pest control field unit in Haiti which will engage in research for the adaptation and development of vertebrate pest management techniques in response to national and small farmers needs and perform limited extension and outreach activities for introducing control practices. The field unit will be established in Haiti to serve Haiti and the Dominican Republic and will be accessible to other countries in the Caribbean. At the end of the project a capability will exist in Haiti and the Dominican Republic for identifying and evaluating vertebrate pest losses and for designing and implementing control programs.

The Grantee will be the Denver Wildlife Research Center (DWRC) of the U.S. Department of Interior under a PASA with A.I.D. The total cost of the four year project is $850,000 which will finance one long-term specialist ($226,300); support costs for one field unit ($113,400) including a vehicle; training ($69,400), research analysis related to field testing at Denver ($255,200); and DWRC overhead costs and contingencies ($185,700). The Governments of Haiti and the Dominican Republic will contribute $97,000 and $38,000, respectively, for laboratory, office space, counterpart personnel assigned to the project, and in-country training costs.

The DAEC reviewed and approved the project on June 21, 1979, with the following modifications to the Project and PP: (1) reduction in the number of field units from two to one and reduction in Life of Project funding from $1,200,000 to $850,000; (2) addition of a condition precedent to disbursement for activities for other than long-term technical assistance which requires the signing of memoranda of understanding between the DWRC and the GOH and the GODR, respectively, describing host country financial contribution and responsibilities under the project, the DWRC activities and responsibilities, and the project monitoring responsibilities of each USAID; (3) addition of a section which describes the current state of the art regarding vertebrate pest control techniques and estimated costs of each applied technology when they have been calculated; (4) addition of benefit/cost calculations of rodent control programs based on data from the Philippine experience; (5) evaluation of DWRC's institutional capability to implement the project; (6) inclusion of scopes of work for the short and long-term technical assistance advisors; and (7) addition of a detailed equipment and vehicle list.

The Initial Environmental Examination recommending a Negative Determination was approved on April 12, 1979. The Project is included in the FY 79 Congressional Presentation for $599,000.

Recommendation: That you sign the attached Project Authorization and Request for Allotment of Funds (PAF), thereby authorizing AID/W to negotiate a PASA with the Denver Wildlife Research Center of the Department of the Interior.

Attachments: TAB A - PAF

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

ASSISTANT
ADMINISTRATOR

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

Name of Country : LAC Regional

Name of Project : Reduction of Vertebrate Pest Crop Losses

Number of Project: 598-0584

Pursuant to Part I, Chapter 1, Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the use of not to exceed Three Hundred Ten Thousand United States Dollars ($310,000) (the "Authorized Amount") to help in financing certain foreign exchange and local currency costs of goods and services required for the project described in the immediately following sentence. The project consists of the establishment by the Denver Wildlife Research Center of the U.S. Department of Interior ("DWRC") of a vertebrate pest control field unit in Haiti which will engage in research for the adaptation and development of vertebrate pest management techniques in response to national and small farmer needs and will perform extension and outreach activities for dissemination of control practices in Haiti and the Dominican Republic (the "Project").

I approve the total level of AID appropriated funding planned for the Project of not to exceed Eight Hundred Fifty Thousand United States Dollars ($850,000), including the Authorized Amount, during the period FY 1979 through FY 1982. I approve further increments during that period of funding up to $540,000, subject to the availability of funds in accordance with AID allotment procedures.

I hereby authorize the initiation of negotiation and execution of the appropriate documents by the officers to whom such authority has been delegated in accordance with AID regulations and Delegations of Authority, subject to the following essential terms, covenants and major conditions, together with such other terms and conditions as AID may deem appropriate.

A. Source and Origin of Goods and Services

Except for ocean shipping, goods and services financed by AID under the Project shall have their source and origin in the United States or in Haiti or the Dominican Republic, except as AID may otherwise agree in writing. Ocean shipping financed by AID under the Project shall be procured in the United States, except as AID may otherwise agree in writing.

B. Condition Precedent to Disbursement for Other Than Long-Term Technical Assistance

Prior to any disbursement, or to the issuance of any commitment documents under the obligating agreement to finance activities other than long-term technical assistance, DWRC shall, except as AID may otherwise agree in writing, furnish AID, in form and substance satisfactory to AID, copies of signed memoranda of understanding among DWRC, the Governments of Haiti and the Dominican Republic, respectively, and the AID Mission in each such country, setting forth the financial contribution and other responsibilities of each such Government, the activities and responsibilities of DWRC and the Project monitoring responsibilities of each such AID Mission.

Assistant Administrator
Bureau for Latin America and
the Caribbean

8/16/79
Date

Clearances:
GC/LAC:J. Kessler JK/AC date 8/16/79
LAC/DR:N. Parker _____ date _____
LAC/DR:L. Armstrong _____ date _____
LAC/DR:M. Brown _____ date 8/15/79

GC/LAC:GMWinter:pc:8/15/79:x29182