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UNCLASSIFIED

UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D. C. 20523

BELIZE

PROJECT PAPER

NATURAL RESOURCE MANAGEMENT AND PROTECTION

AID/LAC/P-692

PROJECT NUMBER: 505-0043

UNCLASSIFIED

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: A (A = Add, C = Change, D = Delete) — Amendment Number: ____ — DOCUMENT CODE: 3

2. COUNTRY/ENTITY: Belize

3. PROJECT NUMBER: 505-0043

4. BUREAU/OFFICE: Latin America and the Caribbean — 05

5. PROJECT TITLE (maximum 40 characters): Natural Resource Management and Protection

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 09 DD 30 YY 96

7. ESTIMATED DATE OF OBLIGATION (Under 'B.' below, enter 1, 2, 3, or 4)
A. Initial FY 91 B. Quarter 4 C. Final FY 96

8. COSTS ($000 OR EQUIVALENT $1 = BzD$2.00)

A. FUNDING SOURCE	FIRST FY 91 B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total						
(Grant)	(1,000)	( )	(1,000)	(5,734.7)	(2,765.3)	(8,500)
(Loan)	( )	( )	( )	( )	( )	( )
Other U.S. 1.						
Other U.S. 2.						
Host Country			250		3,913.9	
Other Donor(s)						
TOTALS	1,000		1,250	5,734.7	6,679.2	12,413.9

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) FN	EVMP-B					1,000		8,500	
(2)	EVFR								
(3)									
(4)									
TOTALS						1,000		8,500	

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 079 | 090 | 096 | 160 | 850 | 876

11. SECONDARY PURPOSE CODE: 230

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

A. Code	ENV	PVON					
B. Amount	2,667	1,700					

13. PROJECT PURPOSE (maximum 480 characters)

To improve conservation management in order to increase and sustain the economic benefits from agriculture, forestry, and fisheries resources.

14. SCHEDULED EVALUATIONS
Interim MM 06 YY 94 | MM YY | Final MM 06 YY 96

15. SOURCE/ORIGIN OF GOODS AND SERVICES
[X] 000 [X] 941 [X] Local [X] Other (Specify) 899

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

The USAID Controller hereby indicates his concurrence with the assessment of the methods of accountability, implementation and financing of this proposed project and approves pertinent sections.

Darrell L. Dolley, Controller

17. APPROVED BY
Signature: Barbara P. Sandoval
Title: A.I.D. Representative USAID/Belize
Date Signed: MM 09 DD 20 YY 91

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

AID 1330-4 (8-79)

BELIZE

PROJECT PAPER

Natural Resource Management and Protection Project

(Project No. 505-0043)

TABLE OF CONTENTS

	Page
Data Sheet	
Table of Contents	
Project Authorization	i
Project Summary and Recommendations	iii
Conditions, Covenants, Waivers and Negotiation Status	vii
Abbreviations and Acronyms	xii
I. BACKGROUND AND RATIONALE	
A. Background	1
B. Problem	2
C. The Response	7
D. Relationship to A.I.D. Policy	8
E. Relationship to Regional Programs	8
F. USAID Strategy	9
G. Project Strategy	10
H. Constraints Limiting the Response	11
1. Policy	12
2. Institutions	12
3. Cultural and Social Forces	12
4. Technological Constraints	12
II. PROJECT DESCRIPTION	
A. Goal and Purpose	14
B. End of Project Status	14
C. Project Elements	15
1. Element 1: Envir. Planning & Monitoring	16
2. Element 2: Sustainable Agric. Production	26
3. Element 3: Forestry Development	34
D. Project Implementation Support	43
1. Element 4: PVO Project Support	43
2. Element 5: Project Coordination & Management	46
III. SUMMARY COST ESTIMATES AND FINANCIAL PLAN	
A. Total Costs and Funding Sources	49
B. Project Financial Plan	49
C. Methods of Financing and Disbursement	53
IV. IMPLEMENTATION PLAN	
A. Implementation Responsibilities	55
1. Government of Belize	57
2. Umbrella PVO and LNGOs	59
3. USAID/Belize	59

B. Project Implementation Strategy 61
1. Environmental Planning and Monitoring 62
2. Sustainable Agricultural Production 62
3. Forestry Development 62
C. Coordination 65
D. Annual Work Plans 63
E. Implementation Schedule 66
F. Procurement Plan 67
1. Technical Assistance 69
2. Training 70
3. Commodities 70
4. Construction 72

V. MONITORING, EVALUATION AND AUDIT

A. Monitoring 73
B. Evaluation 73
C. Audits 75

VI. SUMMARIES OF ANALYSES

A. Institutional Analysis 76
1. The Ministry of Natural Resources 76
2. The Ministry of Tourism & the Environment 77
3. Local Non-Governmental Organizations 78
B. Technical Analysis 79
C. Social Soundness Analysis 80
D. Economic and Financial Analysis 82

ANNEXES
1. PID Approval Message/DAEC Guidance Response
2. Logical Framework
3. Statutory Checklist
4. Government of Belize Request for the Project
5. Environmental Determination
6. Financial Tables
7. Detailed Element Implementation Schedule
8. GIS Implementation Plan
9. Technical Analysis
10. Social Soundness Analysis
11. Economic and Financial Analysis
12. Bibliography

PROJECT AUTHORIZATION

Name of Country: Belize

Name of Project: Natural Resource Management and Protection

Number of Project: 505-0043

1. Pursuant to Sections 103 and 106 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Natural Resources Management and Protection Project for Belize involving planned obligations not to exceed Eight Million Five Hundred Thousand United States Dollars (US$8,500,000) in grant funds over a five-year period from date of authorization, subject to the availability of funds in accordance with the A.I.D. OYB/allotment process, to help in financing foreign exchange and local currency costs for the Project. The planned life of the Project is sixty (60) months from the date of initial obligation.

2. The Project consists of assistance to the Government of Belize (GOB) and to selected non-governmental and private and voluntary organizations to improve the management of Belize's natural resources in order to increase and sustain the economic benefits from agriculture, forestry, fisheries and tourism while protecting and conserving the resource base upon which these industries depend.

3. The Project Agreement, which may be negotiated and executed by the officer to whom such authority is delegated in accordance with A.I.D. regulations and Delegations of Authority, shall be subject to the following essential terms and covenants and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate.

a. <u>Source and Origin of Commodities, Nationality of Services</u>

Commodities financed by A.I.D. under the Grant shall have their source and origin in the United States, except as A.I.D. may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services shall have the United States as their place of nationality, except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the Grant shall, except as A.I.D. may otherwise agree in writing, be financed only on flag vessels of the United States.

b. <u>Conditions Precedent</u>:

In addition to such other conditions as may be appropriate, the agreement shall include the following:

Prior to any disbursement for procurement of pesticides, or to issuance by A.I.D. of documentation pursuant to which such disbursement will be made, the GOB will, except as A.I.D. may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D., an assessment of the environmental impact of the specific pesticides to be procured and a description of measures to ensure their safe use.

c. Waivers

(1) Ocean Shipping: In blanket waiver 90-B-11, which expires October 29, 1991, AID/W waived the requirement for shipping by U.S. flag vessels and authorized shipment on vessels registered in A.I.D. Geographic Code 935 countries. An extension of the blanket waiver is under review by AID/W.

(2) Nationality of Services: The requirement that technical assistance services be of U.S. nationality is hereby waived to permit procurement of technical assistance from Belize and Central America up to a maximum aggregate amount of US$670,000.

(3) Source/Origin of Commodities: The requirement that commodities be of U.S. source and origin is hereby waived to permit procurement of lightweight motorcycles from countries included in A.I.D. Geographic Code 899 up to a maximum aggregate amount of US$50,000. I certify that special circumstances exist to waive the requirement of Section 636(i) of the Foreign Assistance Act, as amended, and the exclusion of procurement from Free World countries other than the cooperating country and countries included in Code 941 would seriously impede attainment of U.S foreign policy objectives and the objectives of the foreign assistance program.

(4) Participant Airfares: The requirement for the Host Government to pay international airfares to the Port of Entry in the U.S., or third country, is hereby waived for those participants departing before March 31, 1992.

Barbara P. Sandoval
A.I.D. Representative
Belize

September 20, 1991
Date

Drafted by:ADO:JRAllen;rev.PDO,PBisek:8/22/91:1325b

Clearances:	ADO:GLike		Date:	9/20/91
	PDO:PBisek		Date:	9/20/91
	CONT:DDolley		Date:	
	RLA:MWilliams	(draft)	Date:	09/04/91
For waivers:	LAC/DR:	STATE 285159	Date:	8/29/91

PROJECT SUMMARY AND RECOMMENDATION

A. Summary

Although Belize is endowed with a rich diversity of natural resources, the need to achieve a balance between economic development and conservation has become urgent. Belize continues to depend on its exploitable natural resources for economic growth without making the investments or taking the precautions needed for sustainable extraction. While existing policies are generally well-conceived, clouded lines of authority and limited technical and financial resources mean regulatory and enforcement impact is negligible. High population growth, including an influx of refugees from neighboring countries, and an expanding economy are straining natural resource renewability levels. The evidence suggests that the devastating cycle of deforestation and environmental degradation present elsewhere in the region will be repeated in Belize if interventions are not adopted immediately.

The Natural Resources Management and Protection (NRMP) Project is designed to help define and implement a strategy, policies and regulations for environmental protection and natural resource management; develop data collection and analysis capability for environmental monitoring, planning and management; introduce sustainable alternative cropping systems in critical areas; establish a comprehensive system of protected areas based on enhanced land use planning; and expand public awareness and investment in conservation. Activities will be scaled to the limited absorptive capacity of the participating government agencies and local non-governmental organizations (LNGOs) responsible for implementation.

The Project fits closely A.I.D.'s Strategy Statement for Environmental and Natural Resource Management in Central America. The Regional Environment and Natural Resources Management (RENARM) Project has helped define its design. The U.K.'s Overseas Development Administration (ODA) is planning complementary assistance in land use planning, including a geographic information system (GIS), and forest management based on the Tropical Forestry Action Plan (TFAP).

Increased capability to plan and rationally manage natural resources is the common objective linking the NRMP Project elements.[1] Project resources will focus on the organizational and institutional shortcomings that limit more effective natural resource management and conservation by applying the technologies found to be successful elsewhere in the region. The Project will be implemented through the combined efforts of the GOB, an international private voluntary organization (PVO) and USAID. Under an umbrella cooperative agreement, the PVO will provide the principal support for project implementation, including mobilizing

the LNGO involvement necessary to complement the GOB's capabilities, implementing the Sustainable Agricultural Production field activity, and furnishing resident technical and administrative support. A Belizean Project Coordinator representing the three ministries involved and USAID project managers will also have access to additional specialized technical assistance through buy-ins to regional and centrally funded projects in watershed management, land use planning, plant protection and and coastal resource conservation.

The Project will strengthen the Department of Environment of the Ministry of Tourism and the Environment, and the Forestry Department, Conservation Division and Lands & Surveys in the Ministry of Natural Resources by providing training, technical assistance and necessary equipment and vehicles. The GOB will establish an effective environmental policy and regulatory framework, monitor key indicators of environmental quality, expand its property registry system to include a GIS for land use capability analysis, and manage the system of forest reserves and protected areas for conservation and production purposes.

Project efforts will initially focus assistance on a relatively few critical areas to acquire needed experience in field interventions. Local non-governmental organizations and community based conservation interests will be relied on heavily to complement the GOB's capabilities. The Project will target these groups to promote grass-roots support and strengthen the indigenous capabilities needed for continuity.

The goal of the Project is to protect and manage the natural resources upon which the sustainable economic and social development of Belize depends. Its purpose is to improve conservation management in order to increase and sustain the economic benefits from agriculture, forestry, and fisheries while protecting and conserving the resource base upon which these industries depend.

The total project cost is US$12.4 million, of which A.I.D. will contribute $8.5 million in grant funds; the balance will come from host country contributions.

Summary Project Budget ($000)

	A.I.D.	H.Cntry
Environmental Planning & Monitoring	1,103	745
Sustainable Agricultural Production	2,103	705
Forestry Development	1,452	1,761
Subtotals	4,659	3,211
PVO Project Support	1,832	300
Project Coord & Mgt.	1,327	70
Subtotals	3,159	370
Inflation & Contingency	682	334
Totals	8,500	3,915

The Project is comprised of three principal technical elements, Environmental Planning and Monitoring, Sustainable Agricultural Production and Forestry Development. Two elements, PVO Project Support and Project Coordination and Management, provide implementation support for the three technical components.

Under the Environmental Planning and Monitoring element, the GOB's ability to monitor key indicators of environmental quality, assess environmental impacts of development projects and enforce compliance with the terms of development concessions will be improved. Environmental policies will be clarified, realigned and more effectively coordinated between government entities. The policy and regulatory foundation established at the outset of the Project will serve to orient field interventions and prioritize activities proposed under the project components, particularly Forestry Development.

The second element, Sustainable Agricultural Production, will bring the combined efforts of improved land use planning, alternative cropping systems, soil conservation practices, integrated pest management, and post harvest technology to bear on the problem of deforestation and environmental degradation caused by declining agricultural productivity. Experience has shown that profit margins of traditional small farms can be increased significantly with relatively minor, minimally disruptive adjustments in cropping systems. These technologies will be extended to areas where farming represents a problem for forestry and/or conservation management.

Under the third element, Forestry Development, rapid assessments of critical areas supported by ODA's analysis of remote imagery will guide initial field interventions and establish the baseline needed for an urgent response to the rate of tropical deforestation, establishment of immutable boundaries of forest reserves and protected areas, and the extent of the production

forest. Subsequent efforts will concentrate on defining and consolidating the boundaries of forest reserves and protected areas and managing them effectively.

Elements four (PVO Program Support) and five (Project Coordination and Management) are means by which the NRMP Project will be implemented. The international PVO will provide technical and program support to the Project Coordinator and GOB implementing entities, backstop its own field operations in implementing the Sustainable Agricultural Production activity and manage a Conservation Fund promoting community based conservation initiatives and linkages with LNGOs. Finally, the Project Coordination and Management element provides the Belizean Project Coordinator, project managers for USAID, certain short-term technical assistance, and funds for evaluations and audits.

B. Recommendation: That the Natural Resources Management and Protection Project be authorized for grant funding of US$8,500,000 over a life-of-project of five years.

CONDITIONS, COVENANTS, WAIVERS AND NEGOTIATING STATUS

A. Conditions and Covenants

The following conditions precedent and covenants are proposed for inclusion in the Project Agreement to be executed with the Government of Belize:

1. Conditions Precedent to Disbursement

a. Initial Disbursement: Prior to any disbursement or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made under the Agreement with the Government of Belize (GOB), the GOB will, except as A.I.D. may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.:

(1) an opinion of the Attorney General of the Government of Belize that this Agreement has been duly authorized and/or ratified by, and executed on behalf of the Government of Belize, and that it constitutes a valid and legally binding obligation of the Government of Belize in accordance with all of its terms;

(2) a statement of the name of the person holding or acting as representative of the GOB and of any additional representatives, together with a specimen signature of each person specified in such statement.

b. Subsequent Disbursements

(1) Prior to any disbursement for activities initiated after December 31, 1992, or to issuance by A.I.D. of documentation pursuant to which such disbursement will be made, and not later than March 31, 1993, the GOB will, except as A.I.D. may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.:

(a) for activities under Element 1, evidence that positions are established and filled in the Ministry of Tourism and the Environment in sufficient numbers to carry out implementation of the portions of the Project for which that Ministry is responsible and, specifically, that a minimum of four positions, in the Department of Environment have been established and filled;

(b) for activities under Element 3, evidence that positions are established and filled in the Ministry of Natural Resources in sufficient numbers to carry out implementation of the portions of the Project for which that Ministry is responsible and specifically, that a minimum of 10 positions in the Department of Forestry's Conservation

Division have been established and filled, and that a minimum of 15 Forest Guard positions have been established, of which a minimum of eight have been filled.

(2) Prior to any disbursement for activities initiated after December 31, 1993, or to issuance by A.I.D. of documentation pursuant to which such disbursement will be made, and not later than March 31, 1994, the GOB will, except as A.I.D. may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D., evidence of effective measures having been taken to ensure that the process by which national lands are made available for other uses is subject to (a) prior public notice; (b) review and approval by a qualified technical group; and (c) due consideration of the environmental impact of the proposed use.

(3) Prior to any disbursement for procurement of pesticides, or to issuance by A.I.D. of documentation pursuant to which such disbursement will be made, the GOB will, except as A.I.D. may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D., an assessment of the environmental impact of the specific pesticides to be procured and a description of measures to ensure their safe use.

(4) Prior to any disbursement for procurement of equipment for the Conservation Data Center, or to issuance by A.I.D. of documentation pursuant to which such disbursement will be made, the GOB will, except as A.I.D. may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D., the identification of the facility in which the Center is to be located and evidence that funds will be available for its operation.

2. <u>Covenants</u>

a. The GOB shall covenant to make available financial resources and personnel in the Ministries of Agriculture and Fisheries, Natural Resources, and Tourism and the Environment sufficient to carry out their responsibilities under this Project. (Training and technical assistance provided under the Project will be subject to approval of plans which specifically identify the individual(s) who will be counterparts to technical assistance personnel and who will carry out the work of the respective organizational unit(s) during proposed periods of training.)

b. The GOB shall covenant to include A.I.D. in its annual planning, programming and budgeting discussions related to the Project and to submit, in form and substance satisfactory to A.I.D., annual implementation plans and budgets, and semi-annual reports on cash and in-kind contributions to the Project.

c. The GOB shall covenant that it will pursue measures to:

(1) restrict the granting of government concessions, leases, development permits or other wide-scale access to areas designated as national parks or equivalent reserves targeted for assistance under the Project; and

(2) require that the granting of land titles and use rights, mining and timber concessions, river and coastal use permits, and road construction projects will be subject to a determination by a qualified body that the proposed land use or development is appropriate and that negative environmental impacts are minimized.

B. Waivers

The following waivers are recommended for approval in the Project Authorization.

1. Ocean Shipping: There is no U.S. flag service to Belize. Only Central Gulf Lines may occasionally call Belize on inducement cargoes of at least 500 revenue tons. Blanket waiver 90-B-11 extended approval of financing of costs of transportation on ocean vessels under flag registry of free world (Code 935) countries through October 29,1991. To reflect this blanket waiver and the expectation that U.S. flag vessels will continue to be unavailable, the following language is recommended for inclusion in the Project Authorization:

> In blanket waiver 90-B-11 which expires October 29, 1991, AID/W waived the requirement for shipping by U.S. flag vessels and authorized shipment on vessels registered in A.I.D. Geographic Code 935 countries. AID/W currently is reviewing an extension of the blanket waiver.

2. Nationality of Services: The Project Paper indicates that for both cost considerations and to further the objectives of the Project by building local capacity in Belize, enhancing the public-private partnership in protection of its natural resources and fostering linkages to natural resource management and protection efforts in the Central American region, some procurement of technical assistance and training services will be from sources in Belize and other countries in the region.

To the extent the technical assistance and training expertise needed is available in Belize, the cost can be expected to be less than half the cost of similar services obtained from the U.S. In addition, providing professional opportunities to Belizeans with relevant skills will enhance the country's capacity to attract and retain these human resources. Use of personnel and institutions from countries in the region may

also result in somewhat lower costs, but more significantly, will help to forge human relationships and institutional linkages of enduring value through Belize's participation in regional environmental protection efforts. Most such procurements will be through buy-ins to contracts existing under the Regional Natural Resources Management (RENARM) Project or through direct contracts with regional institutions, such as CATIE, which are also involved in the RENARM Project. A significant portion of the technical assistance will be provided through assistance agreements with one or more U.S. PVOs and/or agreements with local PVOs.

The Project Paper estimates total costs for technical assistance at $3,864,000. The amount for services other than those to be provided under assistance agreements with PVOs or through buy-ins to existing A.I.D. contracts, is estimated not to exceed $470,000 for services from sources in Belize and $200,000 for services from regional sources. No single contract is expected to approach the $250,000 threshold established in STATE 410442 (12/5/90). The following waiver is recommended:

> Nationality of Services: The requirement that technical assistance services be of U.S. nationality is hereby waived to permit procurement of technical assistance from Belize and Central American countries up to a maximum aggregate amount of $670,000.

Third country training is subject to policies stated in Chapter 8 of Handbook 10. No waiver is required.

3. Source and Origin of Commodities: Commodities to be procured under the Project will for the most part be of U.S. source and origin. Some procurement of local shelf items is also likely, but is generally expected to be small value transactions which will not require waivers. A waiver of origin is required for the procurement of motorcycles.

The Project Paper proposes procurement of 19 motorcycles for use by agriculture extension personnel and forest guards. The required motorcycles have an engine displacement of 250 cc or less. Motorcycles of the required size and specification with spare parts and service are available in Belize, but are not manufactured in the United States. Several brands are locally available that will satisfy the requirements, but all are manufactured in Japan. The probable source for this number of motorcycles will be a local dealer. Motorcycles by U.S. manufacturers, with larger engine displacement, are not appropriate for off highway use.

A.I.D. Handbook 1, Supplement B, Section 4C2d(1)(a) cites one circumstance that may merit waiving the requirement to purchase U.S. manufactured motor vehicles as the "inability of

U.S. manufacturers to provide a particular type of vehicle. e.g., lightweight motorcycles..." The cited circumstance is applicable to this situation.

The total estimated cost for the 19 motorcycles is US$47,500. This amount is within the limit of authority redelegated to the Mission under Redelegation of Authority No. 752. The following waiver is recommended:

> The requirement that commodities be of U.S. source and origin is hereby waived to permit procurement of lightweight motorcycles from countries included in A.I.D. Geographic Code 899 up to a maximum aggregate amount of US$50,000. I certify that special circumstances exist to waive the requirement of Section 636(i) of the Foreign Assistance Act, as amended, and the exclusion of procurement from Free World countries other than the cooperating country and countries included in Code 941 would seriously impede attainment of U.S foreign policy objectives and objectives of the foreign assistance program.

4. Participants' International Airfares: The GOB will be expected to pay airfares for participants under the Project, but requires time to provide for this cost in the budget. The next budget will be prepared in March for the GOB Fiscal Year beginning April 1, 1992. The following waiver is recommended:

> The requirement for the Host Government to pay international airfares to the Port of Entry in the U.S., or third country, is hereby waived for those participants departing before March 31, 1992.

C. Negotiating Conditions

The Project Paper has been developed through discussions with representatives of the GOB and local environmental non-government organizations. Support for the project objectives is high. However, some reluctance to accept the recommended conditions precedent to subsequent disbursements stated in Section A (above) may be anticipated and some reservations have been expressed by GOB personnel with regard to the amounts identified in the Project Paper for assistance to non-governmental organizations. Nevertheless, USAID/Belize anticipates that a Grant Agreement with the GOB will be signed promptly after Authorization of the Project.

ABBREVIATIONS & ACRONYMS

BABCO	Belize Agribusiness Company
BAS	Belize Audubon Society
BEIPU	Belize Export and Investment and Promotion Unit
BCB	Banana Control Board
BCCI	Belize Chamber of Commerce and Industry
BCES	Belize Center for Environmental Studies
BEST	Belize Enterprise for Sustained Technology
BFAC	Belize Federation of Agricultural Cooperatives Society Ltd.
BZ&TC	Belize Zoo & Tropical Education Center
BMB	Belize Marketing Board
BSci	Bachelor's of Science
CAC	Commercialization of Alternative Crops
CARDI	Caribbean Agricultural Research Development Institute
CARE	Cooperative for American Relief Everywhere
CATIE	Tropical Agricultural Research and Training Center
CD	Conservation Division
CIDA	Canadian International Development Agency
CZMP	Coastal Zone Management Project
DBCD	Diversified Business Consultancies Division
DFC	Development Finance Corporation
DOE	Department of the Environment
DOH	Department of Hydrology
EOP	End of Project
EPA	Environmental Protection Agency
EPAT	Environmental Policy and Training
GIS	Geographic Information System
GOB	Government of Belize
HC	Host Country
IFAD	International Fund for Agricultural Development
IICA	Inter-american Institute for Agricultural Cooperation
LIS	Land Information System
LOP	Life of Project
LUA	Land Utilization Authority
MAB	Man and the Biosphere Programme
MAF	Ministry of Agriculture and Fisheries
MED	Ministry of Economic Development
MNR	Ministry of Natural Resources
MOH	Ministry of Health
MSC	Multiple Service Center
MSci	Master of Science
MTE	Ministry of Tourism and the Environment
NFDB	National Development Foundation of Belize
NGO	Non-Governmental Organization
NRMP	Natural Resource Management and Protection Project
ODA	Overseas Development Administration (United Kingdom)
O&M	Operations and Maintenance

PACD	Project Assistance Completion Date
PFB	Programme for Belize
PID	Project Implementation Document
PIL	Project Implementation Letter
POU	Project Operations Unit
PP	Project Paper
PVO	Private Voluntary Organization
R&D	Research and Development
RENARM	Regional Environmental and Natural Resource Management
ROCAP	Regional Office for Central America and Panama
TA	Technical Assistance
TAMP	Toledo Agricultural Marketing Project
TFAP	Tropical Forestry Action Plan
TSFDP	Toledo Small Farmers Development Project
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific, and Cultural Organization
US	United States
USAID	United States Agency for International Development
VITA	Volunteers in Technical Assistance

I. BACKGROUND AND RATIONALE

A. Background

Situated on the western rim of the Caribbean Sea, Belize is bounded on the north and northwest by Mexico and on the west and south by Guatemala. About the size of Massachusetts, the country is roughly a third as wide as it is long, and encompasses 22,963 square kilometers, an area slightly larger than El Salvador (Leonard, 1987).

The current population of Belize is an estimated 200,000 persons. In the ten years since it became independent, Belize's rate of population growth has increased from 2.6 percent in 1981 to 6.9 percent in 1991. Much of the variation is due to the influx of refugees and other immigrants. With less than 9 persons per square kilometer, Belize has one of the lowest general population densities in the world. However, Belize's 306 persons per square kilometer of cultivated land is a higher percentage than Honduras or Nicaragua (Leonard, 1987).

Although geographically situated in Central America, Belize's cultural heritage and economic legacy is distinct from that of its neighbors due to its former status as the English colony of British Honduras. Ethnically, the population is diverse, although predominately creole, with many Maya, European, Chinese and East Indian descendants. English is the official language though a growing segment of the population, now about 40 percent, also speak Spanish.

The basis of the economy grew out of export of logwood (a source of dye), mahogany and other hardwoods extracted from large estates and the mercantile class that made such enterprises profitable. Historically low population levels, difficult access to the interior and the little knowledge about its potential discouraged smaller individual land holdings. Farming never became established among the early non-indigenous settlers. The colonial policy that discouraged domestic food production in the colonies in order to preserve its foreign markets created a reliance on imported food products that continues to the present.

Today, Belize's agricultural sector is comprised of a wide range of farming practices, from indigenous milpa systems to large plantations of traditional export crops heavily reliant on external inputs. At one extreme are the Maya farmers in southern Toledo who continue to use a long fallow, diversified corn cropping system, essentially unchanged since the Conquest. At the other are a few large scale agribusiness producers of sugar, citrus, mangoes and bananas that are heavily capitalized, and dependent on agro-chemicals. Modern farming practices, combined with a common cultural heritage and work ethic have helped the Mennonites in the western and northern districts become the principal producers of small grains and livestock. Dispersed

throughout are a few producers of high value non-traditional agricultural exports and numerous semi-commercial, small farm plots that raise the bulk of a limited selection of seasonal crops available to the local consumer market.

In short, Belize's agriculture, like the natural resource landscape it's a part of, is characterized by its rich diversity. Each requires special, integrally related if not overlapping solutions. Measures to stimulate agricultural development have demanded a flexibility and responsiveness that the government has only partially succeeded in adopting--recent growth primarily has been a result of improved world markets. The importance of achieving a sustainable balance between economic development and conservation objectives has become an urgent policy issue. However, it is unclear whether the GOB's agricultural priority goal is to offset the food requirements of a growing population, or to help meet foreign exchange objectives through increased export production. Belize is at a crossroads in its development and needs assistance now in order to make better informed decisions concerning sustainable development alternatives.

Fortunately, Belize is endowed with a diversity of biological resources unique in tropical America today. The six life zones in the country's ecological profile are heavily forested and largely intact. While detailed countrywide faunal inventories have not been carried out, available data indicate that at a minimum there are 120 mammal, 530 avian and 150 reptile and amphibian species in Belize, with population and habitat status in much better condition than those found anywhere in the region (Cornelius, 1989).

The estimated 4,000 species of native flowering plants include 250 species of orchids and about 700 species of native trees. Forest vegetation, including broad leaf, pine and mangrove habitats, covers approximately 10,120 square kilometers--the highest percentage of forest cover in relation to overall national territory in the entire Central America isthmus. This diversity and abundance is matched by a world class marine environment formed around a barrier reef 280 kilometers long and comprised of 450 cayes, unique oceanic atolls, patch reefs, sea grass beds, coastal lagoons and mangrove forests. Recent harvests of key commercial marine species, i.e., spiney lobster and queen conch, show decline and have probably exceeded sustainable yield levels. Likewise, concerns about the rate of deforestation and mineral extraction are increasing. Fortunately the management of Belize's natural resource base still represents an unparalleled opportunity for a preventative response to the twin challenges of economic development and conservation management.

B. Problem

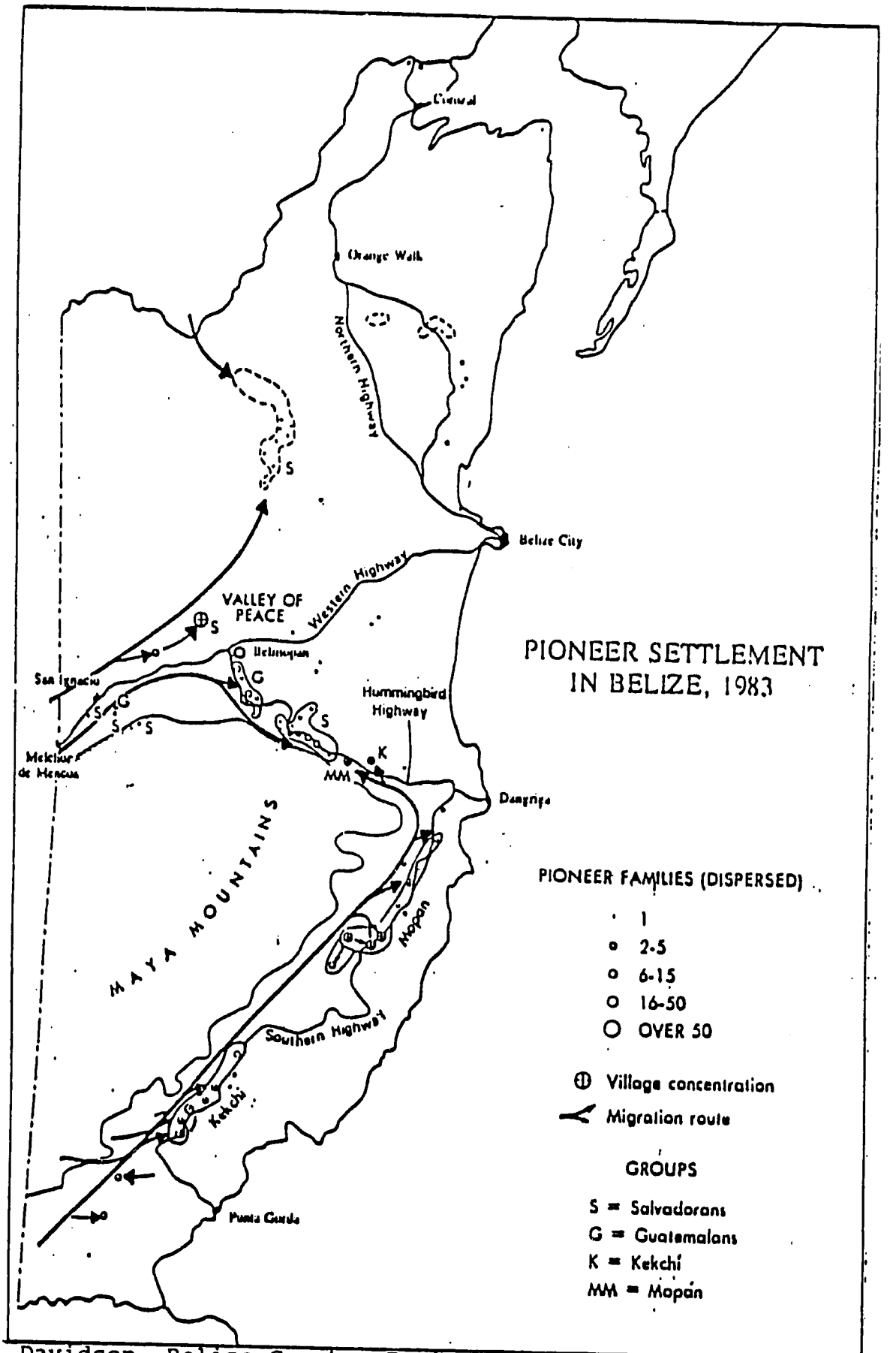
At the core of the current threat to Belize's natural resources is a pervasive lack of alternative economic activities and a

continuum of dependence on, and overuse of, its economically exploitable natural resources. In the absence of commercially viable oil reserves, significant manufacturing, or a competitive labor pool, there is little immediate expectation for rapid economic growth. Therefore, the goal of this assistance program focuses on helping Belize realize the fullest, sustained use potential of its unique natural resource endowment. Efforts are aided by the significant body of macro-economic and sectoral policies in place, and the fact that these have remained essentially unaltered in the recent change of government administration. While generally well conceived individually, these policies in practice overlap and create conflicts among various government jurisdictions (Abt Associates, 1990). Interministerial coordination is poor and decisions affecting the natural resource base tend to be arbitrary (TFAP, 1989). With limited technical and financial resources, regulatory and enforcement impact is negligible. Key demographic and socio-economic trends serve to further highlight the scope and complexity of the problem.

According to the U.N. High Commission on Refugees (UNHCR), Belize's population growth rate is more than any other country in the region--an average annual rate of 4.9 percent during the past ten years. This growth, occasioned by an influx of refugees from neighboring countries has strained health, education and other public services and put direct and considerable pressure on increasingly fewer natural resources. Most of these refugees are poor and uneducated, of different social and cultural antecedents and generally unfamiliar with the husbandry practices required to sustain the productive capacity of undisturbed tropical areas. (See Map 1 - Pioneer Settlement Patterns.) The concentration of their sheer numbers--400 families in the Valley of Peace settlement alone--has formed environmental "hot spots" where the survival interests of the colonizers impact most heavily on the natural resource base. Field observations indicate that many refugees are not farming the plots set aside for them but are working as day laborers for illegal logging taking place in the adjoining forest reserves. Left unabated, the rate of growth will mean that one-third of the 300,000 people in Belize by 1995 will be refugees dependent on renewable natural resources for their livelihood (CDSS, 1989).

Currently, slightly more than 40 percent of the population is concentrated along the coast, most under 16 years of age who have not yet joined the work force. Due to a cultural orientation to the sea, an economy historically dependent on commerce and trade, a nascent farming tradition and lack of employment opportunities in rural areas, Belize's urban populations recently have grown at a rate exceeding 9 percent per year (Leonard, 1987). While agricultural development has advanced in recent years, overall basic food and grain production has not kept up with increasing local demand.

Map 1 Pioneer Settlement Patterns in Belize



Davidson, Belize Country Environmental Profile, 1984
(G. Hartshorn, et al)

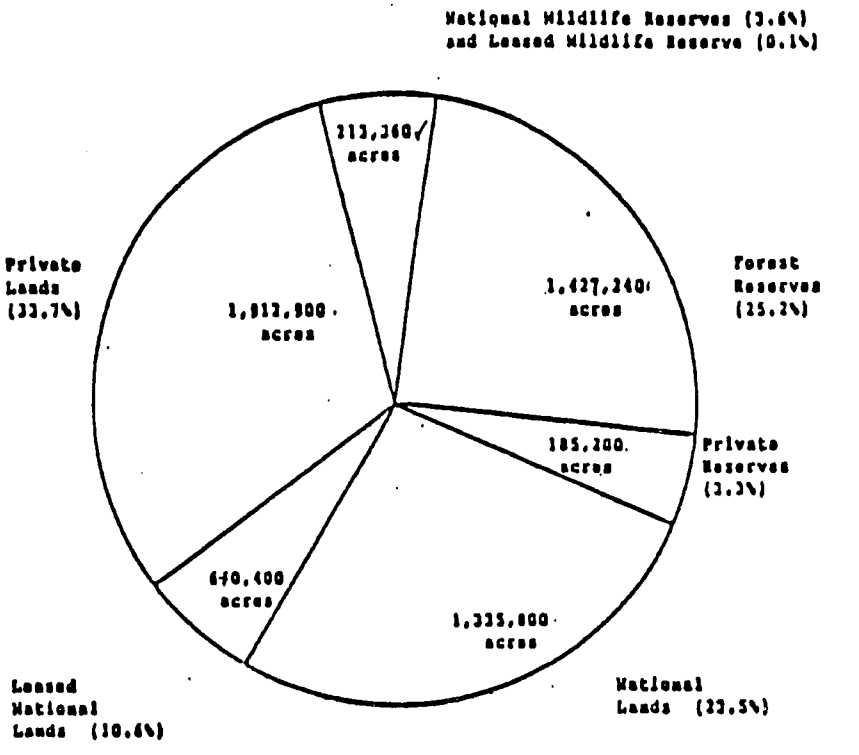
With population growth, development pressures have increased and accelerated the rate of forest conversion. However, a clear definitive estimate of the rate of tropical deforestation is not currently available. In Belize, tropical deforestation is generally defined as forestry lands surrendered to agriculture. Losses to hurricanes and fires, while significant in the recent past, is excluded. In 1983, Nations and Komer estimated the annual forest loss at about 7,900 acres (0.3%) per year, a figure considerably more than the 15,000 acres (0.5%) per year generally referred to by the government Forestry Department (Rosado, 1991). An informal review of development concessions and other leases conducted by the Belize Center for Environmental Studies since Nations and Komer suggests that it may be considerably higher, about 5 percent. (See Chart I-1 and Table I-1.)

Whatever the level of deforestation, the uncertainties expressed by government foresters attending the Tropical Forestry Action Plan (TFAP) International Round Table in April 1991 are even more disturbing. Basic questions about the actual extent, composition and state of the national forest inventory, and the appropriate balance between production and protection remain unanswered. Equally unsettling are plans to rehabilitate 1,600 acres for mechanized rice in the Toledo District, the 50,000 acres being row cropped by Mennonites in north central Belize, and the 35,000 acres planned for citrus expansion in and around the Stann Creek River valley. If true, this level of conversion points to the need for quick and decisive measures. Forest resources must be inventoried, work plans developed, core areas protected, and criteria established if sound land use planning and conservation management is to succeed.

In short, the factors that have led to the considerable deforestation evident elsewhere in the region are becoming increasingly more evident in Belize. Immigrants and migrant farm workers looking for year-round employment are following roads into newly opened areas and, as is the case in the Stann Creek Valley, farming increasingly fragile lands. The environmental conditions--high humidity and rainfall, acidic soils and steep slopes--of the ecological zones where uncontrolled expansion is occurring, make these farming practices unsustainable. Certainly, the basic needs of these people cannot be ignored, but the evidence suggests that the devastating cycle of deforestation and environmental degradation witnessed elsewhere in the region will be repeated in Belize if interventions are not adopted immediately. Manifestations are evident in concerns about water quality (Hartshorn, 1984) and the growing reports of environmental contamination (Pendleton, 1991). The frequency and severity of sediment plumes extending miles into the coastal zone from the rivers draining the cane, citrus and banana producing areas add concerns about the effect of chemical runoff, siltation and turbidity on coastal ecosystems and the Barrier Reef. Unless effective programs are undertaken to guide economic growth along

Chart 1: Land Ownership & Tenure - Belize

Total Acres = 5,714,500



Source: BCES, 1991.
3029a

Table 1: Estimated Rate of Deforestation (CY 1990)

Tenure Type	Total Area	Number of Acres Deforested	Estimated Rate of Deforestation
1. Private Land	1,912,900	145,000	7.60%
2. Leased National Lands	640,000	75,000	12.50%
3. National Lands	1,335,800	25,000	1.90%
4. Forest Reserves	1,427,240	1,000	.07%
5. Private Reserves	185,200	NIL	NIL
6. National Wildlife Reserves	213,360	NIL	NIL
TOTALS	5,714,500	246,000	4.3%

Source: BCES, 1991.

sustainable development paths, the increasing rates of population growth and resource degradation threaten to erode the basis of Belize's sustainable economic development.

C. The Response

The NRMP Project begins the ameliorative process by focusing on the root causes of the terrestrial-marine continuum of natural resource problems, unbridled expansion of citrus and other agricultural production areas, unsustainable agricultural production practices and ineffective conservation management programs. USAID's Commercialization of Alternative Crops (CAC) Project is funding the development of a coastal zone management plan that will, with the technical assistance programmed under the NRMP Project, serve as a basis for a subsequent proposed amendment to include a component for the conservation of coastal resources.

The Project is designed to be a pro-active, conservation oriented program of assistance that will, together with the Government and people of Belize, support the opportunities for sustainable development by:

- helping define and implement an overall strategy for environmental protection and natural resource management;
- developing the policy guidance and regulatory alignment necessary for effective implementation;
- fostering the establishment of a comprehensive system of protected areas based on the recommendations of critical habitat surveys and an enhanced land use planning capability;
- mobilizing indigenous support and resources through participatory, community-based conservation initiatives;
- validating the GOB's capacity to plan, program and implement the mitigative measures needed to control key indicators of environmental quality;
- developing a data collection and analysis capability needed for environmental monitoring, planning, and management purposes;
- significantly increasing public awareness concerning environmental issues related to development objectives and encouraging an open dialogue leading to conflict resolution;
- developing sustainable alternative cropping systems based on improved soil conservation and integrated crop production and protection practices;

- strengthening the involvement of LNGOs in carrying out complementary conservation programs;
- increasing private sector investment in forest conservation practices;
- expanding existing public awareness, environmental education and field research programs focusing on conservation and natural resource management.

Because of the limitations on counterpart funding and personnel, activities programmed under the NRMP Project will be scaled to the absorptive capacity of the participating government agencies and the LNGOs responsible for implementation.

D. Relationship to A.I.D. Policy

The Project is based on the fact that Belize's economic growth depends on a sustainable natural resource base, at least for the immediate and medium terms (Leonard, 1987). The Project conforms to the policies outlined in A.I.D.'s Environmental Initiative encouraging support for sound economic and environmental policy formulations (by developing increased institutional capability in land use planning and forestry conservation practices), assisting human and institutional development (through training and organizational empowerment), and by promoting the extension and adoption of technology (through sustainable agricultural production).

The Project also addresses priority areas of specific concern related to global climate change, tropical forest conservation, and the maintenance of biodiversity through the activities scheduled with the Forestry Department and the Conservation Division, both a part of the Ministry of Natural Resources. Concerns about water quality, pesticide runoff, and agricultural sustainability issues will be addressed by the monitoring efforts of the Department of the Environment as complemented by LNGOs and the crop management practices extended under a separate Sustainable Agricultural Production component. Moreover, the Project design is in full consonance with the FY91 guidelines promoting the protection of critical habitats and parks in the Americas. It also advances the purposes of the Neo-tropical Migratory Bird protection program by mitigating the unmanaged agricultural encroachment on critical migratory passerine habitats

E. Relationship to Regional Programs

The Project also fits closely within the framework of the Strategy Statement for Environmental and Natural Resource Management in Central America. The RENARM Project (Regional Environmental and Natural Resources Management) supporting the strategy's

implementation has helped define USAID's natural resource program and, specifically, the design of the NRMP Project. Consequently RENARM's five areas of emphasis--sustainable agriculture and forestry production, wildlands management and protection of biodiversity, watershed management, policy formulation, institutional strengthening and environmental education--are themes found throughout the NRMP Project.

Concurrent with the NRMP Project, the UK's Overseas Development Administration (ODA) is planning to provide complementary assistance to the GOB on grant terms. The Project supports the activities of the Belize Tropical Forestry Action Plan (TFAP), for which USAID and ODA had a major role in developing. The ODA project is divided into two major components, the Land Use Planning (LUP) Component and the Forest Management Component.

The Forest Management Component is expected to run for 5 years at a total cost US$3.7 million, but the LUP Component will be completed in 2.5 years and is projected to cost a total of US$1.3 million. The LUP Component intends to provide for the identification of suitable development lands, forest reserves and conservation areas, and for the physical on-the-ground demarcation of fixed boundaries. A Geographic Information System (GIS) will be installed as part of the Project and a total of 51 person-months of technical assistance will be provided. The Forest Management Component will be directed to the preparation and initiation of a series of working plans to cover the major forest reserves including the demarcation of core harvesting areas. Permanent sample plots will be established to assess growth and quality of regeneration following exploitation, and data from existing plots and earlier inventories will be analyzed. A Forest Management Specialist will be provided for the length of the Project and will take on the role of Team Leader for the ODA.

F. USAID Strategy

USAID/Belize's development assistance focuses on agriculture and tourism, with special emphasis on resources management issues common to both sectors and on generating sustainable economic growth driven by private sector investment. The USAID strategy is to help Belize develop the capacity to plan and manage the use of its resources to guide economic growth effectively, while continuing to address key constraints of inadequate infrastructure, shortage of managerial and technical skills, and a narrow product base.

The NRMP Project is the principal means by which USAID/Belize will carry out its strategy of natural resource planning and management in the areas of environmental protection and land use planning, sustainable agricultural production and forest protection.

A Tourism Management Project (TMP), Project No. 505-0044, being initiated at the same time as the NRMP, will increase capacity to manage tourism growth in a way that protects Belize's natural and cultural environment. Land use planning and environmental planning and monitoring are where the objectives of both projects coincide. While both will help build the MTE institutional capacity, the NRMP will take the lead in coordinating areas of mutual interest. The TMP Project provides support to the Department of the Environment with specific regard to the tourism sector, but focuses its major efforts at capacity building in the public sector in the Department of Archaeology, the Belize Tourism Board, and a new unit to be established for tourism policy and planning. A third new project was planned to specifically address fiscal policies and resources allocation (Fiscal Policy Planning and Management, Project No. 505-0045). This project has been put on hold, but USAID continues to explore strategies to help improve fiscal policies and management. These efforts will be closely coordinated with the financial resource generation and allocation concerns of both NRMP and TMP. At the same time, NRMP and TMP may both have to give greater attention to fiscal policies than was originally contemplated.

G. Project Strategy

Increased capability to rationally plan and manage natural resource use is the common objective linking the Project components. Project resources will focus on the organizational and institutional shortcomings to more effective natural resource management and conservation through the application of technologies found successful elsewhere.

The Project will be implemented through the combined efforts of the GOB, an international private voluntary organization and USAID. An umbrella cooperative agreement awarded to an international PVO will provide the principal means of supporting Project implementation. It will also support the LNGO involvement necessary to complement the GOB's capabilities, implement the field activities of the Sustainable Agricultural Production element, provide resident technical and administrative support and implement the Conservation Fund. A Belizean Project Coordinator contracted by the GOB will facilitate communication and expedite the implementation responsibilities of the three Ministries involved. USAID will employ a USPSC Natural Resources Project Manager and an FSNPSC Assistant Project Manager to carry out the USAID's project management and support responsibilities. Additional technical assistance available through buy-ins to existing regional and centrally funded projects will provide specialized assistance in watershed management, land use planning, plant protection and coastal resource conservation.

The Project will strengthen the Department of Environment of the MTE and the Forestry Department, Conservation Division and Lands & Surveys (to a limited degree) in the MNR by providing training,

technical assistance and necessary equipment and vehicles. The GOB will establish an effective environmental policy and regulatory framework, monitor key indicators of environmental quality, expand its property registry system to include a GIS for land use and land capability analysis, and manage the system of forest reserves and protected areas for conservation and production purposes. Project efforts will initially focus assistance on a relatively few critical areas in order to acquire needed experience in field interventions. This approach will help develop confidence rapidly and serve to validate and guide subsequent data gathering and planning efforts. Local non-governmental organizations and community based conservation interests will be relied on heavily to complement the GOB's capabilities. The Project will target these groups to strengthen grass-roots support and indigenous resources needed for continuity and for building long-term local support of Project goals and objectives.

As designed, the Project builds on the complementary mandates and comparative advantages of public and private sector entities concerned and actively involved in environmental protection and natural resource management issues. The government's ability to articulate strategy, define policy, coordinate programs, enforce regulations and monitor compliance will be improved. Recurrent costs of maintaining protected areas will be defrayed in part by measures to retain revenues by the protected area management unit. Special efforts will be made to foster LNGO involvement in developing community-based conservation initiatives through the facility of a Conservation Fund.

While the number of environmental organizations and conservation programs in Belize is considerable, the permeability between public and private sector involvement in the sector provides a unique opportunity to complement efforts and leverage resources to advance common objectives. This opportunity will be exploited to direct a concerted program of assistance--based on improved land use data--to more effectively plan and manage renewable natural resources for sustained economic growth.

H. Constraints Limiting the Response

Belize shares many of the same constraints in responding to environmental protection and natural resource management problems found elsewhere. Agencies concerned with environmental degradation lack the technical and financial resources needed to be effective. Staffing levels are insufficient and personnel under-trained. Inappropriate, unenforceable or absent policies and regulations all hinder the processes of sustainable development in Belize.

1. Policy

Existing legislation leaves few gaps in the GOB's fisheries, forestry, and wildlife management authority. Yet, the impressive legislative program remains largely unimplemented. Decisions such as the granting of development concessions, extractive permits, and leases de-reserving land are made without sufficient scrutiny. Coordination and resources are needed to guide the planning process but the will to submit to public scrutiny is crucial in order to avoid invalidating all other efforts.

2. Institutions

Even with specific legislation, clouded lines of authority and competing agendas between ministries and departments result in unnecessary fragmentation of activities, confusion, delays and inaction. Decision making is overly centralized in an under-staffed and inadequately supported civil service. The major burden for conservation activities is being borne by LNGOs working through community groups with support from international conservation PVOs. It is evident that the political will exists to solidify a cooperative public/private partnership in addressing the conservation challenge. However, the lack of business management and administrative experience among LNGOs has made their performance uneven. The major issue is how to expand the capacity for conservation management among public and private entities alike, given their respective comparative advantages and the human and fiscal resources at their disposal.

3. Cultural and Social Forces

The Belizean populace is generally concerned about environmental degradation, and is sensitive to the need to protect the natural resource base for development purposes. Public presentations by LNGOs and PVOs of their activities are usually well attended and newspapers frequently carry articles on environmental issues. Public officials have echoed concerns for these issues in sentiment, if not action. However, public awareness needs to be expanded, particularly among immigrants and other resource user groups, and among primary and secondary level students.

4. Technological Constraints

Adoption of successful measures to protect and manage Belize's natural resources is not dependent on the development of new technologies. Rather, the experiences that have proven successful elsewhere will be extended to address concerns in natural forest management, agroforestry extension, watershed management and land use planning, sustainable agricultural production, integrated pest management and crop protection, and coastal resources management.

The response to these constraints is clearly understood and has been incorporated into the design of the NRMP Project. The effect

of subsistence farming, agricultural production, demands on soil and water resources, and tourism pressures in the coastal zone are interrelated and require comprehensive, integrated and prompt solutions. The interventions selected and discussed in the NRMP Project are based on proven technologies and rely on sources of expertise available in the region.

II. PROJECT DESCRIPTION

A. Goal and Purpose

The goal of the Project is to protect and manage the natural resources upon which the sustainable economic and social development of Belize depends. Its purpose is to improve conservation management in order to increase and sustain the economic benefits from agriculture, forestry, and fisheries while protecting and conserving the resource base upon which these industries depend.

B. End of Project Status

At the completion of the NRMP, selected public and private institutions will have been effectively strengthened and able to guide the course of Belize's economic development along paths ensuring the renewability of the natural resources on which the country's development depends. Specifically,

- the GOB's capability to anticipate the environmental consequences related to economic development and mitigate their impact will be increased;
- meeting the country's food and fiber requirements will not take place at the expense of sustainable agricultural development; and
- the income generated from forest based extractive processes, like timber production, will not compromise the development potential of other conservation based activities like tourism.

C. Project Elements

The Project is comprised of three principal technical elements, Environmental Planning and Monitoring, Sustainable Agricultural Production and Forestry Development. Two additional elements, PVO Project Support and Project Coordination and Management, provide implementation support for activities in the three technical areas.

Thematically, project elements are linked by common concern about the cumulative effect of individual actions on the environment, particularly water quality and forest resources. Watershed management and forest conservation are the two cross-cutting interventions under which project activities will be implemented. Training, technical assistance, equipment and vehicles, and operational support are budgeted at levels commensurate with the priority activities programmed under each component.

Summary Project Budget
(A.I.D. $000)

Elements:			
1.	Environmental Planning & Monitoring	1,103.5	
2.	Sustainable Agricultural Production	2,103.0	
3.	Forestry Development	1,452.0	
	Subtotal		4,658.5
4.	PVO Project Support	1,832.0	
5.	Project Coord. & Mgt.	1,327.0	
	Subtotal		3,159.0
	Subtotal All Elements		7,817.5
	Inflation	290.5	
	Contingency	390.9	
	Total		8,498.8

The first element, Environmental Planning and Monitoring, is the principal conduit through which environmental overview will be added to the natural resource planning and management process. As a result, the GOB's ability to monitor key indicators of environmental quality, assess environmental impacts of development projects and enforce compliance with the terms of development concessions will be improved. Environmental policies will be clarified and more effectively coordinated between government entities participating in the Project through a buy-in under the centrally funded Environmental Policy and Analysis Training (EPAT) Project. The policy and regulatory foundation established at the outset of the Project will serve to orient field interventions and prioritize activities proposed under the Project components, particularly Forestry Development.

The second element, Sustainable Agricultural Production, provides the opportunity to bring the combined efforts of improved land use planning, sustainable agricultural production and post-harvest technology to bear on the problem of forest encroachment and natural resource degradation. Experience gained under the Toledo Agricultural Marketing Project (TAMP) indicates that profit margins of traditional small farmer cropping systems can be increased significantly with relatively minor, minimally disruptive adjustments in established cropping systems. These technologies will be extended to other areas where farming represents a problem for forestry and/or conservation management.

The third element, Forestry Development, provides the means by which to gauge the extent to which the first two elements successfully contribute to more effective management and conservation of Belize's forest resources. Rapid assessments of critical areas supported by ODA's analysis of remote imagery will guide initial field interventions and establish the baseline needed for urgent response to the rate of tropical deforestation,

establishment of immutable boundaries of forest reserves and protected areas, and the extent of the production forest. (See Map 2 - List of Critical Habitat Areas.) Subsequent efforts will concentrate on defining and consolidating the boundaries of forest reserves and protected areas and managing them effectively.

Elements 4 and 5 (PVO Program Support, and Project Coordination and Management) are the means by which the NRMP Project will be implemented. The responsibilities of the international PVO, under the umbrella cooperative agreement, will include technical and program support to the Project Coordinator and GOB implementing entities, backstopping its own field operations in implementing the Sustainable Agricultural Production Component of the Project (excepting the academic training portion), and implementing the Conservation Fund promoting community-based conservation initiatives and linkages with LNGOs. The Project Coordination and Management element will also provide access to short-term technical assistance (through buy-ins to regional and centrally-funded programs) for evaluations and audits.

1. Element 1: Environmental Planning & Monitoring

Element Budget Summary by Activity
(A.I.D. $000)

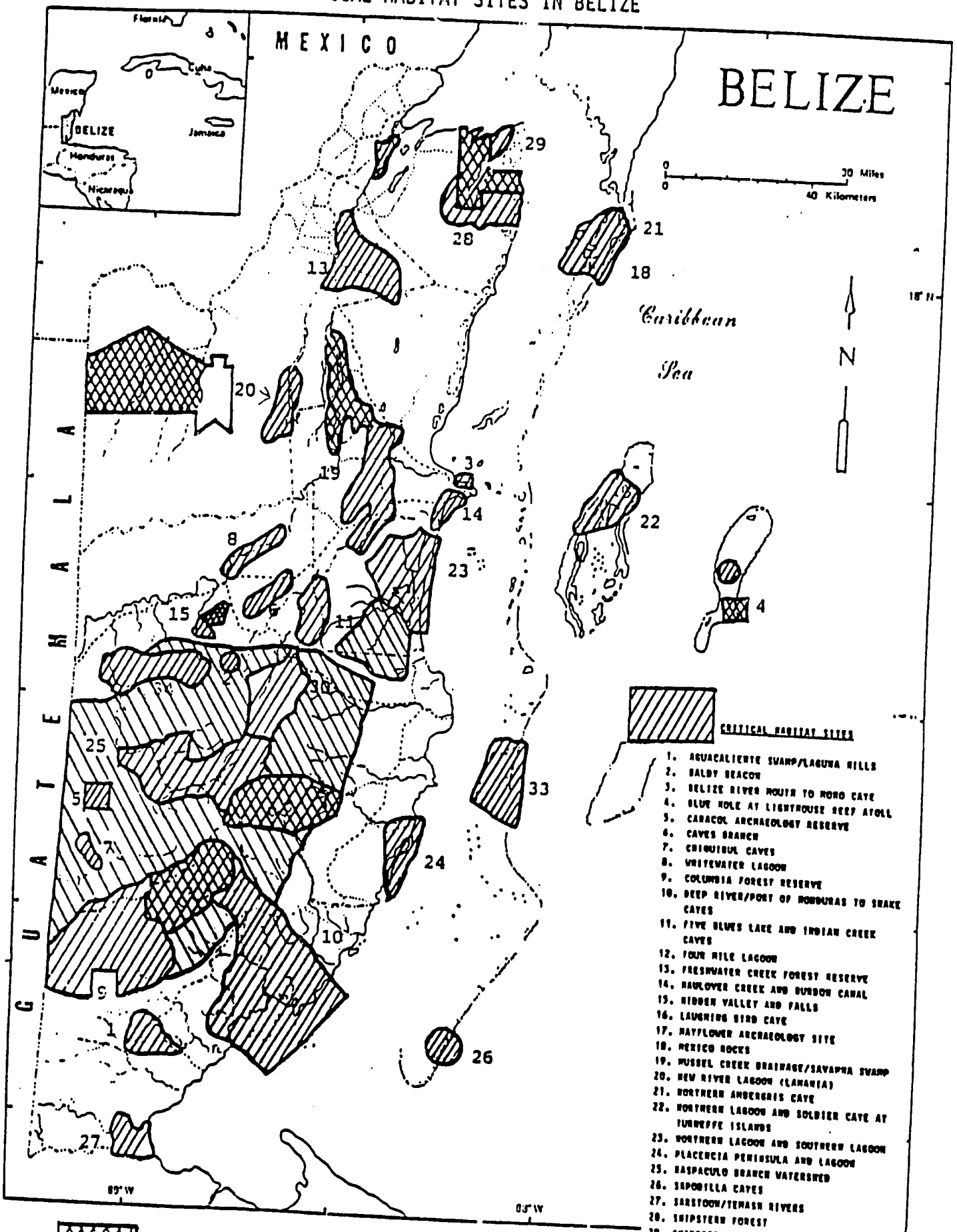
Environmental Planning & Monitoring		
1. Institutional Development	563.0	
2. Environmental Monitoring	365.5	
3. Public Awareness	175.0	
Total		$1,103.0

a. Rationale

Easing the tension and establishing two-way channels of communication between conservationists and developers is critical if the environmental degradation that has accompanied similar expansion elsewhere in the region is to be avoided. Nor should social issues be mislabelled as environmental problems or "externalities" to be solved, cleaned up or managed by other than those who created them. This only serves to perpetuate their mismanagement. Rather, greater awareness is needed to understand the interrelationships of social and environmental problems and design integrated approaches to solve them. Experience has demonstrated that in order to attain sustainability it is necessary to change the relationship between society and nature to make it more synergistic. Specifically, development should be undertaken in a way that manages this relationship so that environmental conservation and economic development are semantic distinctions for the same endeavor.

Map 2 : Natural Resources Management & Protection
A.I.D. Project No. 505-0043

CRITICAL HABITAT SITES IN BELIZE



b. Analysis

The establishment in 1989 of the Department of the Environment (DOE) in the newly created Ministry of Tourism and the Environment (MTE) began the process of linking the public and private interests in expanding tourism and environmental protection efforts. Previously, there was no GOB ministry fully responsible for monitoring the environmental consequences of development. Development concessions were granted, forest leases issued, lands cleared, industries established and tourist facilities opened, with little regard for the carrying capacity of the resource. The DOE was established in response to this need and is beginning to make headway, albeit slowly. The DOE is considerably short-staffed and requires significant levels and types of project assistance to obtain the data and resources needed to leverage its portfolio into a position of greater importance in the GOB budgetary allocation process. Presently, the DOE is expanding its sphere of influence beyond conducting desk reviews of applications for development concessions. Still, the need to substantially increase environmental planning and monitoring capability is critical and should be accelerated as the operational and regulatory framework continues to be defined, adjusted and strengthened.

Also, the openness characterizing Belizean society in general should be extended to involve the entire community in debate on environmental issues affecting them. It is only when there is a comprehensive understanding of the trade-offs involved that the hard choices can be made between development options with the support of the public.

c. Objective

The objective of this component is to strengthen the Department of the Environment of the MTE in order to increase its effectiveness in planning, programming and monitoring the environmental effects of Belize's growth and development.

d. Implementation

(1) Institutional Development

Project funds will provide local, regional and international expertise to help the GOB organize and build the DOE along the lines necessary to implement environmental planning and monitoring programs effectively. The process will begin with a joint review, with RENARM representation, of the Belize natural resource policy inventory completed by Abt Associates in 1990.

The task will be to help the GOB determine how environmental policies and regulations may be realigned to more fully support conservation and production objectives. Drafting new legislation is not expected; rather, the focus will be on defining the areas

of regulatory complementarity of existing legislation between implementing entities. Issues and needs will be identified and prioritized, alternatives analyzed and recommended interventions detailed, prior to initiating implementation measures. Throughout the process, interministerial responsibilities will be clarified and cooperation supported.

This will be augmented by the organizational changes in the DOE necessary for it to carry out its responsibilities under the Project. The major objectives will be to formulate an environmental policy strategy for the GOB; define the strategic objectives and directions for the DOE; develop a functional process for strong interministerial cooperation; draft regulations to empower the DOE to pursue its objectives of monitoring the state of the environment; establish the environmental data base that will be incorporated into a Conservation Data Center (CDC)1/; conduct environmental impact assessments and promote public awareness of and involvement in environmental issues. The specific interventions identified in the course of these assessments will serve as test cases to fine-tune the organizational changes and planning methodology. For example, the environmental impact assessment conducted on the new access road for the Macal River hydroelectric site could be reviewed and strengthened to include measures such as posting of conservation compliance bonds to encourage greater sensitivity and regard for environmental impact--planned and unanticipated. Other examples might include such practical steps as maintaining vegetative border strips to reduce agricultural runoff of pesticides and fertilizers resulting from the banana disease control measures in the Stann Creek District, minimization of the effects on local climate patterns caused by clearing large blocks of tropical forest in northwestern Belize, and the secondary deforestation resulting from the fuel wood requirements of small producers of agricultural lime used for citrus production.

A range of mitigative measures will be identified and refined to provide the DOE with an opportunity for first-hand experience in environmental planning, coordinating and compliance. Expatriate assistance will define appropriate environmental quality guidelines, make them operational, expedite their adoption and train DOE staffers to facilitate subsequent monitoring.

1/ The CDC will form the basis of the data analysis and land use planning that will support the conservation management program under the Project. Funds will be available to expand the hardware and software platform acquired under A.I.D. Project 505-0008 (Commercialization of Alternative Crops) to provide satellite workstations and expand the Land Information Systems (LIS) used to automate the property registry system for geographic planning purposes (GIS). Technical assistance, user support, systems management and training opportunities will be programmed and budgeted jointly.

The initial effort to define and build an effective organizational and management structure will also confirm the staff training requirements to be undertaken during the course of project implementation. The Project will assist the DOE and the MTE with its interministerial responsibilities through skills training and technical assistance in environmental policy making and administration, environmental planning, monitoring and evaluation, and information analysis (including gender based demographic and socio-economic data).

Consultancies provided through the RENARM consortia of international PVOs will provide assistance in developing environmental impact assessments, benefit/cost analysis, proposal writing, and methodologies for drafting environmental legislation and regulatory procedures. This will be augmented by academic training for two BS candidates in integrated natural resource management and two MSc candidates in environmental planning and management. Competition for the scholarships will be open to competitive selection of the community of professionals at the outset of the Project on the pledge of service upon their return.

(2) Environmental Monitoring

Starting the process of monitoring environmental quality has been expedited considerably by the Harvard Environmental Hazards Assessment (EHA) completed in April 1991. This study, the summary matrix of which follows in Table II-1, provides a ready reference of Belize's environmental vulnerability and identifies initial issues to frame discussions on natural resource policy. The EHA will be expanded and revised periodically during the course of project implementation and used to identify the interministerial collaboration necessary to cut across sectoral interests and serve to illustrate the interdependencies of desired actions.

Both the EHA and the recommendations of the Belize Environmental Profile (Hartshorn, et al, 1984) stressed the importance of water quality in drawing the linkages between terrestrial and marine ecosystems and the impact of human activities as the fundamental indicator of overall environmental health. Because watershed degradation leads to onerous environmental and socio-economic costs that threaten agriculture, potable water supplies, hydroelectric generation, irrigation, flood control, navigation and tourism, the NRMP Project will adopt watersheds as units of environmental planning (see Map 3). Water quality will be monitored as a general indicator of impact and used as a common denominator in addressing the issues related to forestry, agriculture, tourism development and marine resource management.

Systematic sampling and monitoring of water and aquatic organisms in all major watersheds and adjacent coastal areas will be conducted to assess the impacts of land use changes on water quality and aquatic biological diversity. These tasks will be

Table II-1 : Environmental Hazard Assessment of Belize

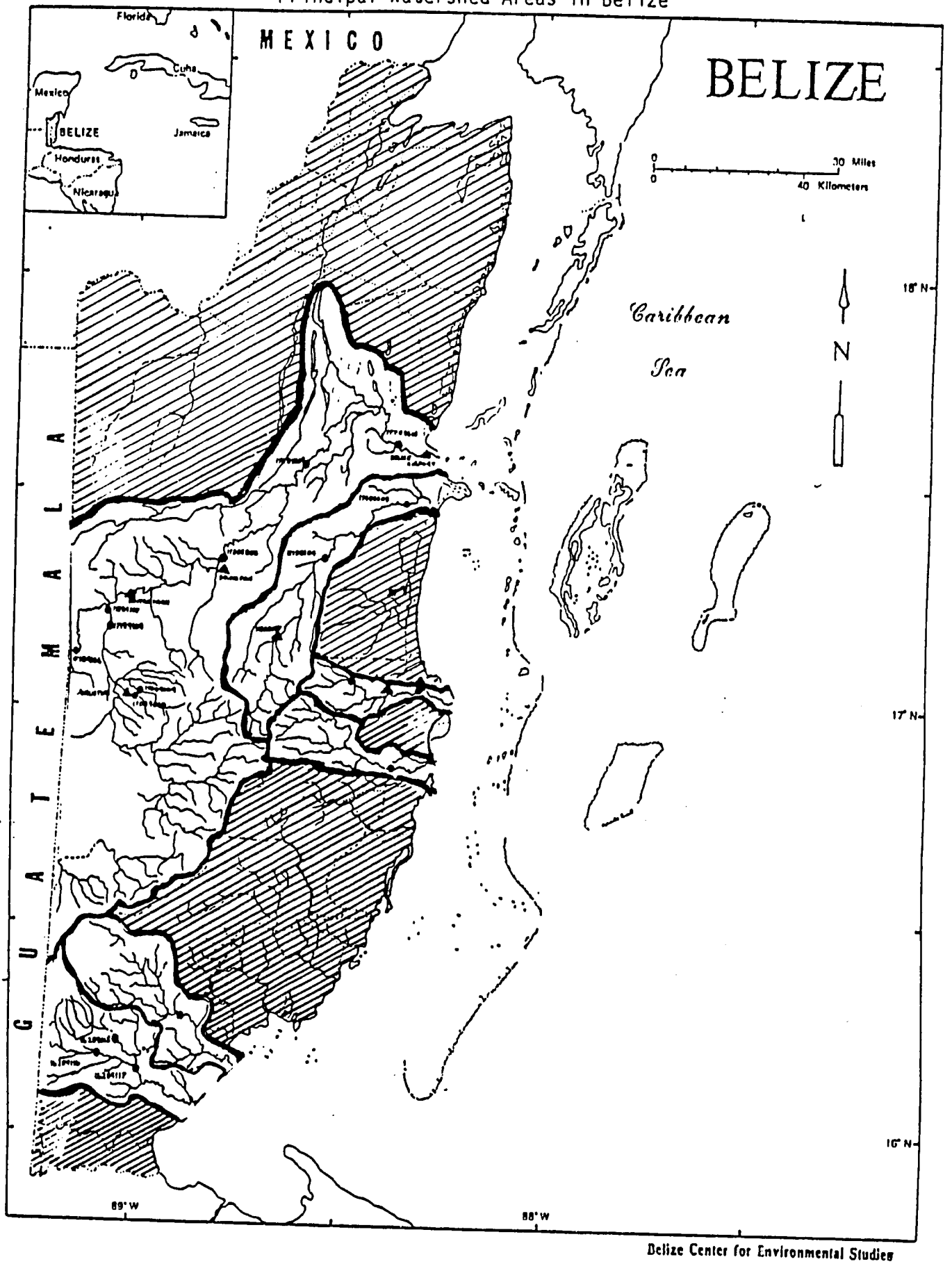
Impact	Temporal		Sectoral	
	Current Hazards	Trends	Ecosystem and Resources	Health[1]
Most Serious	Fisheries Freshwater-Eutro. Freshwater-Toxins	Forests Mangroves Reef Degradation	Fisheries Forests Wildlife Harvesting	Forests Freshwater-Toxins Ocean Quality Pesticide Applic.
Intermediate Seriousness	Forests Pesticide Applic. Wildlife Harvesting	Fisheries Freshwater-Toxins Ocean Quality	Freshwater-Eutro. Freshwater-Toxins Mangroves	
Least Serious	Mangroves Ocean Quality Reef Degradation	Freshwater-Eutro. Pesticide Applic. Wildlife Harvesting	Ocean Quality Pesticide Applic. Reef Degradation	Fisheries Freshwater-Eutro. Mangroves Reef Degradation Wildlife Harvesting

Source: (Pendleton, 1991)

[1] Within the "Health" perspective, the resolution of scoring only permits a classification of "most serious" or "least serious." See the "Health" scoring sheet in Appendix III for more details.

Map 3: Natural Resources Management & Protection
A.I.D. Project No. 505-0043

Principal Watershed Areas in Belize



Belize Center for Environmental Studies

assumed by LNGOs selected by tender and directed by the DOE and the MNR. Sampling parameters and monitoring indicators will be identified and field tested. Point and non-point sources of pollution will be located and monitored regularly. An environmental impact review and compliance process will be developed by DOE and attached as a condition of all development agreements. The result of this process will enhance GOB's ability to guide development with regard for environmental quality protection.

Responsibility for monitoring environmental quality will be shared by the GOB entities along the clearly defined areas of responsibility identified as a result of the policy and regulatory realignment. Selected LNGOs will be competitively chosen to augment the technical capability of GOB Ministries to monitor environmental impacts emanating from current development activities. A training needs assessment, supported by appropriate on-the-job programs, will be carried out by the DOE and the LNGOs to meet existing and future demands of monitoring and compliance activities. Short courses, workshops, seminars and internships will be the primary means for the DOE, other government ministries and LNGOs to meet the planning, monitoring and compliance requirements of this component.

A number of environmental impact studies will also be undertaken by competitive, locally tendered contracts to assess resource use practices and evaluate regulations governing these practices. Mitigating measures will be developed based on field findings. These studies may include:

- monitoring parameters for agro-chemical runoff;
- appropriate technologies for solid waste management and sewage treatment;
- impacts of river sand and gravel mining on aquatic ecosystems;
- soil loss and sedimentation rates due to land use practices.
- freshwater fauna inventory and sustainable harvest management of commercially viable species;
- groundwater resource inventory;
- projected demands on water resources for irrigation and rural/urban potable water supply.

Amendment 5 to the USAID financed Commercialization of Alternative Crops Project directs funds to the fisheries sector to address specific marine resource management issues. Several short term planning studies and hands-on operational activities, such as the strengthening of the Hol Chan Marine Reserve and Conch Laboratory, are supported by the CAC Amendment. Because actual field implementation for much of the CAC Project Amendment is just beginning, many of the proposed resources in the NRMP Project for marine-related activities are dependent upon the work and results of the Amendment activities.

Development of a comprehensive coastal zone management plan is the primary output of the CAC Project Amendment and an important basis for allocating resources under subsequent amendments to the NRMP Project. The plan is still in the development stage and a set of activities is not expected to be agreed upon until late 1991. Yet, it is apparent at this time that a number of discrete analytical studies and research programs are appropriate to marine resource management, even though the institutional framework has not yet been established. These include:

- monitoring parameters of reef health including pesticide and nutrient pollutants at select sites within the coastal zone complex;
- small scale habitat mapping and health status assessments;
- biological, ecological, life history and replenishment studies for threatened and endangered species;
- coastal run off, mangrove habitat destruction/ conversion related to land use activities;
- culture and re-seeding programs for seriously depleted commercial fish and commercially important mollusks;
- policy related research for the management of coastal resources.

Project support for select marine research and monitoring activities will be awarded by the Project Coordinating Committee to competitively chosen LNGOs, based on the priority recommendations of the coastal zone management plan developed under the CAC Project.

(3) Public Awareness

Increased public involvement and awareness of the value of environmental and natural resource management is critical if corrective measures are to be implemented, particularly with any appreciable distance, physical or psychological, between the people and the problem.

The information developed through the baseline studies, critical habitat surveys and environmental assessments will provide the basis on which to build a public awareness program. Established yet inactive organizations like the Environmental Council will serve as a forum within which to make these initial findings public through periodic meetings, presentations, and debates. A specific competitively tendered grant to an LNGO will be issued for recommendations on the process to be followed in translating the findings into policy and corrective actions. This study will identify the organizational framework of the public awareness program, the funding and resource allocations needed to sustain it, and the criteria against which it should be evaluated.

e. Outputs: (Environmental Planning & Monitoring)

- The legislative and regulatory framework defining the MTE and the DOE's responsibilities for environmental planning and monitoring will be clarified and revised as necessary to increase interministerial coordination and effectiveness.
- An Environmental Protection and Natural Resources Management Strategy will be developed and adopted by the GOB.
- The DOE will be institutionally strengthened and organizationally empowered to apply environmental quality guidelines, carry out environmental impact assessments, and monitor trends in key indicators of environmental quality.
- Public awareness of environmental issues will be increased and converted into political support for the decisions made affecting the environment.
- LNGO involvement will be increased in support of the GOB's environmental objectives and lead to periodic assessments of environmental vulnerability, policy options, and annual reports on the State of the Environment.

f. Inputs

Environmental Planning & Monitoring
(A.I.D. $000)

Technical Assistance	229.5	
Training	424.0	
Equipment/Commodities	200.0	
Program Operations	250.0	
TOTAL		1,103.5

The Project will provide grant financing for 41 person months of short-term technical assistance, including about 25 person months for local data collection personnel. Four long-term academic degree programs will be offered on a competitive basis for personnel committed to employment in the Department of Environment, in addition to eight person months of short-term participant training in the U.S. and the region and eight person months of short-term training conducted locally. Other inputs include office and communications equipment and equipment for field operations and funding for studies and multiple-use plans and for the public awareness program.

2. Element 2: Sustainable Agricultural Production

Element Budget Summary by Activity (A.I.D. $000)		
Sustainable Agricultural Production:		
1. Institutional Development	432.0	
2. SAP Program - PVO	1,671.0	
TOTAL		2,103.0

a. Rationale

The rationale behind including sustainable agricultural production as a component of the NRMP Project is because neither productivity nor the quality of rural life can be maintained if production systems are not ecologically stable over the long term. The type of resources being used for production and the means available for conserving their use will determine intervention strategies. Allocation of project resources among specific target sites will be guided by three considerations: productivity levels needed to meet food requirements, the susceptibility to depletion of the renewable resources on which that productivity depends, and the impact of existing and proposed cropping systems on the social organization, culture and vitality of the community.

b. Analysis

Until the mid-19th century, agricultural production was insignificant in Belize. In a curious preview of present developments, the population increased by two-thirds with the arrival of some 10,000 refugees fleeing the Caste War in the neighboring Mexican Yucatan. Those who settled helped extend the agricultural practices known in Belize as "milpa" farming (Hartshorn, et al., 1984). With time, milpa became the predominant form of agriculture and despite the emergence of large scale plantations producing traditional export crops, it is still in widespread use today.

Milpa initially requires felling and burning primary (or logged) forest to grow basic food crops. Land is then left fallow for ten to twelve years, so the soil can recover its structure and fertility, and to control pervasive pests and weeds. As long as population growth is modest, milpa is comparatively benign, particularly where the long fallow period can be maintained. However, this is changing with increases in population and the resulting demand for more land. Traditional husbandry practices are giving way to increasing use--and misuse--of chemical forms of weed and pest control. In the Toledo district where milpa practices are still prevalent, cultivated acreage increased by 65 percent in the fifteen years prior to 1985, and the fallow period

has dropped to seven years (TFAP, 1989). Soil capability mapping conducted by ODA has confirmed that the expansion has taken place on marginally suitable lands that would normally require a considerably longer fallow period to maintain fertility and decrease the threat of erosion (King, et al., 1986). The pattern is being repeated elsewhere. ODA's Land Resources Survey of the Cayo District recorded a 45 percent increase in crop land since 1983, partly because of refugee farmers settling on lands adjacent to the Mountain Pine Ridge Forest Reserve, and partly because of expansion of mechanized farms in and around the Mennonite community of Spanish Lookout. In northwestern Orange Walk District, large tracts are being cleared for small grains production, and another totalling 50,000 acres is being logged extensively. In Toledo the GOB has plans to rehabilitate 1,600 acres for mechanized upland rice production and has been requested to identify 35,000 acres for citrus expansion in the Stann Creek District.

The expansion is quickly exhausting the few remaining areas suitable for sustained agricultural development. ODA's Land Resource Surveys of Toledo, Stann Creek and Cayo Districts have found that there is little highly to moderately suitable land still unused (King, et al., 1986). As evident on the following chart, the net effect is that 246,000 acres of forest, or about 5 percent of forested land, may have been surrendered to agriculture in recent years (BCES, 1991).

While the cause of some these developments--like the immigrant issue--are beyond the scope of the Project to influence, the NRMP Project will endeavor to direct this change along more environmentally sensitive paths. The key lies in identifying those lands best suited for agriculture and providing the tenure security, assistance and support needed to grow food in a sustainable manner.

Experience under the Toledo Agricultural Marketing Project (TAMP) demonstrates the technical feasibility of the extension program planned under the NRMP Project. Activities programmed under the Sustainable Agricultural Production element will expand the radius of successful endeavors initiated under TAMP. Factors critical to the success of the Project have proven to be the clear prospect of increased profit (including secure tenure); well trained and motivated extensionists; proven agricultural technologies; and community participation. Farmers, in turn, have demonstrated a sensitivity and understanding of the dynamics between soil and water conservation, and long-term productivity as evidenced by their preference for long-fallow milpa systems, the adoption of slash and mulch to obtain a second dry season corn crop and the acceptance of contour rows and hedgerow alley cropping. Farmer willingness to innovate is particularly strong where clear title to the land was held by participants. Consequently, this element of the NRMP Project will draw heavily on the increased efficiency

provided by the automated property registry system funded under the USAID's CAC Project in order to provide participating farmers priority access to surveying and titling assistance.

Support to be provided will focus on improving existing farm practices where it is important for the production of basic grains and diversified crops, soil and water conservation, agroforestry, post-harvest losses and involvement of the extended farm family. The TAMP evaluation noted consistent farmer satisfaction with the type and quality of assistance provided through direct, locally based extensionists and farmer technicians. Diversified crops such as cacao and spices, and crop yield enhancements including marketing and post-harvest technologies will help accelerate the transition from slash and burn agricultural practices to modified, stable cropping systems. The experiences which have proved successful under TAMP, such as local determination of needs and involvement in decision-making, will be continued under the NRMP Project. New interventions and services such as soil fertility analysis, marketing advice, pest population monitoring, assistance in crop varietal selection, soil and water conservation technologies, modified cropping systems (mulch incorporating practices rather than burning) and agro-forestry systems, will be validated on-site and introduced where warranted.

Under both the CAC and TAMP Projects, large scale farmers producing specialized export crops, such as Hawaiian-style papayas, and small farmers experimenting with tomatoes and other vegetables, have demonstrated a proclivity for chemical pest control. Records of poisonings and contamination are unusually low given the important role of traditional crops like sugar cane, bananas and citrus. However, this may be more a result of a system that places the responsibility of reporting on the individual rather than on the initiative and monitoring capabilities of the Pesticide Control Board (Franklin, 1991). The TAMP evaluation identifies the inadequacy of extension materials for proper use and safe handling of farm chemicals and the need to incorporate integrated pest management practices as an area requiring priority attention.

Improvements in integrated pest management practices on both small and large scale farms will help reduce potential misuse, ameliorate the down stream effect of residues, and increase on-farm income. TAMP's experience in promoting IPM and the safe handling of farm chemicals will be expanded in coverage and strengthened under the NRMP Project. Large scale farming operations also will be included under the scope of the assistance program due to the magnitude of their potential impact and the need to reinforce the monitoring activities under the Environmental Planning & Monitoring Program Component.
The expansive concepts associated with integrated pest management programs will be focused under the NRMP Project to provide on-farm assistance appropriate to the specific characteristics of the farm site, traditional cropping patterns and the farmer's absorptive

capacity. While the NRMP Project alone will not be able to resolve all the problems anticipated, specialized expertise will be accessed through buy-ins under CATIE's Crop Protection Program funded by ROCAP's RENARM Project.

c. Objective

The objective of this component is to ameliorate the deleterious impact caused by the unsustainable farming practiced by small farmers in the specific areas bordering forest reserves and other protected areas. Interventions used will be in consonance with the forestry management and conservation objectives discussed in Element 3 (Forestry Development) and will build on two major technological advances: (1) the validated, adapted integrated farming systems technology derived from the Toledo Agricultural Marketing Project, and (2) the increased capability in land use planning and soils analysis that will build on the CAC property registry activity and the Environmental Planning and Monitoring component of the Project. While the focus of field activities will be directed at subsistence farmers, the land use planning and soils capability data will also be available to guide the investment and cropping decisions of producers of traditional export crops.

d. Implementation

(1) Institutional Development

Staff training, farmer outreach programs and participant training opportunities will be provided to strengthen and encourage adoption of improved agricultural production and integrated natural resource management skills. Much of this human resource development effort will be training integral to the sustainable agriculture program activity to be carried out under an umbrella cooperative agreement with an international PVO. The separate institutional development activity in this project element concentrates on increasing the availability of relevant professional skills through academic degree programs and short-term training at institutions in the U.S. or the region.

Initially the focus will be on enhancing the technical skills of field staff in areas at the interface of agricultural production, and natural resource management. As field programs evolve and extension skills become honed, leading farmer practitioners will be selected to help transfer the technologies to other areas. Workshops and field days promoting the adoption of integrated pest management, soil conservation practices and improvements in post-harvest technologies for subsistence grains will be scheduled throughout the target area for the duration of the component.

Qualified farmers, extension agents and field staff will be selected for short- and long-term training opportunities. Four bachelor of science degrees and two graduate degrees at the

Master's degree level will be offered to competitively selected, qualified candidates in return for a commitment of public service. Academic training in agricultural ecology, integrated natural resource management and related fields will serve to augment local capacity to address problems arising from meeting the food requirements of a growing population.

(2) SAP Program - PVO

Whether among the Maya Indians in the Toledo District, or refugees in the Cayo District, or part-time migrant farmers in the Stann Creek District, efforts to intensify land use, such as the Improved Milpa Integrated Cropping System (IMICS) promoted under USAID's TAMP Project, will be a formidable undertaking.

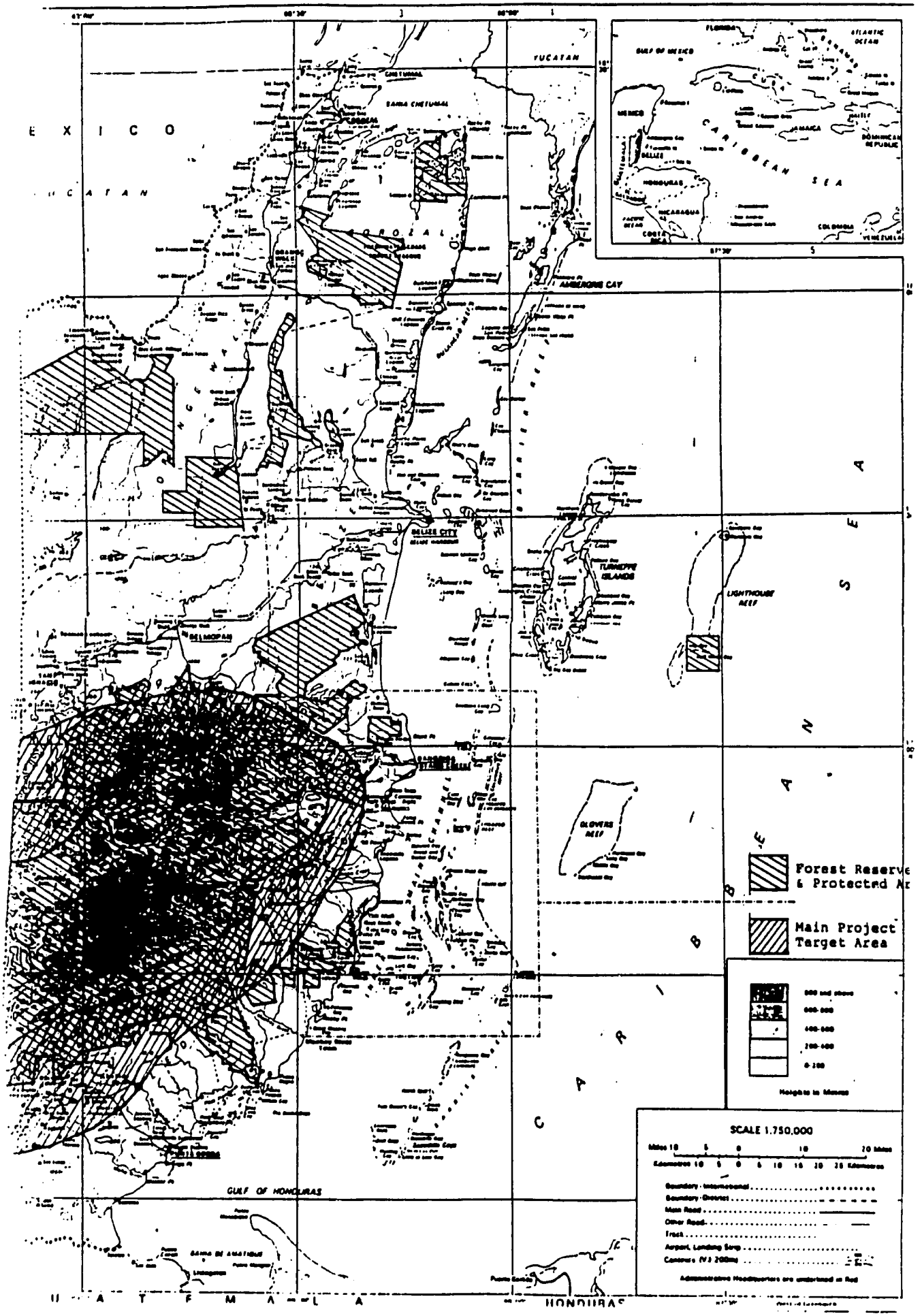
Overcoming this obstacle will require an intensive effort utilizing trained field extension agents supported by a body of technical advisors. While interventions are focused on three themes--soil conservation, cropping systems and integrated pest management--the extension strategy is characterized by a unified, holistic approach. The activity will rely on the use of multi-disciplinary teams of extensionists and para-technicians as close and in as frequent contact with the client groups as possible. These extensionists, both men and women, will focus on the farms and communities adjacent to forest reserves and protected areas of the extended Maya Mountain area (see Map 4). Their tasks will include identifying individual farmer needs, and developing and delivering the appropriate mix of technologies and other resources needed to make farming economically viable and ecologically sustainable.

Attaining sustainable agricultural production implies that crop yields, cyclical variability, environmental quality and net income to the farmer are all optimized. To do so, this component has three interrelated, complementary and mutually reinforcing themes--soil conservation, cropping systems, and integrated pest management. The activities will be guided by the need to (1) maintain and improve soil quality; (2) understand the degree to which specific ecosystems can be utilized for various key resources and factors of production; (3) develop farm management practices that provide the checks and balances for stable cropping systems; and (4) preserve wildlands and naturally occurring biological diversity.

Land with promising agricultural potential identified through the soils capability analysis conducted will be made available to expand the range of options available to farmers, extensionists and planners. In areas where forest production, conservation and other land use considerations coincide in support of re-aligning the boundaries of reserves and protected areas, support will be sought to relocate inhabitants of existing settlements. In all instances, extension activities will be carried out based on

Map 4

BELIZE


YUCATAN
E X I C O
U C A T A N
AMBERGRIS CAY
BELIZE CITY
TURNEFFE ISLANDS
LIGHTHOUSE REEF
GLOVERS REEF
GULF OF HONDURAS
H O N D U R A S
Forest Reserve & Protected Ar
Main Project Target Area
SCALE 1.750.000

individual farm plans, programs and budgets incorporating production, ecological and cultural considerations consistent with the watershed management objectives of the region.

The umbrella PVO will be responsible for working with the various government entities (Lands & Surveys of the Ministry of Natural Resources, the Conservation Division of the Forestry Department, the Department of the Environment of the Ministry of Tourism and the Environment, and the Ministry of Agriculture and Fisheries) as well as LNGOs. They will analyze available information, initially identify priority areas of concern, and enumerate the specific sites where the enhanced land use planning capabilities can be used to support forestry conservation and environmental planning objectives of the GOB.

Field activities will begin with a series of site specific rapid cadastral surveys carried out by LNGOs with the guidance of the MNR. This will confirm the information on existing land surveys, aerial maps and remote imagery developed by the ODA, and help identify priority areas for assistance. Later, as the hardware platform and software data base supporting the enhanced land use planning capability comes on line, the process of pinpointing present and future areas of environmental impact will be accelerated and incorporated into planning and monitoring decisions.

Interventions can take one of two alternative paths depending on the degree of existing or potential impact, i.e., realignment of the boundaries of forest reserves and protected areas or, where possible, farmers will be offered lands in other, more suitable areas. In either case, technical assistance will be made available to work directly with farmers to develop sustainable agricultural cropping systems and to safely manage the use of pesticides. In addition to resident advisors in cropping systems and soil conservation and the project funded team of four local field agents responsible for implementing the subsistence agriculture component, the Belize Agribusiness Company (BABCO) will be invited to tender proposals for site specific crop varietal trials. High value cash crops (like spices) and select tropical fruits and vegetables will be incorporated into the cropping systems package extended to farmers. Also, as the Lands and Surveys Office of the Ministry of Natural Resources progresses in its computerization of the titling process funded under the CAC Project, priority attention will be given to issuing secure tenure status to farmers affected by the boundary consolidation program.

By working through farmers and para-extensionists similar to those used with success under the TAMP Project and LNGOs, the PVO's field staff will develop specific integrated pest management components for each farm management plan. To the maximum extent possible, farm level interventions will focus on reducing undue dependency on pesticides and other chemicals through the adoption

of pest population monitoring practices, non-viral biological controls, multi-layered strip and alley cropping, adjusted planting schedules and judicious cultivation practices.

Additional support to address the need for agricultural extension and outreach will be provided to explore and build on other existing farm improvement and product marketing programs successfully operating in Belize. At least two LNGO's working with small farmer cooperatives have proven success records in extension and post-harvest loss reduction projects. One of these, Help for Progress, has established an impressive demonstration farm plot that is used to teach organic farming and composting techniques. Two agricultural extension officers are employed full-time to provide outreach and training services to rural, small-farmer cooperatives in three of the country's six districts. The expanded approach now being used successfully in rural villages is to establish demonstration gardens in conjunction with the Ministry of Education's REAP (Relevant Education for Agricultural Production) Program. Farmers and students receive hands-on training in the village with follow-up instruction and extension services through Help's agricultural officers.

Another successful activity was carried out through CARE's small farmer assistance program. The two-year continuing program works with 15 small farmer cooperatives from predominately refugee communities in rural areas to improve post-harvest storage facilities and farm-to-market delivery services. Both of these programs offer successful examples of improved agricultural extension communication and farmer acceptance of improved technology. The NRMP Project will evaluate these and other ongoing programs and provide resources for expansion where appropriate.

e. <u>Outputs</u>: (Sustainable Agricultural Production)

- Adoption of sustainable alternative cropping systems by farmers on the fringes of protected areas
- Establishment of demographic and production profiles as benchmarks for subsequent outreach efforts
- Field application of land use planning and soils capability analysis in directing the further expansion of principal agricultural crops and minimizing the deleterious impact on protected areas
- Development of indigenous, site-specific diagnostic and production outreach capability
- Expeditious granting of secure land titles in support of the agricultural outreach program

- Twenty percent decrease in the rate of post-harvest losses for principal food crops as a result of the adoption of improved technologies.

f. Inputs

Sustainable Agricultural Production ($000)	
Technical Assistance	1,362.0
Training	516.0
Equipment/Commodities	225.0
TOTAL	2,103.0

The Project will provide grant financing for 239 person months of long-term and short-term technical assistance under a cooperative agreement with an international PVO. Six long-term academic degree training scholarships in fields related to agricultural development and integrated natural resource management will be awarded on a competitive basis to qualified candidates agreeing to work for the GOB upon graduation. Additional regional and international short-term training totalling 17 person months will be provided in cropping systems and agricultural extension. LNGOs experienced in dealing with refugee communities will be encouraged to bid on the tender issued for specific activities such as the rapid cadastral survey, gender based outreach programs and community organizational efforts.

3. Element 3: Forestry Development

Element Budget Summary by Activity (A.I.D. $000)	
1. Institutional Development	1,021.0
2. Protected Areas Program	107.0
3. Boundary Demarcation Program	324.0
TOTAL	1,452.0

a. Rationale

It is noteworthy that a nation which owes its existence and early development to the value of its forestry resources still enjoys the highest level of natural forest cover of any country in the region--about 80 percent (TFAP, 1989). This places Belize in the enviable position of being able to influence the course of its agricultural development before the rate of land clearing results

in further haphazard deforestation (Leonard, 1987). Recent trends in population growth and settlement patterns suggest that this window of opportunity is closing rapidly. In order to manage the course of its agricultural development, Belize must control what happens to its renewable forestry resources and it must move to do so quickly.

b. Analysis

The Forestry Development component is based on the Belize Tropical Forestry Action Plan (TFAP), a comprehensive guide to the development of Belize's forestry sector produced by ODA with assistance from CIDA, USAID and FAO and submitted in late 1989. Since its official acceptance, the GOB has moved ahead on several important recommendations not dependent on donor assistance. Effective October 1990, timber royalties were revised, price controls removed on domestic sales of major hardwood species and timber concessions restricted to one year renewable terms. While figures have not yet been compiled, indications are that government revenues have increased significantly, hardwood grades and standards have been adopted, and utilization of secondary hardwood species accelerated. For example, approximately 80 percent of the volume of lumber processed by the largest sawmill in the country now consists of secondary hardwood species.

Other measures, such as revision of the terms for lumber concessions to promote private sector investment in renewable forestry resources, are dependent on donor funding and were only recently and formally apportioned at the International Roundtable held in April 1991. The occasion also provided an opportunity for the LNGO community to underscore its support for land use planning and the urgent need to follow through on such recommendations as reforming the authority allowing de-reservation of land by ministerial fiat, the expansion of parks legislation and the protection of wildlife.

Nonetheless, most actions recommended by the TFAP will be covered under the forthcoming ODA project that focuses on forest management, or the NRMP Project. ODA's strategy, like A.I.D.'s, is based on enhanced land use planning capabilities to guide the policy dialogue, strategic planning, implementing guidelines and field activities impacting on forestry resources. Both donors have worked closely with host country institutions during the design process and agreed that A.I.D.'s assistance would focus on forest conservation in support of ODA's forest management activities.

c. Objective

The objective of the forestry development component is to enable the public institutions and private organizations sponsoring protected area programs to undertake greater responsibilities in managing forested areas for conservation purposes.

d. Implementation

In general, project resources will reinforce the complementary mandates of the public and private sector entities involved in forestry development programs and build on the comparative advantages distinguishing their programs in the field. Resources budgeted under the forestry development component will flow through three activities: (1) institutional strengthening to improve the resource management capacity; (2) a protected areas program to create a comprehensive system of protected areas and improve legal and policy support of their status, and (3) a boundary demarcation program to establish and guard the boundaries of key areas to be protected.

(1) Institutional Development

The process of strengthening the public and private institutions begins with a rapid institutional assessment of government agencies and LNGOs to confirm program focus, effective field impact, areas of complementary and possibly duplicative interests. Fortunately, this initial step builds on a good beginning by the Belize Audubon Society (BAS) and the newly created Conservation Division (CD) of the Forestry Department where funding provided by World Wildlife Fund/U.S. (WWF/US) and A.I.D./Washington is helping to examine the options for managing Belize's National Park System, including the transfer of park management responsibilities from BAS to the Conservation Division.

Similar comparative program assessments will be carried out for other LNGOs and will be used to harmonize government and private sector roles with respect to protected area actions. While the GOB has ultimate responsibility for public wildlands, it is unlikely that the CD will be able to assume all the responsibilities related to managing the country's protected areas. Many management tasks are best suited for the local NGO community.

For example, the Belize Center for Environmental Studies has been actively involved in policy inventories, critical habitat surveys and environmental assessments. The Belize Zoo and Tropical Education Center contributes significantly to environmental education programs at the primary school level. While a relative newcomer, Programme for Belize (PfB) has shown considerable potential for attracting funding and has moved quickly to establish research programs in sustainable yield forestry, neo-tropical migratory bird research, archaeological studies and coastal zone activities. The Ix Chel Tropical Research Center, which is actively involved in collecting medicinal plants of promising value for cancer research, contributes importantly to the preservation of tropical biodiversity.

PfB is receiving significant support under grants funded by A.I.D./Washington, which will be managed by USAID along with the

NRMP Project. Ix Chel has also had funding from A.I.D./Washington managed by USAID and will be a candidate for further support under the NRMP. Additional support will be provided to other selected LNGOs to enable them to take on greater responsibilities in collaboration with the CD. Advice and assistance will be provided through a buy-in to the RENARM consortium of PVOs to help LNGOs develop strategies and specific work plans to define the nature of their complementary activities. Business management plans needed to address recurrent cost issues, strengthen overall managerial capacity and generally enhance the LNGO's competitive position will also be improved.

The Project will train selected personnel from the CD, the LNGOs and the new Department of the Environment of the Ministry of Tourism and the Environment to help these entities fulfill their expanded mandates. The six competitive academic degree scholarships to be funded under the Forestry Development element will be open to candidates outside the GOB in order to select the best possible individuals for continuing positions in government. In addition, funds are provided for shorter, non-degree programs aimed at increasing the awareness and understanding of conservation issues on the part of mid- and senior-level individuals. Selected short courses, workshops, seminars and internships will also be provided to train the staff of the CD, the LNGOs and the Department of the Environment in land use planning and natural resource management. Initial training efforts will focus on management of protected areas, community relations, and conservation compliance measures for forest rangers and park wardens (the latter as part of the boundary demarcation activity). Training materials and audiovisual equipment will be procured and made available to support the training and extension work carried out in the field.

The establishment of the Conservation Data Center (CDC) will help serve the diverse data requirements of both government and LNGOs. The CDC will expand the capabilities of the automated land titling system developed under the CAC Project for MNR's Lands and Surveys Office to encompass the Geographic Information System (GIS), a requirement for effective land use planning. However, before project finances are available for the creation of such a Center, the parties involved, including the CD and the LNGOs, must demonstrate that (a) available information on the ODA land surveys is being used to guide development of agriculture and forestry; (b) agreement on collaborative use of that information has been reached; and (c) the diverse demands for a GIS have been reconciled, i.e., land use planning, land titling, property registration, forest management and protected areas development. Recurrent costs of operating the Center after the termination of the LOP must also be demonstrated. Options under consideration include linkages to the Green Library Program that would be established as a semi-autonomous entity supported by government and end users and appended to an LNGO or other educational facility.

(2) Protected Areas Program

This activity encompasses the various actions related to developing a comprehensive system of protected areas. Although created ad hoc, the number of existing protected areas is significant (see Table II-2). Combined under a discernible system, they represent not only an opportunity to preserve representative samples of major habitat types but also the opportunity to leverage support for the GOB's environmental initiatives. The fact that most of Belize's land area is still under government control is fortuitous; changing the category of national lands will not imply significant outlays, especially if local interest and support is generated. However, it is an opportunity that is rapidly disappearing.

Seizing this opportunity will begin with a concerted program to implement ODA's recent land capability studies and the Belize Critical Habitat Survey compiled by the Belize Center for Environmental Studies in mid-1991 (BCES, 1991). Combined, these are two excellent tools for making objective proposals for boundary adjustments of existing protected areas and the creation of additional ones. Through the CD, the NRMP Project will contract LNGOs to develop proposals and justification for such a system of protected areas. The Project will support this effort by expatriate technical assistance working closely with the revision of the boundaries of the forest reserves foreseen by the Forestry Department and complemented by the extension efforts under Element 2 (Sustainable Agricultural Production). The resulting proposals (hereafter referred to as the comprehensive system of protected areas) will form part of the National Land Use Plan that will be developed by the GOB with ODA assistance.

Initially, the proposals for the comprehensive system of protected areas will be presented to the GOB for promulgation as a ministerial decree. However, because ministerial decrees can be easily modified or reversed, the Project will provide technical assistance in formulating policies that help assure immutability in order to avoid alienation of land targeted by the Project. One option would be to require that excising land from protected areas and forest reserves first be approved by a group representing a broad range of interests, such as the Land Use Authority to be supported by the ODA and the Environmental Council. Another option would be to revise the inventory of existing natural resource policies to clarify mandates, specify the institutional responsibilities and facilitate the creation of a system of protected areas as is proposed under Element 1 (Environmental Planning & Monitoring). The process of sensitizing legislators and decision makers would be expanded to include elements of the interested public in order to build support and understanding for such logical extensions as the creation of biosphere reserves and world heritage sites.

The Public Awareness Activity under Element 1 will help to establish a forum to provide open hearings on issues of public

Table II-2 : Protected Areas of Belize
Natural Resources Management & Protection
A.I.D. Project No. 505-0043

Category	Name	Area (ha.)
A. Legally Declared Protected Areas:		
1. Strict Nature Reserve	Society Hall	2,729.0
	Bladen	39,271.0
2. National Park	Guanacaste Park	21.0
	Blue Hole	233.0
	Five Blues Lake	358.0
3. Natural Monument	Half Moon Caye	4,144.0
4. Wildlife Sanctuary & Nature Reserves	Crooked Tree	1,810.0
	Cockscomb Basin	41,538.0
	Hol Chan	411.0
5. Wildlife Sanctuary & Nature Reserve Declared Earlier	Little Guana Caye & other un-named cayes	5.0
6. Abandoned Wildlife Sanctury and Nature Reserve	Columbia Forest	2,340.0
7. Private Wildlife Sanctuary & Reserve	Bermudian Landing	4,680.0
	Comty Baboon Sanctuary	
	Rio Bravo Consvn Area	61,538.0
	Shipstern Reserve	8,907.0 *
	Monkey Bay	433.0
B. Sites of Nature Conservation Interest Within Forest Reserves:		
1. Potential Natl Parks	Mountain Pine Ridge	58,725.0
2. Potential Wildlife Sanctuary and Nature Reserve	Union Camp/Little Quartz Ridge	1,300.0
	Upper Guacamallo & Raspaculo River Valley	5,000.0
3. Potential Biosphere Reserve	Chiquibul Forest Res	186,490.0
C. Sites of Nature Conservation Interest With No Current Legal Protection:		
1. Potential National	Northern & Southern Lagoons	6,660.0
2. Potential Wildlife Sanctuaries and Nature Reserves	Baldy Beacon	9,700.0
	Blue Hole, Lighthouse Reef	0.5
	Mussel Creek	10,600.0
	Northern Lagoon	5,500.0
	Northern & Sandbore Cayes	1,400.0
	Sibun River Karst Area	5,015.0
	Silver Creek Bank	1,200.0
	Southwest Caye and Glovers Reef	15.0
	Temash River Mangrove Forest	20,000.0
	Thousand Foot Falls	4.0
	Mountain Pine Ridge Double Waterfall	8.0
3. Potential World Heritage Sites	Belize Barrier Reef Cayes	45,000.0
	Coastal Zone	2,365,700.0

* Includes private Wildlife Reserve.
Source: (Zisman, 1989)

interest. The possibility of reactivating the Environmental Council to fulfill this role and assist the CD will also be explored by the RENARM consortia of PVOs. Particular attention will be devoted to concerns about the proliferation of similar boards having overlapping mandates comprised of essentially the same people who are equally constrained in their ability to effectuate needed changes.

(3) Boundary Demarcation Program

Measures undertaken in the field will complement these policy initiatives by helping the CD to identify those critical segments of protected areas where the threat of incursion is imminent. Forest guards will be trained, equipped with transportation and radio communication and deployed immediately to those areas in need of monitoring. In areas where the threat is less urgent, the roles and responsibilities for managing the protected areas will be agreed upon by the CD, the LNGOs and the local communities. Contracts will be funded to survey and demarcate these boundary segments in the field. Similar efforts to delineate forest reserves funded by ODA will provide opportunities to share the costs of vehicles, radios, guard stations and other inputs needed to assure the integrity of the boundaries.

In order to generate the local support necessary for continuity and maximum effectiveness, these measures will be preceded by the orientation and promotional efforts to elicit greater community involvement and to provide the training for forest workers, forest rangers, park wardens and guards. Recurrent cost implications will be addressed by the special efforts of the CD and LNGO community to develop funding arrangements that will permit retaining generated revenues to meet continuing costs of operation. (Important precedents--such as use of the hotel tax by the tourism association, the Community Baboon Sanctuary, Hol Chan Marine Reserve, and the recent designation as National Park of Five Blues Lake as a community-managed protected area--suggest that such revenue management initiatives are plausible). The LNGO linkages with collaborating international PVOs will be used to raise funds for these operating costs and if possible, to establish the endowments needed to sustain a satisfactory cash flow. The combined effect of regularizing the legislative framework, field interventions at critical areas, and community empowerment will lay the foundation from which to progress to a more intensive management program--one which epitomizes the integrated approach initiated under the comprehensive system of protected areas.

For many years, UNESCO has advanced just such a concept through its Man and the Biosphere Programme (MAB). A biosphere reserve typically consists of an area managed for multiple uses and characterized by protected core areas surrounded by buffer zones of increasingly intensive land use under an integrated natural resource management and conservation program. Once officially recognized as being representative of the world's ecosystems,

biosphere reserves form an international network of protected areas that combine the preservation of ecological and genetic diversity with environmental education, research, training and monitoring.

The improved analysis and planning provided by the CDC, will support the GOB efforts to develop the policies and programs needed to declare, support and manage the protected areas of the Maya Mountains and their surrounding buffer zones as a biosphere reserve under UNESCO's MAB guidelines. This represents a logical extension of a comprehensive system of protected areas. Exact boundaries will be established based on the National Land Use Plan to be developed with ODA assistance, critical habitat surveys, field expeditions and negotiations. It may be found desirable to include transects down to and including sections of the coastal zone, including cayes and the Barrier Reef in order to expand the radius of terrestrial-marine conservation management objectives. The main advantages for Belize are that this official status provides protection against spontaneous changes in boundaries and categories of land use. It also attracts the attention of the world scientific and conservation community, thereby making it attractive for support from a wider spectrum of international funding agencies.

The process involved is considerable, but much is already in place. Most of the area proposed for the reserve is still remote and intact, and because the forest reserves accounting for much of the area are subjects of forest management plans, the additional work is expected to be very modest during the life of the Project. As a first step, technical assistance for biosphere planning is provided under the Institutional Development activity. Support of the LNGOs will also be mobilized to enlighten the decision makers and interested public concerning the concept and implications of the biosphere reserve. The CD, with the assistance of LNGOs, will develop a strategy for its creation and management by harmonizing the management aims of the forest reserves, protected areas, local communities and private interests. The Environmental Council will take the lead in coordinating these actors. LNGOs and their supporting international PVOs will generate interest and financial support for this strategy in Belize and abroad. With the help of consultants, the CD will prepare the documentation that the GOB will use to apply to UNESCO for recognition.

The land use plans and activities of the GOB, the LNGOs and community-based conservation programs will be carried out in consonance with and support for the biosphere concept. This will include giving preference to local people in all activities that generate income, such as employment as guards, laborers, and guides, tourism-related concessions, extraction of non-timber forest products and others. While the need for community relations, education of decision makers and information of the public permeates these activities, a specific national campaign on environmental education will be funded under the Project

especially to emphasize the value of rational use of renewable resources in protected areas. Funds are provided in Element 1 (Environmental Planning and Monitoring) for the activities to be carried out under the Public Awareness Program. In addition, under Element 4 (PVO Project Support) environmental education will be one area supported by the Conservation Fund. Proposals will be invited from LNGOs, possibly in joint ventures with international PVOs, for the design of such a campaign from which the best proposal will be chosen for implementation.

e. Outputs

- The GOB and LNGOs will have enough qualified staff to maintain and manage the declared protected areas, have complementary mandates, have the necessary tools, and are working harmoniously together toward the management of these areas.
- The number and extent of the protected areas needed to preserve representative critical habitats of Belize are legally fixed and are based on objective land use capability studies, present land use, gap analyses and other techniques.
- The threatened segments of the boundaries of the protected areas are delineated in the field and the areas are adequately patrolled.
- Expanded land use planning capability in the MNR.
- The system of reserved lands of the Maya Mountains and the surrounding buffer zones have been officially declared a biosphere reserve, whose management is gradually being intensified according to a comprehensive management strategy.
- The local population near the protected areas, and the Belizean public in general, are aware of the existence, value and need for rational use of protected areas.

f. Inputs

Forestry Development (A.I.D. $000)	
Technical Assistance	217.0
Training	676.0
Equipment, Materials & Supplies	439.0
Construction	60.0
Program Operations	60.0
TOTAL	1,452.0

The Project will provide grant financing for 13.2 person months of short-term technical assistance, six long-term academic degree programs plus short-term training and non-degree programs, equipment and materials for educational programs, the Conservation

Data Center, and forest guards. It also provides funds for construction of forest guard stations and boundary survey and demarcation work.

D. Project Implementation Support

Two elements support the implementation of the three technical elements. Element 4, PVO Project Support, provides funding for the umbrella PVO cooperative agreement including office support, but not the costs of field operations for the PVO's implementation activity under Element 3 (Sustainable Agricultural Production). This element also includes the Conservation Fund, which will support a variety of PVO and LNGO activities to complement the three technical elements. Element 5, Project Coordination and Management, provides funds for the GOB Project Coordinator and USAID's project management and direct support activities, as well as for audits and evaluation. Funds are budgeted separately, as Element 6, for inflation (projected at five percent per year) and for contingencies (at five percent of project costs).

Element 4: PVO Project Support

Element Budget Summary by Activity
(A.I.D. $000)

1.	PVO Technical and Admin. Support	1,332.09
	-- Technical Assistance	964.0
	-- Office Operations	273.0
	-- Equipment/Commodities	95.0
2.	Conservation Development Fund	500.0
	TOTAL	1,832.0

a. Rationale

The NRMP Project will be addressing a wide range of activities over a geographically extensive area (see map of target area) which involves the collaboration of or contractual arrangements with LNGOs and extensive use of short-term technical assistance, including important linkages to regional programs and institutions. The NRMP will require creative and efficient administrative mechanisms, additional trained staff and logistical support to successfully support the Sustainable Agricultural Production component as well as to carry out the considerable staff work required to mobilize the LNGO community. Neither the primary GOB implementing entities nor USAID has the flexibility or staff resources needed.

Among the alternatives considered were the use of an institutional contractor, a Title XII U.S. university consortium, or a

semi-autonomous project implementation unit staffed with personnel hired directly for the Project. The design choice is a cooperative agreement with a U.S. PVO for major implementation and support assistance. The underlying rationale for relying heavily on an international PVO is based on several factors:

- the assistance needed in areas of environmental planning and monitoring and conservation management as well as monitoring and building the management capacity of local NGOs is likely to be more readily available through an international PVO than from private consulting firms or universities;

- a cooperative agreement with a PVO will simplify management, shorten response times, and facilitate the collaboration of the lead institution with a variety of other agencies including local NGOs to provide the necessary services;

- through an international PVO the linkages with the consortium implementing the PVO related group of activities under ROCAP's RENARM Project should be strengthened considerably.

b. Implementation

The PVO selected will be charged with three principal responsibilities.

- Technical and Administrative Support: The PVO will provide resident technical staff needed to complement USAID and GOB project management staff, logistic and administrative support to the Project Coordinating Committee and its Project Coordinator, and assistance in defining needs and preparing scopes of work for assistance to be provided to the GOB implementing entities. The PVO will also serve as the conduit for obtaining short-term assistance from local sources such as LNGOs and help selected LNGOs improve their management and financial operations.

- Coordination with LNGOs and Regional Programs: The PVO will coordinate project activities carried out by local NGOs and facilitate linkages to regional sources of assistance, particularly under ROCAP's RENARM Project.

- Sustainable Agricultural Production Implementation: The PVO will implement the Sustainable Agricultural Production activity in coordination with the Ministry of Agriculture and Fisheries and in coordination with LNGOs working in this area. (Costs of field operations for this activity are budgeted under Element 2.)

(1) PVO Technical and Administrative Support

The PVO will recruit staff and establish an office--the project support unit--to carry out the technical and administrative support role described above. Through subgrants and contracts

approved by the GOB and USAID, the PVO will work closely with local NGOs to help implement activities under the Environmental Planning and Monitoring and Sustainable Agriculture Production Elements. The PVO's linkages to regional and international networks will be drawn on heavily to guide development of the comprehensive system of protected areas contemplated under the Forestry Development component.

A Natural Resources Advisor, supported closely by a program manager, will be responsible for the day-to-day operation of the project support unit and will form one-third of a management triangle shared by the Belizean Project Coordinator and the USAID Project Manager (see page 56, Figure IV-1). The GOB Project Coordinator will be provided office space and administrative and logistic support by the PVO's project support unit. Together, reflecting the public/private partnership crucial to success of the NRMP Project, the Coordinator and the support unit will constitute the Project Office.

The PVO's project support unit will develop an information system for the Project Office that will serve as the basis for planning implementation of specific project activities, monitoring performance of key indicators and evaluating progress toward achievement of project goal, purpose, objectives and outputs. The Project Office will serve as a central clearinghouse for handling requests for information on the progress and constraints affecting any of the three technical elements of the NRMP Project. Periodic progress reports will be fed back to the implementing units in the ministries and to the field to keep them abreast of accomplishments against annual and monthly work plans.

During early start-up, the Project Office will be responsible for assembling baseline data from the initial field assessments conducted under each component that will be used to identify priority watersheds and protected areas for intervention. As necessary, the technical support available will revise this system to assure that it generates the information necessary to measure progress under the Project.

Coordination and scheduling of financial requirements, training needs and technical assistance will also be managed by the Project Office. Once fully operational, the information system will also serve as the basis for continuous Project monitoring and external evaluations by assembling periodic data on the quality and quantity of activities occurring in the field. Should it become necessary for improving implementation, the Project Office will also liaise with other related activities such as the CAC Project's property registry system and coastal zone activities.

(2) Conservation Fund

In addition to the involvement of LNGOs in implementation of various activities identified under the first three project elements, the Project will establish a Conservation Fund to

support related and complementary activities initiated and proposed by PVOs and LNGOs. One probable candidate and example of the use of this fund is the Belize Ethnobotany Project, which, with matching contributions from A.I.D./Washington and from the PVO, would continue efforts to identify and preserve plant species of promising medicinal value. The Conservation Fund will be administered by the umbrella PVO under the cooperative agreement. Grant proposals will be subject to competitive review and selection by a committee representing the GOB, USAID, and the Belizean public.

c. Outputs

This element is a means of achieving the outputs identified for the first three elements; no separate outputs are stated.

d. Inputs

PVO Project Support ($000)	
Technical Assistance	964.0
Equipment/Commodities	95.0
Program Operations	773.0
TOTAL	1,832.0

A total of 224 person-months of long-term technical assistance, will be provided to staff the PVO's project support unit, along with office equipment and vehicles. Funds budgeted under program operations include $273,000 for rent and support unit operating expenses and the $500,000 Conservation Fund.

2. Element 5: Project Coordination and Management

Element Budget Summary by Activity (A.I.D. $000)	
1. GOB Project Coordination	160.0
2. USAID Project Management	802.0
3 USAID Direct Project Support	180.0
4. Audit and Evaluation	185.0
TOTAL	1,327.0

a. Rationale

Neither the responsible GOB Ministries nor USAID has sufficient staff resources to adequately coordinate and manage the multiple activities envisaged under this Project. Nor can the umbrella PVO undertake all responsibilities on behalf of the GOB and USAID.

Consequently, the Project makes provision, under this element, for financing a Project Coordinator to be hired by the GOB and up to two individuals to assist USAID in its project management responsibility. This element also includes funding for specialized short-term technical assistance to be arranged by USAID which does not fall directly under one of the three project components, as well as funds for evaluations and audits.

b. Implementation

(1) GOB Project Coordination

A Project Coordinator will be hired to serve as secretary to the Project Coordination Committee and as the GOB's focal point for coordination of all project activities. While supported by the PVO project support unit, he/she will be contracted directly by the GOB, as the GOB representative in the Project Office and in the management triangle with the umbrella PVO and USAID.

(2) USAID Project Management

Primary USAID project management responsibility will initially be borne by the USDH Natural Resources Officer. Beginning in year two of the Project, provision is made to replace that individual with a USPSC Natural Resources Manager. The Project Manager will be assisted by a Belizean Project Assistant, also employed under a PSC. Funds are also provided to rent additional office space if needed. Office furniture and equipment, vehicle support and utilities are expected to be available from USAID's current inventory, motor pool and operating expense budget.

(3) USAID Direct Project Support

During project design, sources of technical expertise were identified to help orient the start-up effort and provide periodic guidance during implementation. RENARM staff, who contributed effectively to the NRMP Project design, will be invited to participate in periodic reviews and to strengthen the regional network of related programs. Extra-regionally, the considerable experience available under A.I.D.'s centrally funded projects in Coastal Resources Management and Environment and Natural Resources Policy and Training (EPAT) will also be tapped. Funds are provided for USAID to directly access this support, which will contribute to overall project objectives, but which are outside of the specific tasks identified under the three technical elements.

(4) Audit and Evaluation

Two major evaluations of the Project--a mid-term process evaluation and a final impact evaluation--are planned. While all implementing partners will be involved in these evaluations, the arrangements will be made by USAID and funding will be provided under this element. Funds are also provided in the event non-federal audits are required by A.I.D.'s Inspector General during the course of the Project.

c. Outputs

This element is a means of achieving the outputs identified for the first three elements; no separate outputs are stated.

d. Inputs

Project Coordination and Management ($000)	
Technical Assistance	1,092.0
Program Operations	50.0
Audits	90.0
Evaluations	95.0
TOTAL	1,327.0

III. SUMMARY COST ESTIMATES AND FINANCIAL PLAN

A. Total Costs and Funding Sources

The total cost of the five-year NRMP Project is estimated to be $12.41 million. A.I.D. grant financing totals $8.50 million, to be funded incrementally through the regular Mission OYB process. Host country support includes contributions from the GOB, LNGOs, and others totalling $3.91 million, or about 32 percent of the total project costs. Table III-1, Summary Cost Estimate and Financial Plan, shows the distribution of costs among major project elements and activities by source of funding.

Approximately 67 percent of the A.I.D. grant funds will be used for foreign exchange costs and the remaining 33 percent for local currency costs. It should be noted that the A.I.D. foreign exchange costs include some items which may include a local cost element, e.g., costs of expatriate technical advisors who will incur local costs while in Belize. Similarly, the Host Country contribution is all stated as local costs although some expenditures, e.g., international airfares for participants, will include a foreign exchange element.

The financial management and accountability system of the GOB is basically sound. The system starts with the budgeting process, which includes obligating and allocating funds; accounting for funds expended, as well as internal controls and external audit functions exercised by the Auditor General Office.

USAID/Belize has not had prior experience with the Ministry of Natural Resources, the lead GOB implementing entity under the NRMP. Nonetheless, USAID expects that both the Ministry of Tourism and Environment and the Ministry of Natural Resources will be adhere to the same financial management system which the Ministry of Finance established for the Ministry of Agriculture and Fisheries under several bilateral projects. USAID will confirm that the implementing entities--both GOB and LNGOs--have an acceptable fund release mechanism and are capable of complying with A.I.D.'s accountability requirements as a condition precedent to cash advances or reimbursements. Although individual Host Country Contracts in excess of $250,000 will not be awarded under this Project, prior to MNR or MTE awarding a Host Country Contract an informal assessment of the Ministries' contracting capabilities will be performed by USAID.

B. Project Financial Plan

Tables III-2A and 2B show planned fiscal year expenditures by A.I.D. and the host country by major project element and activity. Although initial obligation will be made at the end of FY 1991, the first expenditures are not expected until FY 1992.

Table III-1. SUMMARY COST ESTIMATE AND FINANCIAL PLAN
(US$000)

ELEMENT Activity	USAID FX	USAID L.C.	USAID Total	H.Cntry Total	Project Total
ENVIRONMENTAL MONITORING & PLANNING	726.0	377.5	1,103.5	745.0	1,848.5
Institutional Development	508.0	55.0	563.0	585.0	1,148.0
Environmental Monitoring	148.0	217.5	365.5	140.0	505.5
Public Awareness	70.0	105.0	175.0	110.0	285.0
SUSTAINABLE AGRICULTURAL PRODUCTION	1,710.0	393.0	2,103.0	704.6	2,807.6
Institutional Development	432.0	0.0	432.0	160.5	592.5
S A P Program - PVO	1,278.0	393.0	1,671.0	544.1	2,215.1
FORESTRY DEVELOPMENT	1,200.0	252.0	1,452.0	1,761.1	3,213.1
Institutional Development	951.0	70.0	1,021.0	928.5	1,949.5
Protected Areas Program	50.0	57.0	107.0	113.0	220.0
Boundary Demarcation Program	199.0	125.0	324.0	719.6	1,043.6
PVO PROJECT SUPPORT	682.0	1,150.0	1,832.0	299.9	2,131.9
PVO Tech. & Admin. Support	682.0	650.0	1,332.0	133.2	1,465.2
Conservation Fund	0.0	500.0	500.0	166.7	666.7
PROJECT COORDINATION & MANAGEMENT	957.0	370.0	1,327.0	69.5	1,396.5
GOB Project Coordinator	0.0	160.0	160.0	45.0	205.0
USAID Project Management	592.0	210.0	802.0	0.0	802.0
USAID Direct Project Support	180.0	0.0	180.0	4.5	184.5
Audit & Evaluation	185.0	0.0	185.0	20.0	205.0
INFLATION & CONTINGENCIES	459.7	221.6	681.3	333.9	1,015.2
Inflation	196.0	94.5	290.5	154.8	445.3
Contingencies	263.8	127.1	390.9	179.0	569.9
PROJECT TOTALS	5,734.7	2,764.1	8,498.8	3,913.9	12,412.7

TABLE III-2A. Planned Expenditures by Fiscal Year by Budget Category
(US$000)

Budget Category	FY92 Year 1		FY93 Year 2		FY94 Year 3		FY95 Year 4		FY96 Year 5		LOP TOTAL	
	AID	GOB	AID	GOB	AID	GOB	AID	GOB	AID	GOB	AID	GOB
1. Technical Assistance	738.5	238.0	1121.5	308.0	1082.5	333.0	732.5	331.5	189.5	336.5	3,864.5	1,547.0
2. Training	261.0	99.7	411.0	241.7	504.5	332.2	330.5	279.0	109.0	192.0	1,616.0	1,144.6
3. Equipment/Commodities	794.0	57.0	125.0	76.0	35.0	79.0	5.0	79.0	0.0	79.0	959.0	370.0
4. Construction	0.0	0.0	60.0	0.0	0.0	1.2	0.0	1.2	0.0	1.2	60.0	3.6
5. Program Operations	215.0	86.4	270.0	98.1	240.0	112.1	240.0	112.1	168.0	86.0	1,133.0	494.9
6. Audit and Evaluation	0.0	2.0	0.0	2.0	90.0	5.0	0.0	2.0	95.0	9.0	185.0	20.0
7. Inflation & Contingency	100.4	24.2	198.8	72.6	195.2	86.3	130.8	80.5	56.2	70.4	681.3	333.9
TOTAL	2,108.9	507.3	2186.3	798.4	2,147.2	948.8	1,438.8	885.3	617.7	774.1	8,498.8	3,913.9

Table III-2B: Planned Expenditures by Fiscal Year by Project Element
(US$000)

Project Element	FY92 Year 1		FY93 Year 2		FY94 Year 3		FY95 Year 4		FY96 Year 5		LOP	
	AID	GOB	AID	GOB	AID	GOB	AID	GOB	AID	GOB	AID	GOB
1. EP&M	366.5	74.0	282.5	149.5	200.5	179.0	158.5	170.0	95.5	172.5	1,103.5	745.0
a. Instl Devt	193.0	42.0	144.0	117.5	112.0	147.0	86.0	138.0	28.0	140.5	563.0	585.0
b. Envl Monitoring	133.5	10.0	103.5	10.0	53.5	10.0	37.5	10.0	37.5	10.0	365.5	50.0
c. Public Awareness	40.0	22.0	35.0	22.0	35.0	22.0	35.0	22.0	30.0	22.0	175.0	110.0
2. SAP	488.0	110.7	631.0	151.7	673.0	181.2	287.0	155.0	24.0	105.0	2,103.0	704.6
a. Instl Devt	48.0	13.0	96.0	33.5	168.0	63.0	96.0	41.0	24.0	10.0	432.0	160.5
b. SAP Program - PVO	440.0	97.7	535.0	118.2	505.0	118.2	191.0	115.0	0.0	95.0	1,671.0	544.1
3. FD	666.0	229.5	320.0	344.0	242.5	419.7	162.5	407.0	61.0	367.2	1,452.0	1,761.1
a. Instl Devt	384.5	164.5	187.5	189.0	225.5	215.5	162.5	196.5	61.0	163.0	1,021.0	928.5
b. Protected Areas Prgm	50.0	21.0	40.0	23.0	17.0	23.0	0.0	23.0	0.0	23.0	107.0	113.0
c. Bdary Demarcation Prgm	231.5	44.0	92.5	132.0	0.0	181.2	0.0	181.2	0.0	181.2	324.0	719.6
4. PVO Project Support	331.0	56.4	448.0	68.1	438.0	67.1	438.0	67.1	177.0	41.0	1,832.0	299.9
a. PVO Tech Admin Supt	231.0	23.1	348.0	34.8	338.0	33.8	338.0	33.8	77.0	7.7	1,332.0	133.2
b. Conservation Fund	100.0	33.3	100.0	33.3	100.0	33.3	100.0	33.3	100.0	33.3	500.0	166.7
5. Project Coord. & Mgt	157.0	12.5	306.0	12.5	398.0	15.5	262.0	11.0	204.0	18.0	1,327.0	69.5
a. GOB Prjt Coordination	20.0	9.0	40.0	9.0	40.0	9.0	40.0	9.0	20.0	9.0	160.0	45.0
b. USAID Prjt Mgt	77.0	0.0	212.0	0.0	212.0	0.0	212.0	0.0	89.0	0.0	802.0	0.0
c. USAID Direct Prjt Supt	60.0	1.5	54.0	1.5	56.0	1.5	10.0	0.0	0.0	0.0	180.0	4.5
6. Audit and Evaluation	0.0	2.0	0.0	2.0	90.0	5.0	0.0	2.0	95.0	9.0	185.0	20.0
7. Inflation & Contingencies	100.4	24.2	198.8	72.6	195.2	86.3	130.8	80.5	56.2	70.4	681.3	333.9
TOTAL	2,108.9	507.3	2,186.3	798.4	2,147.2	948.8	1,438.8	885.3	617.7	774.1	8,498.8	3,913.9

Project activities are scheduled to permit completion of the Project by the end of FY 1996.

A.I.D.-financed expenditures under the Project will be heaviest during the first three years of implementation, tapering off during years four and five. This reflects the heavy input of technical assistance in the early years as well as the up-front expenditures for equipment. Also, the Sustainable Agriculture Program activity is planned as a three-year effort, beginning in year one and wrapping up in year four.

Host country contributions are more steady over the life of the Project, rising in each of the first three years and then declining slightly. The increases are largely attributable to increased staffing, which will remain a continuing cost to the GOB beyond the life of the Project. Declines in the final two years reflect reduced direct counterpart costs as activities phase down.

Annex 6 includes additional budget tables showing detailed year-by-year projections of costs both for A.I.D. and the host country, as well as life of project totals. All costs are projected in year-one dollars with separate line items for inflation calculated at 5 percent per year beginning in year two and contingencies at 5 percent of planned expenditures each year.

The Project Officer with Controller Office guidance will assure that officials responsible to oversee and administer NRMI implementation are aware of the importance of documenting and recording the approval of contractor invoices for services, and for maintaining invoices and other supporting documentation on file for USAID review during the life of the Project and up to three years after the PACD.

C. Methods of Financing and Disbursement

Disbursements will be authorized on the basis of documentation submitted for USAID approval. Periodic reimbursements will be made to assure the availability of funds during the life of the Project.

At the recommendation of the Project Officer (plus clearance by the USAID Controller and written authorization by the A.I.D. Representative), required advances for GOB entities or non-profit organizations may be given. An initial advance may be given to meet the cash requirements for a ninety-day period with the stipulation that liquidation and replenishment vouchers to account for the advance are to be submitted on a monthly basis thereafter. Such a procedure will ensure compliance with A.I.D.'s policy that an advance shall not be given in excess of the cash requirement for a thirty-day period. Standard USAID procedures will be followed for direct payments and direct reimbursements.

USAID will handle off-shore procurement and arrangement for overseas training. Methods of financing are outlined in Table III-3.

Table III-3 - Methods of Implementation and Financing
Natural Resource Management & Protection
(A.I.D. $000)

Method of Implementation	Method of Financing	Approximate Amount
Personnel		
Direct Technical Services Contracts	Direct Payment	1,584.0
Direct PVO Grant	Advance/Liquidation or Letter of Credit	2,280.5
		$3,864.5
Training		
Direct Contract	Direct Payment	1,457.0
Direct PVO Grant	Advance/Liquidation or Letter of Credit	159.0
		$1,616.0
Equipment/Commodities		
Direct Contract	Direct Payment	429.0
Purchase Orders	Direct Payment	360.0
HC Contract	Direct L/COM	60.0
Direct PVO Grant	Advance/Liquidation or Letter of Credit	170.0
		$1,019.0
Construction		
HC Contract	Direct L/COM	$ 60.0
Program Operations		
Direct Contract	Direct Payment	150.0
Direct PVO Grant	Advance/Liquidation or Letter of Credit	923.0
		$1,073.0
Evaluation and Audits		
Direct Contract	Direct Payment	$ 185.0
Inflation & Contingency		$ 681.3
Total		$8,498.8

The USAID/Belize Controller has reviewed the detailed assessment of methods of implementation and financing for the activities of NRMP as summarized above. Once the financial management and procurement procedures are developed, the Controller will evaluate them for adequacy of financial management, record-keeping and control.

IV. IMPLEMENTATION PLAN

A. Implementation Responsibilities

Responsibility for implementing the NRMP Project is shared between three GOB Ministries--Agriculture and Fisheries, Natural Resources, and Tourism and the Environment--with support from a Belizean Project Coordinator, USAID (represented by the Natural Resources Project Manager), and a U.S. PVO (represented by a Natural Resources Advisor). These organizational responsibilities and relationships are depicted in Figure IV-1. External sources of technical expertise such as short-term consultants under RENARM or other buy-ins are expected to contribute significantly to advancing project objectives.

The activities of several elements intentionally overlap both in the focus of the intervention and the potential application of the output. This will increase the opportunities for the coordination and communication needed to successfully address individual actions contributing to widely felt problems like deforestation and non-point environmental degradation. While the interest and support that characterized public and private sector involvement in project design is expected to continue, overall responsibility for project implementation will reside with USAID. As stated earlier, the approach to implementation builds on the traditionally good working relationship between the government and private sector (LNGOs), such as that existing between the Belize Audubon Society and the Forestry Department in the management of the national park system, and by the GOB's support of local conservation initiatives such as the Community Baboon Sanctuary, Five Blues Lake and others.

USAID's experience in project implementation to date suggests that the GOB's most effective contribution may be at the macro level in defining policy and promoting inter-ministerial coordination. With project assistance it could reasonably extend to conservation compliance, and environmental monitoring and planning. Consistent GOB support in these areas will be needed to provide the necessary framework to guide and make best use of the data gathering, analysis and recommendations best carried out under the NRMP.

A Project Coordination Committee will be formed to coordinate the activities of the numerous entities involved. To assist the Committee the GOB will employ a Project Coordinator under a host country contract. This Coordinator will be a Belizean national competitively selected by the Permanent Secretaries of the three Ministries involved, with USAID concurrence. The Coordinator will serve as Secretary to the Project Coordinating Committee and will be the focal point of contact for project activities. Both USAID and the umbrella PVO as well as LNGOs contracted or assisted under the Project, will have frequent contacts directly with the appropriate operational units within the Ministries.

Figure IV-1 Project Management Structure

Natural Resources Management & Protection Project
A.I.D. Project 505-0043

Permanent Secretaries
(MTE, MNR, MAF)

o .Other Donors
o - UNHCR
o - ODA
o
o
o

.Functional Areas:
- Secretariat for NRMP Coord Committee
- Ctrprt to NR Project Manager

GOB PROJECT COORDINATOR.
(Host Country Contract)

USAID COORD & MGT
- USPSC NR Prjt Mgr
- Asst Prjt Mgt

Functional Areas:
- Overall Prjt Mgt
- Commodity Procurement
- Financial Systems Mgt
- Contract Mgt
- RENARM/AID Buy-ins

INTL PVO UMBRELLA
- NR Advisor/COP (expat)
- Cropping Sys Adv (expat)
- Soil Consvn Adv (expat)
- 4 SAP Agronomists (local)
- Program Manager (local)
- Support Staff: - Sec (2)
  - Drvr/Msngr (2)

Functional Areas:
- Support the GOB:
  - -- LNGO contracts/OPNS/TORs
  - -- Admin Support
  - -- Support Prjt Coordinator
- SAP Implementation
- Intermediary/Advocacy:
  - -- LNGO Strengthening
  - -- CDF Grant Program
  - -- ST RENARM PVO Consortium

The coordinating arrangements established under the NRMP Project will also serve other natural resource and conservation activities whether financed locally or by other donors. The terms of employment will take into consideration the possibility of continuing the position with GOB funding at the end of the Project.

Apart from this coordinating function, A.I.D. project funds will not be used to support individuals not exclusively working on the Project. Additional GOB staffing is expected as part of the Host Country contribution to the Project. In addition, the GOB's outreach capability will be augmented by project staff hired under the umbrella PVO grant and supported by short-term technical assistance from LNGOs and through buy-ins to regional and centrally funded projects.

1. Government of Belize

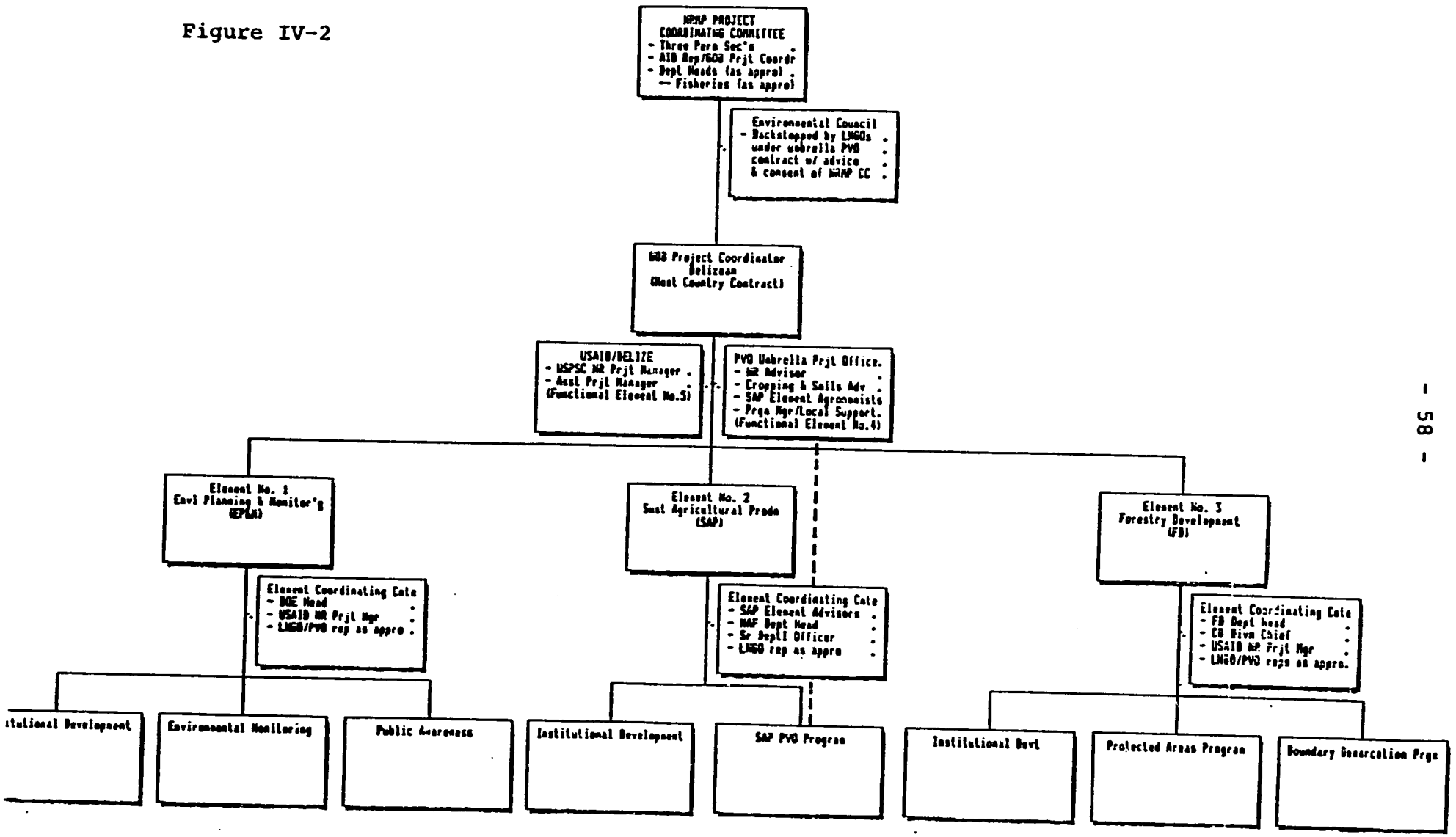
Successful project implementation will require the coordinated efforts of three GOB Ministries--Agriculture and Fisheries, Natural Resources, and Tourism and the Environment. The Coordinating Committee--composed of the three Permanent Secretaries, the PVO Natural Resources Advisor, and the USAID Natural Resources Project Manager--will be the principal instrument for that coordination. As the secretary to the Coordinating Committee the GOB Project Coordinator will be responsible for day-to-day coordination of project activities. Figure IV-2 depicts the GOB organizational arrangement for the Project.

The Ministry of Natural Resources will be the lead agency and will have primary responsibility for the Forestry Development element of the Project. The Ministry of Tourism and the Environment will have primary responsibility for the Environmental Planning and Monitoring Element, while the Ministry of Agriculture and Fisheries will be the main GOB counterpart for the Sustainable Agricultural Production element.

Specific implementing actions will involve appropriate department heads and staff. By including representation of the MAF's Fisheries Department from the outset, the GOB's internal organizational arrangement will facilitate relationships and linkages between the ongoing CAC Project fisheries/coastal zone management activities and a possible amendment to the NRMP Project to be designed in 1992 to add a Coastal Resources Conservation element.

Serious understaffing is a recognized constraint in several departments with vital roles under the Project. For the longer term, this constraint is addressed by plans to establish and fill additional positions. Much of the project's long-term training is aimed at providing a larger pool of individuals with the needed skills to fill these positions. The selection process for long-term participants will thus become a recruitment process for

Figure IV-2


NRMP PROJECT
COORDINATING COMMITTEE
- Three Para Sec's
- AID Rep/GOB Prjt Coordr
- Dept Heads (as appro)
— Fisheries (as appro)
Environmental Council
- Backstopped by LNGOs
under umbrella PVO
contract w/ advice
& consent of NRMP CC
GOB Project Coordinator
Belizean
(Host Country Contract)
USAID/BELIZE
- USPSC NR Prjt Manager
- Asst Prjt Manager
(Functional Element No.5)
PVO Umbrella Prjt Office.
- NR Advisor
- Cropping & Soils Adv
- SAP Element Agronomists
- Prgm Mgr/Local Support.
(Functional Element No.4)
Element No. 1
Envl Planning & Monitor'g
(EP&M)
Element No. 2
Sust Agricultural Prodn
(SAP)
Element No. 3
Forestry Development
(FD)
Element Coordinating Cmte
- BOE Head
- USAID NR Prjt Mgr
- LNGO/PVO rep as appro
Element Coordinating Cmte
- SAP Element Advisors
- MAF Dept Head
- Sr Dept Officer
- LNGO rep as appro
Element Coordinating Cmte
- FD Dept Head
- CB Divn Chief
- USAID NR Prjt Mgr
- LNGO/PVO reps as appro.
itutional Development
Environmental Monitoring
Public Awareness
Institutional Development
SAP PVO Program
Institutional Devt
Protected Areas Program
Boundary Demarcation Prgm

the GOB which will, in most cases, be expected to have a commitment of employment with the participant prior to his/her departure for training. Some participants may be from among the existing GOB staff, but in each such case it will be essential that the GOB have identified the person who will do the work in the participant's absence.

For the shorter term, the staffing constraints will be partially addressed by the heavy reliance on short-term technical assistance, especially from local NGOs.

2. Umbrella PVO and LNGOs

A resident Natural Resources Advisor, also serving as the PVO's Team Leader, will head the project support unit headquartered in Belmopan and funded under a cooperative agreement with a U.S. PVO. For broad program and administrative support to all project elements, the Team Leader will be supported by a program manager and support staff. For implementation of the Sustainable Agriculture Program, he/she will be supported by long-term technical advisors with expertise in cropping systems and soil conservation, as well as a field staff of four local agronomists.

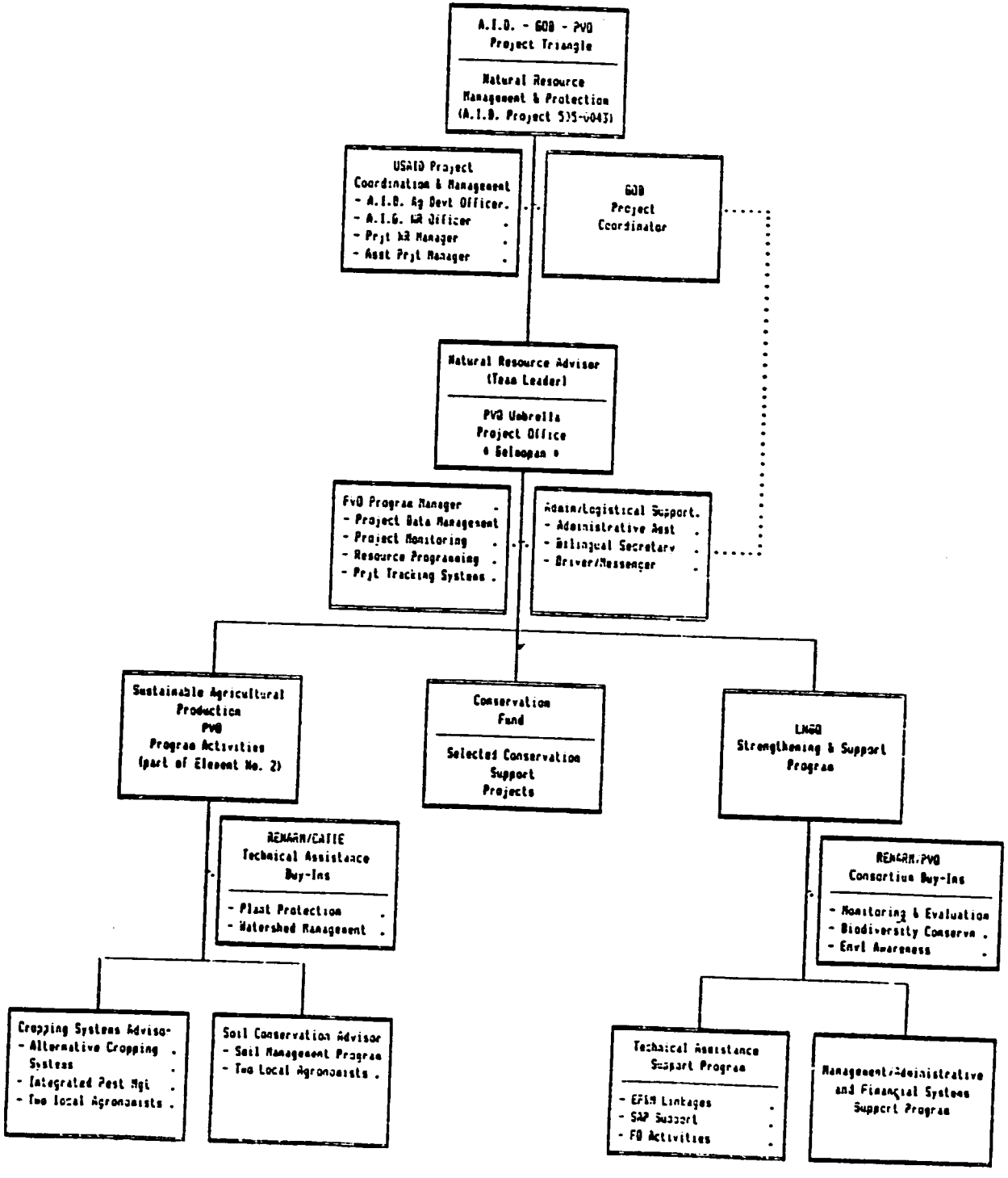
The PVO's project support unit will be housed in offices to be made available by the GOB in Belmopan. The support unit will share office space with and provide staff and logistic support to the GOB Project Coordinator. Figure IV-3 depicts the detailed composition of this Project Office. Location in Belmopan is advantageous for proximity both to the counterpart GOB Ministries and to the major target areas of the Sustainable Agricultural Production activity around the Maya Mountains. The office space requirements will be substantial and will need to be sufficiently separate from Ministry offices to allow full and ready access by the PVO's staff. In the event the GOB is unable to provide suitable office space, the project budget includes funds for leasing space under the cooperative agreement.

Early on, the PVO will initiate work with LNGOs to identify which, with help, have the potential to become viable change agents, and will help these LNGOs improve their management and financial operations. All LNGOs involved in the NRMP will meet annually as part of the evaluation process to review together the progress achieved by each in its respective area.

3. USAID/Belize

In USAID/Belize, the Agricultural Development Officer (ADO) will be responsible for providing overall guidance and direction to the Project. Initially, the ADO will be assisted in direct project management responsibility by a USDH Natural Resources Officer, later replaced by a USPSC Natural Resources Project Manager, and an FSNPSC Assistant Project Manager.

Figure IV-3


A.I.D. - GOB - PVO
Project Triangle
Natural Resource
Management & Protection
(A.I.D. Project 525-0043)
USAID Project
Coordination & Management
- A.I.D. Ag Devt Officer.
- A.I.D. NR Officer .
- Prjt NR Manager .
- Asst Prjt Manager .
GOB
Project
Coordinator
Natural Resource Advisor
(Team Leader)
PVO Umbrella
Project Office
& Secretary
PVO Program Manager .
- Project Data Management
- Project Monitoring .
- Resource Programming .
- Prjt Tracking Systems .
Admin/Logistical Support.
- Administrative Asst .
- Bilingual Secretary .
- Driver/Messenger .
Sustainable Agricultural
Production
PVO
Program Activities
(part of Element No. 2)
Conservation
Fund
Selected Conservation
Support
Projects
LNGO
Strengthening & Support
Program
REMARN/CATIE
Technical Assistance
Buy-Ins
- Plant Protection .
- Watershed Management .
REMARN/PVO
Consortium Buy-Ins
- Monitoring & Evaluation
- Biodiversity Conserva .
- Envl Awareness .
Cropping Systems Advisor
- Alternative Cropping .
Systems .
- Integrated Pest Mgt .
- Two Local Agronomists .
Soil Conservation Advisor
- Soil Management Program
- Two Local Agronomists .
Technical Assistance
Support Program
- EFIM Linkages .
- SAP Support .
- FO Activities .
Management/Administrative
and Financial Systems
Support Program

USAID will be directly responsible for the cooperative agreement with the umbrella PVO and will arrange to buy-in to ROCAP and A.I.D./Washington projects for short-term technical assistance. The short-term assistance will be developed in collaboration with the responsible GOB entities and with assistance from the umbrella PVO.

USAID will also be directly responsible for participant training arrangements in the U.S. and third countries. For placement, logistical arrangements and monitoring in the U.S., USAID will use contractors available through the A.I.D./Washington Office of International Training. For training in third countries, USAID will work through other USAIDs and training institutions to place and monitor the participants.

USAID is expected to use direct A.I.D. contracts for major procurement of equipment, especially where it is advantageous to consolidate orders and inappropriate to effect the procurement through the umbrella PVO's cooperative agreement. The GOB entities and umbrella PVO will handle other commodity procurements, especially expendable supplies and small items, including materials for the SAP component.

B. Project Implementation Strategy

Implementation of the Natural Resource Strategy will not depend on either MNR's overtaxed staff resources or the MTE's nascent capabilities. Neither will it condition assistance on 'a priori' staff increases, although continued support is conditioned on progress in filling staff needs early in the implementation period. The need to mount an effective response to the deforestation problem and the accelerating rate of environmental degradation is urgent and will not solely depend on the GOB's highly centralized and bureaucratic personnel system at the outset.

Rather, the strategy of implementing the NRMP Project is to provide the DOE (and the MNR) immediate access to information to make better planning decisions, provide the opportunity and means to have a positive effect in directing the path of Belize's economic growth, and--by the second year of the Project--begin to garner the staff and financial resources needed for institutional and program sustainability. Project interventions will initially focus on just a few critical areas, consistent with the limited absorptive capacity of the institutions involved and the need to acquire experience and confidence.

The PVO's project support unit will be responsible for funds management, contracting and procurement, mobilization of the LNGO community, and general project implementation functions in coordination with the Departments of Forestry and Environment. The PVO's Team Leader will be responsible for hiring and supervising the administrative and support staff required for the Project Office as well as that required to carry out the activities under the Sustainable Agricultural Production element.

This will allow the Project Office to be more flexible and responsive to the needs in the field because it will operate under the A.I.D.-approved financial management system of the PVO's parent organization. Items such as per diem, vehicle maintenance, purchase of supplies and materials, and special services and technical assistance requirements will be processed more quickly because the functioning of the office will not depend on the GOB's administrative and logistical system.

1. Environmental Planning and Monitoring

The group of activities described under the Environmental Planning and Monitoring component will be carried out by local NGOs under the guidance of the Project Office and MTE. While presently understaffed, the Department of Environment is expected to figure importantly in defining the priority areas to be studied through its active participation in the review and approval of the terms of reference for the studies scheduled for LNGO execution. Close contact with the other ministries through the Project Coordinating Committee will result in the collaboration needed to successfully address cross sectoral environmental and natural resource management issues.

2. Sustainable Agricultural Production

Support for the Sustainable Agricultural Production component will be channelled through the second major component of the technical assistance program contemplated under the umbrella contract. The PVO's field staff of advisors and local extensionists will carry out the SAP activity in close collaboration with the MAF. This will be a priority in order to coordinate with other small farmer outreach programs by CARE, CARDI, UNHCR, and others. Environmental issues resulting from large scale export oriented agriculture, like citrus, banana and mango production also present along the fringes of the Project target area, will require differing technological responses more appropriate to high-input, capital intensive agricultural experience gained elsewhere in the region, such as CATIE's plant protection program. This support will be accessed through buy-ins to RENARM.

3. Forestry Development

The task of promoting a more proactive approach to conservation management will depend largely on LNGO success in increasing public awareness about the ecological importance of the remaining critical habitats and the economic benefits to be derived from alternative land use practices. The comprehensive system of protected areas providing the framework for individual conservation efforts and multiple land use plans will require cooperation with local communities and the support of government to be successful. Linkages between the international PVO selected under the umbrella contract and similar PVO efforts taking place

elsewhere in the region under RENARM's aegis are expected to effectively jump start the protected areas program contemplated under the NRMP.

C. Coordination

A Project Coordinating Committee, comprised of the three Permanent Secretaries and Project Coordinator, the umbrella PVO's Natural Resources Advisor, and the USAID ADO, will be formed to facilitate Project coordination and communication. The Project Coordinator, with administrative and logistical support provided by the Project Office, will serve as Secretary of the CC. Department heads and representatives of LNGOs will attend as appropriate. The CC will meet on a monthly basis (weekly during the start-up period) to:

- o provide close supervision to project start-up;
- o ensure timely project implementation;
- o define project policies according to specific needs;
- o recommend short-term technical assistance requirements;
- o review and approve the terms of reference for LNGO services;
- o secure the inter-institutional coordination necessary;
- o promote the cooperation between the various departments and among the three principal ministries;
- o review annual evaluations, budgets and operating plans;
- o request, support and review external project evaluations.

In addition, representatives from LNGOs and other GOB entities such as the Ministry of Finance may be invited to attend the meetings when appropriate. Overall policy guidance and direction will be issued by the CC in minuted consultation of its members for the purpose of expediting project implementation and supporting the GOB's fulfillment of its staff and counterpart commitment. Also, the CC will expedite agreement on the first year's work plan, develop a training plan, establish the basis for the use of project vehicles and non-expendable property, and generally seek to optimize use of project resources.

Upon determining the overall technical orientation of the Project through consensus on the priorities to be followed, the CC will develop an overall training plan for the project participants and establish the criteria to be followed in their selection. The Project Coordinator will work closely with the GOB Establishment Office, other government entities and private sector groups active in environmental education (such as Programme for Belize and the Zoo) in order to identify and specify training needs and potential participants both in and out of the public sector.

D. Annual Work Plans

Annually, and in sufficient advance of the GOB budgetary process to permit counterpart requirements to be effectively programmed,

the Project Office will be responsible for developing an overall and three specific work plans, one for each technical element of the Project. Each of the three technical work plans will be based on the initial set of outputs targeted in the Project Paper as programmed in the individual implementation schedules. The overall work plan will specifically address the end of project status indicators by linking the individual efforts into a cohesive whole. Combined, the work plans will serve to guide implementation progress during the ensuing twelve-month period and serve as the initial point of reference for monitoring purposes.

Environmental Planning & Monitoring: Programming the initial set of activities to be pursued under this element will begin with a combination of programmatic and geographic considerations. Two technical assistance missions will be provided concurrently. The first will initiate the process of organizational and regulatory realignment while the second begins the process of defining the topographic, demographic and other characteristics of the five principal watersheds in Belize.

This latter activity when combined with a limited number of expediency actions (such as developing an oil spill contingency plan, a hurricane vulnerability assessment and a review of development concession compliance with environmental guidelines) will combine to serve future and immediate environmental monitoring and planning actions. As data is generated by the field activities, a critical baseline of environmental status will begin to emerge that will guide subsequent efforts along specific lines of inquiry.

Preliminary assessments, like the Harvard Environmental Hazard Assessment and a revision to the Belize Environmental Profile (completed in 1984) will help frame the nature and extent of Belize's environmental problem. At mid point through project implementation, and at least 18 months after the initial set of field studies, subsequent samples of the same area will provide the update required to establish rates of change, quantify problem areas and focus mitigation efforts. By the end of the second full implementation period, a white paper will be drafted reporting on the state of Belize's environment. This document will serve to substantiate the requirement for counterpart personnel and resource allocation during the out years of the Project, as initially identified by the organizational and regulatory review.

Sustainable Agricultural Production: Contact between farmers and settlers and the teams implementing the sustainable agricultural production and the forestry development activities will be critical. The point of relevance for the planning, monitoring and evaluation and will depend on the quality of this interaction. Initial baseline studies, followed by periodic assessments will serve to examine and identify cross cutting issues such as agriculture's effect on deforestation and subsequent downstream impact on environmental quality.

Generally, the planning process will begin with the collection of existing information on environmental "hot spots". This will include, basic topographical maps, site specific information on soils and climate, slope and vegetative cover. The result will be a composite map of priority work areas that indicate where traditional land use practices exceed the capacity of that parcel to support that use.

The composite maps of the priority areas will be supported by information necessary for accurate decisions in selecting technological interventions appropriate to local agro-ecological conditions and socio-economic and cultural characteristics. This will include data on the local population, its vocations, land tenure and use, farming systems, communal organizations, local variations, local variations in soils and climatic conditions and the current status of the natural resource base. This will serve to characterize the priority areas and extrapolate the interventions required. Once the maps and general characterization is completed, a strategy for each community will be developed that tailors the technical assistance program to the needs and provides a basis for programming the level of effort required, the schedule of visits and expected outcome of the assistance effort. Combined, these area strategies will form the basis for an annual work plan describing the activities to take place under the Project.

Forestry Development: While relatively straightforward in concept, application of the Protected Areas and Boundary Demarcation Program will depend directly on the degree to which efforts under the other two elements succeed in increasing environmental awareness in support of conservation and in reversing the rate of encroachment on remaining protected areas.

Like the preliminary field work to establish the baseline for subsequent environmental planning and monitoring efforts, similar "hot spots" along the boundaries of established and future protected areas will be pinpointed, rapidly assessed and programmed for appropriate intervention. Once identified, these areas will serve as the nucleus of the first year's work plans and serve to focus and complement similar efforts under Element 2, Sustainable Agricultural Production. Measures to enforce compliance with forestry regulations will be augmented by the outreach efforts of the PVO team of SAP extensionists with whom they will work in close coordination. Where the pressure is particularly critical, boundaries will be cleared on the ground to enhance control measures.

While the focus of the first year's work plan in Forestry Development is on stabilization and control of the forestry inventory, concurrent efforts will be undertaken to explore alternative arrangements for managing protected areas such as increased involvement of the LNGOs like the Belize Audubon Society and community based programs like that mentioned earlier for Five Blues Lake, Monkey River Nature Preserve and others.

The cohesiveness required to bind these individual efforts together into a synergistic whole will result from the mutual interest of all three activities where they converge in the field. This will be the focus of attention of the general work plan in light of the end of project status indicators.

At this point, the respective roles of the MNR and the MTE will be clarified and implementation responsibilities apportioned according to each entity's complementary capabilities. It is anticipated that the majority of the field work will be contracted out as studies and field assessments conducted by LNGOs and individual consultants selected through a competitive and open process.

An annual work plan will be prepared that summarizes the individual efforts of the field activities into four parts. The first will list the strategies for addressing the needs of the communities, farmer groups and "hot spots" along the boundaries of the protected areas. A comparison of these assessments will identify common interventions. Next, a quantified summary of the goals involving participating individuals, adjustments in cropping patterns, pressure on adjoining natural resources, and downstream environmental impacts will categorize the principal interventions to be promoted in each area. This step will facilitate development of an estimated level of effort and the specific progress indicators for subsequent monitoring. The third part of the plan will schedule technical assistance for the following twelve-month period according to crop rotation cycle and seasonal weather patterns. Based on the information developed so far, the fourth and last part of the plan will be to program and procure the necessary commodities and supplies required to carry out the projected year's activities. The process will culminate in an annual review and programming session to build consensus, increase the general level of awareness among the implementors of the three components and strengthen the coordination needed to address cross-sectoral concerns.

In this manner, project implementation will follow a cyclical process from one year to the next that will facilitate the systematic approach to addressing issues, ongoing assessments and feedback on progress, identification of problems or weak areas and the feedback needed for programming in subsequent periods.

E. Implementation Schedule

The actions listed below focus on the steps required to get the Project going. Once the Project Agreement is signed, the priority will be the issuance of a request of application (RFA), recruitment of a USPSC Natural Resource Manager, the start of selected field activities critical to refining the Project target area and preparation of first year detailed work, procurement, training and financial management plans. Detailed implementation schedules for each of the Project elements are found in Annex 7.

First Year Schedule of Implementation Actions

	Week
Project Agreement Signed	0
Project Implementation Letter No. 1 sent to GOB	3
Request for Applications (RFA) Issued	6
Terms of Reference for preliminary field work drafted:	6
o Critical Watershed Assessment	
o Identification of protected area "Hot Spots"	
o Siting of Point & Non-Point Sources of Environmental Contamination/Degradation	
Specifications for initial equipment procurement written	7
Initial Conditions Precedent met by GOB	8
Project Coordinator position advertized	8
First Year Annual Work Plan & Budget approved	8
First Year Project Procurement Plan approved	9
First Year Training Plan approved	10
IFB for initial equipment issued	10
Procurement of TA for preliminary field work started	10
Receipt of PVO applications responding to RFA	13
Trainees and participants for first year training selected	14
Project Coordinator recruited	17
RFA respondents evaluated; selection made	17
PVO Cooperative Agreement negotiated	24
Arrival of initial commodities (vehicles, PCs, etc.)	28
Arrival of key PVO personnel to establish operations	30
Second Annual Work Plan and Budget approved	46

F. Procurement Plan

The Project's emphasis on data generation, analysis, training and planning for conservation management will place a considerable load on contracting for personal services.

The resident technical advisor provided under a cooperative agreement with an international private voluntary organization experienced in dealing with local nongovernmental organizations on environmental and natural resource conservation issues, and able to expedite subcontracting actions considerably.

There is also a considerable requirement for procuring training services (academic and short-term), vehicles and other equipment, and commodities. As shown in the accompanying Table, scheduled procurement actions are identified according to type of action implementing entity. Procurement of technical services, U.S. training and certain categories of commodities will be carried out directly by USAID/Belize with the support of the Regional Contract Management Office in Guatemala and A.I.D./Washington. The GOB's requirements for technical assistance from the LNGOs will be contracted directly by the international PVO. Terms of reference for technical assistance, project support requirements, detailed

Table IV-1 Procurement by Budget Categories and Responsible Implementing Entity

Natural Resources Management and Protection
A.I.D. Project 505-0043

Budget Category	Responsibility for Procurement		Total	Approval
Technical Assistance:				
Expat	USAID		585.0	GOB
Local	"		999.0	GOB
Expat	Intl PVO		1,496.0	USAID, GOB
Local	" "		784.5	USAID, GOB
		Subtotal	$ 3,864.5	
Training:				
LT U.S.	USAID		1,133.0	GOB, USAID
U.S./Regl	"		324.0	GOB, USAID
ST/Local	"		30.0	GOB, USAID
U.S./Regl	Intl PVO		66.0	GOB, USAID
ST/Local	" "		63.0	GOB, USAID
		Subtotal	$ 1,616.0	
Equipment/Commodities				
Office Furniture & Equipt	USAID		429.0	GOB, USAID
Vehicles	USAID		360.0	GOB, USAID
Office Furniture & Equipt	Intl PVO		170.0	USAID
		Subtotal	$ 959.0	
Construction:	GOB		60.0	USAID
Program Operations:	USAID		150.0	-
	Intl PVO		923.0	USAID
	GOB		60.0	USAID
		Subtotal	$ 1,133.0	
Other:				
Audit			90.0	
Evaluation			95.0	
Inflation			290.4	
Contingency			390.9	
Total			$ 8,498.8	

specifications for vehicles, equipment and commodities will be developed with assistance from the international PVO.

In order to ensure equitable participation of small and disadvantaged businesses in this Project, all procurements advertised in the Commerce Business Daily (CBD) will specifically state that A.I.D. encourages the participation of small and minority business in this Project. Because the NRMP is designed to encourage the complementarity and mutual reinforcement between Belizean LNGO and Government efforts to address environmentally related agricultural and economic development problems, the Project design team considers that exclusive use of the Title XII procedure of the FAA is not appropriate. Potential bidders under the RFA will be required to provide a subcontracting plan as part of their proposal for carrying out the numerous activities contemplated for LNGOs. This plan should include procedures for soliciting proposals, orienting LNGOs to project objectives, providing guidelines in proposal writing, evaluation criteria and procedures for assessing institutional capacity, management ability, technical skills capability, financial management systems and general institutional soundness.

1. Technical Assistance

The bulk of the technical assistance requirements of the Project will be provided under a cooperative agreement with a U.S. PVO and subgrants/contracts with LNGOs. The cooperative agreement will be awarded on the basis of responses to a competitive Request for Applications, which will be issued and publicized to the PVO community as soon as possible after the initial Project Grant Agreement with the GOB is signed. Selection will be by a committee composed of GOB and USAID representatives and the selection will be subject to USAID approval.

The PVO awarded the umbrella cooperative agreement will be responsible for recruiting and hiring its own staff for the Project support office and to implement the Sustainable Agricultural Development activity. The selection of experienced and well-trained individuals will be critical to the success of the NRMP. USAID will review the selection criteria for key personnel, whose appointments will be subject to written confirmation of approval.

The umbrella PVO's project support unit will assist the Project Coordinator and responsible GOB operational units in preparing specifications and terms of reference for all technical assistance requirements for the Environmental Planning and Monitoring, Sustainable Agricultural Production and Forestry Development elements of the Project. Subgrants and subcontracts for specific tasks will be awarded by the umbrella PVO on a competitive basis. The selection of LNGOs, firms or individuals to implement the tasks will be approved by the Coordinating Committee.

Some short-term technical assistance may also be procured directly by the GOB, although the efficiency of using the umbrella PVO's mechanisms to obtain most of these services is likely to limit the amount of such direct grants and contracts. The GOB will be responsible for directly contracting with an individual to serve as Project Coordinator, as described in the section on Implementation Responsibilities.

The GOB will also be responsible for obtaining directly some of the local services required to carry out program activities. This is likely to increase over the period of the Project, as Ministry staff grows and becomes capable of assuming the responsibility.

Significant amounts of short-term technical support for the Project is also expected to be obtained through A.I.D.'s Regional Environment and Natural Resources Management (RENARM) Project and other regionally- and centrally-funded projects. While the project support unit will also assist in preparing terms of reference for this support, USAID, with support of the Regional Contracting Officer in Guatemala or the responsible contracting officer in A.I.D./Washington, will arrange the appropriate buy-in or contracting actions.

2. Training

A training plan will be developed as an initial step in implementing the Project. In addition to a more precise identification of needs and fields of study, the plan will include procedures for selection of candidates and the terms and conditions to be used to assure their return to appropriate employment in furtherance of project objectives.

Long-term degree programs and short-term participant training in the U.S. and in the region will be arranged by USAID, using the contractors available through the Office of International Training in A.I.D./Washington for placement, monitoring and logistic support of participants in the U.S. and the A.I.D. Missions or training institutions for this support of participants in third countries.

Short courses, seminars and workshops to be conducted in Belize will be arranged either by the umbrella PVO or by the GOB with the PVO's assistance.

3. Commodities

With the possible exception of the additional workstations required to expand the GIS capability, commodity procurement will be done in full and open competition. It is anticipated that procurement of the majority of the commodities will take place in one or two large lots during the early years of the Project under Invitations for Bids issued directly by USAID with assistance from

the Regional Commodity Management Officer. This will permit the consolidation of orders, for example, of vehicles for the various project elements.

The GOB has requested that the NRMP procure a total of 19 (nineteen) motorcycles of up to 250cc engine displacement that will be used by the 12 forest rangers, their field supervisors and other project technical staff. Mobilizing these individuals is essential to the successful implementation of the forest development activity and requires the utilization of these lightweight motorcycles.

Motorcycles of the required size and specifications with spare parts and service available in Belize are not manufactured in the United States. USAID/Belize has determined that spare parts and service are available locally in Belize for motorcycles manufactured in Japan which meet the required specifications. USAID will, upon prior consultation with the RLA and LAC/DR, procure these vehicles based on the cite in A.I.D. Handbook 1, Supplement B, Section 4C2d(1)(a) which lists one circumstance that may merit waiving the requirement to purchase U.S. manufactured motor vehicles as the "inability of U.S. manufacturers to provide a particular type of needed vehicle: e.g., lightweight motorcycles...."

Further, Redelegation of Authority, No. 752, provides the USAID/Belize A.I.D. Representative with the authority to waive the source/origin requirements of motor vehicles. The line item in the budget totalling $76,000 is estimated for 19 motorcycles at approximately $2,500 each, for a total of $47,500. The remainder will be used to cover freight costs and spare parts.

Fourteen field utility vehicles will also be required to support the various project activities. Although the GOB has generally standardized on Ford vehicles because of the availability of parts and service, the procurement for this Project will be open to competitive bids for any U.S. manufactured line. However, the competitive IFB will require adequate provision for parts and service.

Computer equipment for the Geographic Information System may require a sole-source waiver. If so, this waiver will be sought prior to procurement.

In addition to helping identify needs and prepare specifications for equipment and commodities required for the Project, the umbrella PVO will be responsible for procurement of equipment and materials needed for operations of the Project Office and the Sustainable Agricultural Production activity, other than items consolidated in orders placed directly by USAID (e.g., vehicles).

Similarly, MNR and MTE will procure items required for their respective activities under the Project. This direct host country procurement will primarily be locally sourced supplies and materials.

4. Construction

The only construction contemplated under the Project is twelve forestry guard posts. Although the posts will include living quarters, they will be modest, simple structures, estimated at US$5,000 each. Construction will be arranged by the Department of Forestry in the MNR.

V. MONITORING, EVALUATION AND AUDIT

A. Monitoring

The development and application of work plans for the Project and each of the Project elements will be the basis for project monitoring. Minuted meetings of the Coordinating Committee, monthly implementation meetings, and the quarterly reports provided by the Project Coordinator and the international PVO will provide the means of monitoring progress.

Central responsibility for monitoring project implementation will rest with the Project Office established under the cooperative agreement with the international PVO. Once work plans for each of the Project elements are established, specific objectives for each year of implementation will be negotiated for each professional of the Project Office. Progress toward these objectives will be reported monthly in a brief, abbreviated format. Monthly implementation meetings to review progress toward work plan objectives will serve to keep the members of the Project Coordinating Committee informed of progress. Quarterly, the team leader and Project Coordinator will jointly prepare a report to USAID/Belize detailing the accomplishments during the preceding period. This will form the basis of the USAID reports on the Project. While the specific format for these reports will be developed in consultation with the international private voluntary organization, the reports will be organized to facilitate drawing the following references about progress toward the end of project status indicators:

- progress toward achievement of desired outputs and impacts and propose needed corrective actions;
- facilitating the coordination and complementarity between the activities of each project element;
- building accountability among the various participants;
- promoting coordination between Project activities and other donor activities; and
- strengthening the evaluation capacity of the government entities and LNGOs participating in Project implementation.

The objective will be to assemble and analyze the data generated under each element to verify trends in deforestation, soil erosion, water quality, land use (and later, coastal zone degradation) and to disseminate and apply the findings to support needed reforms in institutional mandates and natural resource policies.

B. Evaluation

The three technical elements of the Natural Resource Management and Protection Project are scheduled to produce, because of the

different focus and complexity of their activities, results at different though complementary intervals during the five-year project life.

While many of the inputs for all elements will be provided early, the principal results expected from the Environmental Planning and Monitoring element--except for returning participants--will come at the beginning (organizational changes and benchmark survey results) and during year three (trends analysis, results and recommendations). Similarly, the thrust of the Protected Areas and Boundary Demarcation program under the Forestry Development element is expected to produce, by year 3 of the LOP, the information needed by GOB decision makers to consolidate a comprehensive national system of protected areas.

At that point of the Project, a mid-term evaluation will be carried out to measure progress toward common objectives where the cross sectoral overview will have provided the perspective needed to appreciate Belize's environmental and natural resources fully as well as the guidelines necessary to implement a national program of conservation management. Mid-course corrections, including the reprogramming of any project elements due to lack of progress compliance or support, will be based on the results obtained from the mid-term evaluation. Certain key issues, such as the environmental impact of process by which national lands are dereserved, will be looked at closely.

Because of its long-term nature, the Sustainable Agriculture Production component will follow a slightly different evaluation schedule. As discussed in the section on implementation, field activities will be subject to annual evaluations of effectiveness that will be augmented by monthly meetings to progress reviews. Still, SAP activities represent an opportunity to gauge the effectiveness of the conservation objectives pursued under the Forestry Development element. The extent to which forestry boundaries hold fast will depend directly on the degree to which farmers adopt the alternative cropping systems technology and improved soil conservation practices. "Hot spots" where these considerations coincide will serve as the specific sites to evaluate the complementarity of the individual efforts.

Mid-term and final examinations, as well as the annual reviews, will involve all NRMP participants--the MTE, MAF, MNR, USAID, LNGOs and selected outside reviewers. Each review will examine the availability of inputs, production of outputs, issues regarding coordination, oversight, management and the general appropriateness of planned project activities. Particular attention will also be given to performance under the two non-technical elements of the Project, PVO Project Support and Project Coordination and Management. Lessons learned will be incorporated into subsequent planning periods and to the extent feasible, complementary project activities like the proposed Coastal Resources Conservation amendment and other projects like Rural Access Bridges and Tourism Management.

C. Audits

Audits will be provided by the A.I.D. Regional Inspector General (RIG), the GOB's Auditor General and the LNGO's external auditors to determine compliance, efficiency and effectiveness of the use of Project funds. In addition, the amount of $90,000 has been budgeted for audit because of the size, complexity and duration of the Project. It is expected that USAID will contract directly for these services among the auditing firms duly accredited by the RIG. Also, the USAID Controller will make random financial reviews to assure that the accounting and internal controls needed are being implemented. Financial and compliance audits of LNGOs will be conducted yearly by an audit firm approved by USAID. The audits will examine and render audit opinions in accordance with A.I.D.'s Audit and Compliance requirements. Audits of the MTE, MAF and MNR will be conducted by the GOB Auditor General in accordance will GOB practice.

VI. SUMMARIES OF ANALYSES

A. Institutional Analysis

The two principal GOB Ministries involved in NRMP Project implementation are Tourism and the Environment (MTE) and Natural Resources (MNR). (An institutional assessment of the Ministry of Agriculture will be conducted in the course of developing the coastal resources amendment because MAF's role in implementing the Sustainable Agricultural Component is limited.) The relationship between the GOB and local nongovernmental organizations and regional and other sources of technical assistance is also described in the context of specific Project activities.

1. The Ministry of Natural Resources (MNR)

The Ministry of Natural Resources will serve as the lead counterpart institution. It contains the GOB's Lands & Surveys Office, Forestry Department and Conservation Division that will form the core of the land use planning and management capability to be expanded under the NRMP. The Minister of Natural Resources is also the Deputy Prime Minister and has, in the two years since taking office, become an important advocate for conserving Belize's natural resources. During his tenure, several new reserves have been created and protected areas have expanded significantly.

The origins of the MNR date to the mid-1950s and continue through the colonial transition with a varying portfolio. The Ministry of Agriculture and Fisheries formed a part of the MNR until 1986. With the change in government that year, Forestry joined the Water and Sewage Authority, Geology and Petroleum, and Lands and Surveys to form the MNR as it is known today.

During the past five years there has been growing recognition of the merit in keeping the MNR portfolio consistent; as a result it has emerged as one of the more powerful and effective Ministries in the Cabinet. As presently organized (see Figure 4), the MNR comprises two administrative and two operational levels. At the highest is the Minister of Natural Resources who is also assisted by a Minister of State. The senior career civil servant is the Permanent Secretary who provides direction for implementation of sector policies and programs. The NRMP will be organizationally appended between the Permanent Secretary and the line departments on the secondary level, because Project planning, program budgeting, monitoring and evaluation is initiated at the departmental level. From Belmopan, the MNR carries out its mandate through four departments: Lands & Surveys, Water & Sewage, Geology & Petroleum, and Forestry. The Forestry Department is organized along the geographical areas (southern and western) containing the forest inventory and functional areas of Forestry Management, Conservation, Research, and Forest Products utilization.

The regional headquarters of the Forestry Department are the responsibility of the Chief Forestry Officer who, acting through the district forestry officers, helps plan field activities, research programs, and initial personnel supervision. Once developed with Forestry headquarters in Belmopan, regional forestry offices will coordinate and support the forestry conservation activities under the NRMP Projects.

By contrast, Lands & Surveys is more centralized and is represented nationally through the District Lands Officers. While principally responsible for revenue collection, their knowledge of property transactions, land use patterns and other property issues will provide valuable points of reference for improving the registry. Equipment, software, technical assistance and maintenance support funded under the Property Registry component of the CAC Project will be expanded to include data analysis and land use planning under the NRMP. (See Annex 8 for the plan by which L&S will develop LIS/GIS capability.)

2. The Ministry of Tourism & the Environment (MTE)

The MTE was established in September 1989 as a manifestation of the commitment of the GOB to the protection of the total environment of Belize. MTE's goal is to "establish harmonious equilibrium between the natural and the human orders of the nation". Before the creation of the MTE's Department of the Environment (DOE) there was no GOB ministry fully responsible for monitoring resource use and alteration to development. Land use planning continued, industry developed and concessions were granted with little regard for environmental monitoring and resource protection. The DOE was established in response to this need but the allocation of existing environmental responsibilities between the DOE and the other ministries is required.

The major objectives of the Department of the Environment are to:

- formulate a policy strategy on the environment for the GOB;
- create directional policies and regulatory objectives for the DOE;
- develop functional process for strong interministerial cooperation needed to address environmental issues cutting across sectors;
- establish an environmental data base;
- increase public awareness;
- promote research and conduct environmental impact assessments.

As is to be expected with a governmental entity not quite two years old, the MTE has a limited human resource base and a weak institutional structure. It is still in the process of consolidating its role in the GOB and is seeking to improve the coordination among the government entities involved in natural resource management. The Forestry Department of the MNR is

similarly under-staffed and under-trained and not capable of assuming the additional responsibilities that the integrated approach under the Natural Resource Management Project entails. Consequently, the considerable support available for implementation is designed to elicit responses from indigenous sources of expertise in an open and competitive manner in areas of priority concern.

3. Local Non-Governmental Organizations

Local non-governmental organizations actively involved in promoting Belize's agricultural and economic development represent a diverse range of interests and varying degrees of institutional capability.

Some, like Help for Progress and BEST (Belize Enterprise for Sustainable Technology), work closely with local communities and small businesses to meet self empowerment and institutional strengthening objectives. Others, like the Belize Audubon Society and the Belize Zoo, carry out significant outreach programs--one in conservation advocacy, the other in environmental education--in addition to core programs in park management and wildlife conservation.

Fortunately, both LNGOs and GOB are becoming increasingly aware of the difficulty and considerable effort to resolve Belize's natural resources problems. New relationships like that permitting BAS management of the national park system is an encouraging example and one that will be promoted under the NRMP. However, the degree to which their wealth of knowledge can be directed at Project objectives will depend on how successfully they compete for resources and carry out their responsibilities, a process that will be facilitated by the international PVO.

At present, the most active conservation LNGOs at the national level include the Belize Audubon Society, Programme for Belize, the Belize Zoo, the Ix Chel Tropical Research Center, and the Belize Center for Environmental Studies; and at the community level, BEST and Help for Progress. While a considerable number, they have historically not had to compete for contracts and have instead relied on program support grants from A.I.D. and other donors. Performance has tended to be uneven, pointing to the need for further strengthening in areas of reporting, management operations and financial control systems.

These limitations notwithstanding, the need to build indigenous capabilities in and out of government is critical to long-term sustainability and merits additional effort before turning to other sources of assistance.

B. Technical Analysis

The technologies and methodologies proposed for this Project are already being utilized in varying degrees within Belize and/or the region. Thus, there should be few unknown technical difficulties encountered during the life of the Project. Where problems may emerge, the technical support being provided through LNGOs and RENARM's Central American resources are easily accessible. The entire underpinning of the RENARM assistance is to strengthen or facilitate the project initiatives in a planned, logical, and technically sound manner.

Examination of the Project for its technical feasibility, appropriateness and effectiveness confirmed that the management systems being proposed represent the most suitable approach in addressing natural resource management and protection in Belize. The key is to put into place a technological and institutional format whereby social and natural systems can be effectively balanced and managed on a long-term sustainable basis. Many of these approaches and technological innovations are already known and proven. The concepts noted in this Project are building upon successful experiences that A.I.D. and other donor agencies have had in natural resource management projects over the past decade. Naturally, intensive testing and refining of these concepts must continue in order to address current social, economic and environmental needs and issues in Belize.

The basic technical strategy is to develop and test activities that are compatible with the Belizean cultural and natural landscape. In selecting priorities for the program, a number of factors were considered, e.g., resource status, economic potential, local perceptions and most importantly, the planning and decision making processes that affect policy response. Successful techniques and relationships will be nurtured, refined and extended to enhance the success rate in addressing natural resource management and protection issues, while static, outdated ones are retired. Vigorous partnerships among local public and private sectors are currently developing activities related to all three components of the NRMP Project. Therefore, the technologies to carry out the environmental and natural resource interventions find considerable reinforcement by involving local people and community organizations with participating LNGOs and government agencies. An innovative part of this Project is the opportunity for refining existing and new management techniques and structures to specific socio-economic and conservation settings in Belize. Where natural resource management and public participation technologies are yet unproven or undefined, applied research will be conducted, evaluated and refined with the concerned client before it is adopted as a viable technology. This will be particularly important in the Environmental Planning and Monitoring and Forestry Development related activities.

In sum, the Project will continue to build and add to scientific knowledge that is necessary in identifying problems and developing solutions to economic challenges while maintaining biological diversity and sustaining natural resources through integrated management structures and processes. Once organized, a participatory planning process will serve to prevent irreversible trends of destruction of renewable natural resources in Belize. Additionally, the small but competent groupings of individuals and organizations concerned with planning, conservation and appropriate technology transfer are aware of their limitations, but will be strengthened during the life of the Project. The Project Implementation Unit and a Technical Advisory Committee will provide the requisite multi-disciplinary skills and expertise to monitor and guide training and interventions as the Project develops and matures. The NRMP Project promotes techniques that are proven and will help build management and decision making skills, community confidence and self-guided independence to sustain planned activities and their outputs beyond the life of the Project.

C. Social Soundness Analysis

For purposes of this Project design, it is assumed that natural resources management and protection must be "people oriented". This requires an approach that links community interests with local and national social structures responsible for developing and conserving the natural resources of Belize. The aim of this resource management project is to protect and manage natural resources, upon which sustainable economic and social development depends, for the long-term benefit of Belize and its citizens.

This is especially important from a socio-economic perspective because Belize is a relatively poor country, particularly in the rural areas. Rural community members depend upon the land, water, soil and marine resources for their basic needs and livelihood. Thus, any project plan implemented for the management of these resources must ensure that the recommended interventions do not unreasonably conflict with the utilization of these resources without acceptable alternatives being offered and made accessible. The community voice is an integral part of this process and must be heard.

Based on these assumptions, the NRMP Project is designed to be "people sensitive" in order to meet the long-term needs of those directly involved with and/or affected by the Project activities and outcomes. Organizations that represent those directly involved in the utilization and protection of natural resources (such as timber producers, agricultural cooperatives, tourism industries and conservation organizations) must be the ones that the Project works <u>through</u> rather than only with. This approach will maximize both the benefits and the participation of those directly affected by the Project. It will also minimize

constraints (such as resentment and indifference) that may occur when the role for these individuals is less well defined. The help and particpation of those directly involved in the utilization of natural resources through indigenous organizations that represent them is the most crucial aspect affecting the social soundness of the Project.

Additionally, success of the Project depends on across-the-board acceptance by all GOB ministries and departments, and LNGOs involved in or affected by the Project. Since all major aspects of the Project include technical assistance to help access, evaluate and ultimately improve decision making and management capability, resolve interministerial conflicts in jurisdiction, and strengthen public/private cooperation, the Project is designed to involve all existing organizational structures, on a competitive basis, currently participating in the development process.

The direct beneficiaries of the NRMP Project include:

- the primary users of agricultural and forest resources;
- the private sector and LNGOs involved in the development process, environmental conservation, management and protection of natural resources;
- the decision makers and related staff of government who are responsible for environmental protection and natural resource management and protection in Belize.

Women will clearly benefit from the NRMP Project. The interdependence of the family unit in the rural areas of Belize ensures that whatever economic benefits accrue to the family will be evenly dispersed among family members. Additionally, the task of maintaining the relatively high quality of life will be greatly eased. Women's roles in the rural areas especially tend to be much more flexible than that of men, enabling them to more readily accommodate new ideas and innovations. Conclusions of the analysis are summarized below.

- Most of the people interviewed and/or surveyed have positive attitudes towards conservation and recognize the benefits of sustainable resource management. This suggests that the Project will be well received among the resource user groups and the general populace.

- Most of the Project's direct beneficiaries stated that they were willing to contribute to the Project. This reinforces the belief that with proper dialogue there ought to be no lack of local talent involved in the Project, and little negative feedback from the primary resource user groups is anticipated.

- Government and LNGOs are clearly interested in contributing to the Project. They have indicated that a Project of this nature is very timely and expertly tailored to suit their development/conservation agenda.

Finally, it is concluded that Belizeans are being sensitized to conservation and sustainable resource management issues. All of this indicates that with proper education and public awareness-based activities, the acceptance and ownership of the NRMP Project will be firmly Belizean.

D. Economic and Financial Analysis

The primary approach of the NRMP Project is institution building in support of environmental protection and natural resource management activities. Some of the planned activities build on previous projects, while others will be introduced to Belize based on experiences elsewhere in the region. Since conventional benefit cost analysis would be inappropriate for this Project, other techniques are used. Cost-effectiveness, replacement cost or shadow project techniques, as well as a review of recurrent cost and resource user incentive issues comprise the approach followed in the economic and financial analysis. These are explicit or implicit incentives suggested by A.I.D. Handbook 3.

The relatively good environmental health and natural resource status in Belize provides an opportunity to address important issues before the costs become prohibitive. The "Financial/ Economic Considerations" in the PID noted important facts relevant to the approach used in this economic and financial analysis. First, while Belize is not yet an environmental disaster area, there are clear signs that corrective or protective actions should be taken now, while the economic situation is good and the natural resource base is relatively intact. Second, the cost of building institutions and developing effective mechanisms to support sustainable development is cheaper now than when the natural resource base becomes degraded.

These points serve to place into perspective the "with and without" descriptions of the effects of the Project. Failure to begin addressing the problems of deforestation, pollution and environmental degradation, for example, will simply result in much more costly solutions in the future because protection and sustained management are easier when the resource base is intact than after it is destroyed. Belize is particularly dependent on the sustained use and quality of its resource base. Mining of the resources for short-term gains will lead to long-term economic disaster.

The purpose of financial analysis is to ensure that an activity can be paid for and to determine the profitability of a project. The NRMP Project will produce little or no direct financial benefits through revenue generation. It will, however, prevent the need for much greater expenditures in the future for rehabilitating or replacing the biological resources necessary for sustained economic growth. Another aspect of financial analysis is the individual or group financial effects of involvement with

the Project. The ultimate success or failure of this Project in terms of reducing natural resource and environmental problems or preventing problems from developing will depend upon the ability and willingness of natural resource users to change their behavior. Changing practices is often a short-term financial decision by people who have few choices. Therefore, an essential element within the project implementation strategy is to explicitly examine the incentive and cost structures faced by resource users.

In general, conventional benefit cost analysis is not well suited to an assessment of situations involving complex ecosystem behavior, cumulative impacts and diffuse spatial effects. The process of identifying and implementing sustainable economic growth and environmental protection strategies is not straightforward. Benefit cost analysis is not applicable to a project where institution building, development of alternative technological packages and environmental education and management are primary activities in addressing and preventing current and future problems. This is because there are no outputs that are easily given a quantitative, economic value. While some natural resource and environmental problems have short-term characteristics that have a demonstrable effect on the economy or environment many, if not most, represent long-term effects where the benefits are uncertain and accrue much later and often to future generations. Due to these factors, a number of analysts have advocated "safe minimum standards" to prevent irreversible damage to critical resources. Some form of this criteria is needed in the ongoing decision making process because, like it or not, it is the present generation that makes decisions.

In conclusion, it is noted that most of the activities proposed in the NRMP Project are public goods that require something other than pure market actions in order to be provided. This is, therefore, often the realm of government involvement. These services are usually difficult to evaluate using benefit cost analysis. This is especially the case where institution building is the primary activity since the line of causality from inputs to final outputs is purely speculative. The fundamental logic of the Project is simply that it is cheaper to preserve a resource or a high level of environmental quality than it is to restore or rehabilitate it. Since Belize is particularly dependent on the sustained use and quality of its resource base, the primary activity of institution building, if unaddressed, will result in greater and likely prohibitive costs in the future.

The host country contribution for this Project is estimated at LOP US$3.9 million. These contributions range from a low of US$507.3 thousand in FY92 to US$948.8 in FY94. GOB revenues have been increasing dramatically over the last five years. Recurrent revenues have increased from Bz$123.0 million in FY87/88 to Bz$204.7 million in FY90/91, and are expected to reach Bz$218.7 million in FY91/92. If Belize's economic performance continues

along the present path, the Government of Belize will be able to afford these contributions. Actual expenditure levels will of course depend on the political will and the level of GOB commitment to the management of its environment.

A large portion of GOB's contribution will be in the form of salaries, study leave commitments, and office supplies necessary to sustain the present and future levels of operation of the MTE, MNR and MAF offices, as anticipated in this Project. All of these costs will be met from a recurrent portion of the expenditure budget. The 1991/92 recurrent budget levels for these departments were Bz$0.6 million, Bz$7.4 million, and Bz$5.8 million, respectively, for MTE, MNR and MAF. The combined budget of all three Ministries represents 6% of the total estimated revenue. The maximum host country contribution over the LOP represents less than 1% of GOB total estimated recurrent costs for FY91/92.

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Annex 1

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E.O. 12356: N/A
TAGS:
SUBJECT: DOA - NATURAL RESOURCE MANAGEMENT AND PROTECTION PROJECT, MISSION AUTHORIZATION

REF: (A) BELIZE 5979; (B) STATE 405790

1. BASED ON BUREAU REVIEW OF REFTEL WHICH CONFORMS SUBJECT PROJECT TO RECOMMENDATIONS OF EARLIER DAEC REVIEW OF PID FOR THIS PROJECT, THE ASSISTANT ADMINISTRATOR, JAMES MICHEL, PURSUANT TO DOA NO. 400, SECTION 6.A., HEREBY APPROVES AN AD HOC DELEGATION OF AUTHORITY TO THE A.I.D. REPRESENTATIVE TO APPROVE AND AUTHORIZE THE NATURAL RESOURCE MANAGEMENT AND PROTECTION PROJECT (505-0043) IN AN AMOUNT NOT TO EXCEED DOLLARS 8.5 MILLION.

2. PLEASE POUCH A COPY OF THE APPROVED PP TO LAC/DR/PSS FOR PRINTING AND DISTRIBUTION. BAKER
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#2475

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AMEMBASSY BELIZE 5979
SECSTATE WASHDC, IMMEDIATE 3643

ADM AID

FOR FRED SCHIECK, ACTING AA/LAC

E.O. 12356: NA
SUBJECT: BELIZE NATURAL RESOURCES MANAGEMENT AND PROTECTION PROJECT (505-0043)

REF: STATE 405790

1. AS A RESULT OF THE DAEC REVIEW OF THE SUBJECT PID, THE MISSION AGREED TO REDUCE THE NUMBER OF PROPOSED ACTIVITIES AND BRING THEM INTO SHARPER FOCUS.

A. THE MISSION IS PLEASED TO REPORT THAT THIS HAS BEEN ACCOMPLISHED AND THAT AS THE PROJECT PAPER BEGINS THE PROCESS OF INTERNAL REVIEW, WE ARE ABLE TO PROVIDE ASSURANCES NOW THAT ALL THE CONCERNS IDENTIFIED IN REFTEL HAVE BEEN ADDRESSED IN CONFORMANCE WITH THE BUREAU'S GUIDANCE.

B. THE DEVELOPMENT OF THE PROJECT PAPER WAS STRENGTHENED AND CONSIDERABLY EXPEDITED BY THE SUPPORT PROVIDED BY RENARM. AS SUCH, THE DESIGN IS IN CONSONANCE WITH THE BUREAU'S ENVIRONMENTAL STRATEGY AND CONTRIBUTES SIGNIFICANTLY TO COUNTRY AND REGIONAL ENVIRONMENTAL OBJECTIVES.

C. CONSEQUENTLY, WE AGAIN PROPOSE THAT FINAL APPROVAL AND AUTHORIZATION OF THE PROJECT BE DELEGATED TO THE MISSION.

2. SCOPE OF THE PROJECT - THE COASTAL ZONE MANAGEMENT PLAN SUPPORTED BY THE FY90 AMENDMENT OF THE COMMERCIALIZATION OF ALTERNATIVE CROPS (CAC) PROJECT IS UNDERWAY AS ARE GOB EFFORTS TO STRENGTHEN THE FISHERIES DEPARTMENT'S ABILITY TO PLAN,

COORDINATE, MONITOR, AND REGULATE BELIZE'S MARINE SECTOR. WHILE THE LATTER GROUP OF ACTIVITIES MAY EVENTUALLY REQUIRE MORE TIME TO IMPLEMENT, THE CONSIDERABLE NUMBER (14) OF NGOS WITH ACTIVE COASTAL ZONE PROJECTS FEEL THAT REACTIVATION OF THE CZ ADVISORY BOARD AND THE ESTABLISHMENT OF A PERIODIC REVIEW PROCESS AIMED AT IMPROVING COMMUNICATION AND COORDINATION WOULD BE MORE EFFECTIVE THAN THE INITIATION OF NEW RESEARCH PROJECTS.

A. OUR REVIEW OF THE GOB'S CURRENT CAPABILITIES HAS LED US TO THE CONCLUSION THAT THE GOB'S ABILITY TO CARRY OUT THE ACTIVITIES CONTEMPLATED IN THE PID WILL DEPEND IN LARGE MEASURE ON THE PROGRESS MADE IN EFFECTIVELY UTILIZING THE RESOURCES UNDER THE CAC AMENDMENT. FUNDING AVAILABLE UNDER THE AMENDMENT APPEARS TO BE SUFFICIENT TO ADDRESS CURRENT PRIORITIES AND WE HAVE CONCLUDED THAT THE DESIGN OF THE COASTAL ZONE MANAGEMENT COMPONENT SHOULD BE DEFERRED UNTIL LATER DURING THE LOP. FUNDS INITIALLY PROGRAMMED IN THE NRMP PID FOR MANAGEMENT OF COASTAL AREA WILL BE BETTER UTILIZED ON THE OTHER THREE PROJECT COMPONENTS.

3. SPECIFIC NEEDS FOR ASSISTANCE HAVE BEEN IDENTIFIED IN THE ENVIRONMENTAL MANAGEMENT AND FORESTRY AREAS AS A RESULT OF THE ABLE ASSISTANCE OF RENARM PROJECT ADVISORS WORKING IN CLOSE COORDINATION WITH A BRITISH ODA TEAM. THE GOB HAS EFFECTIVELY COORDINATED THE INTERESTS OF THE DONOR COMMUNITY AND SUCCEEDED IN APPORTIONING INTERVENTIONS ACCORDING TO AREAS OF INTEREST AND LINES OF RESPONSIBILITY.

A. AS A COMPLEMENT TO ODA ACTIVITIES IN LAND USE PLANNING AND FORESTRY MANAGEMENT, THE NRMP PROJECT WILL FOCUS ON ENVIRONMENTAL PLANNING AND MONITORING AND ON MANAGEMENT OF PROTECTED AREAS UNDER THE FORESTRY COMPONENT.

4. AGRICULTURAL DIVERSIFICATION ACTIVITIES ARE NOW COVERED UNDER THE MORE APTLY NAMED SUSTAINABLE PRODUCTION COMPONENT. THE FOCUS WILL BE ON PROMOTING COMMUNITY LEVEL INVOLVEMENT IN SOIL CONSERVATION, INTEGRATED CROP MANAGEMENT, PRODUCTION OF PERMANENT CROPS (CACAO, PAPAYA, AND OTHER TROPICAL FRUITS, AND SPICES) AND LOW-INPUT PRODUCTION TECHNOLOGIES THAT

97

REPRESENT VIABLE ALTERNATIVES TO THOSE TRADITIONAL CULTIVATION PRACTICES THAT HAVE DELETERIOUS EFFECTS DOWNSTREAM.

A. ALTHOUGH THE MISSION WILL NOT OPPOSE BABCO UNDERTAKING COMMERCIAL MARKETING ACTIVITIES ON ITS OWN, EARLIER THOUGHTS TO STRENGTHEN BABCO BY ENCOURAGING ITS SPECIALIZATION AS A MARKETING ENTITY HAVE BEEN DISCARDED.

B. INSTEAD, THE PROJECT WILL CONTINUE TO SUPPORT BABCO'S RESEARCH PROGRAM AND WILL PLACE INCREASED EMPHASIS ON BOTH THE SELECTION AND PRODUCTION OF CROPS WHICH ARE CONSISTENT WITH THE OVERALL ENVIRONMENTAL CONCERNS OF THE PROJECT.

C. IN ACTUALITY, BABCO IS, FOR ALL INTENT AND PURPOSES, THE GOVERNMENT'S DEFACTO RESEARCH FACILITY FOR INTRODUCING NEW CROPS. WHILE THIS HAS NOT YET RESULTED IN ANY INCREASED FUNDING, WE ARE ENCOURAGING THE GOB TO UNDERWRITE THE COST OF BABCO'S OUTREACH PROGRAM AND TO EXPLORE WAYS BABCO CAN CONTINUE R&D OPERATIONS BEYOND THE LIFE OF THIS PROJECT.

5. FINALLY, AS A RESULT OF CONTINUED REDUCTIONS IN THE MISSION'S OYB, THE AMOUNT PROGRAMMED FOR EACH COMPONENT OF THE PROJECT IS BEING REDUCED. WHILE WE ARE IN THE PROCESS OF REFINING THE BUDGET, IT APPEARS THAT LOP FUNDING LEVELS MAY BE IN THE RANGE OF DOLS. 7.5 MILLION TO DOLS 8.5 MILLION. PLEASE NOTE THAT THE MISSION INTENDS TO AMEND THE NRMP PROJECT TO INCLUDE A COASTAL ZONE MANAGEMENT COMPONENT ONCE ONGOING ACTIVITIES HAVE STRENGTHENED THE GOB TO WHERE IT WILL BE ABLE TO UNDERTAKE THE MANAGEMENT OF ITS COASTAL AND MARINE RESOURCES WITHOUT OVER-EXTENDING ITSELF AND TO CARRY OUT ITS OBJECTIVES RESPONSIBLY AND EFFECTIVELY. HAYES##

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E.O. 12356: N/A
TAGS:
SUBJECT: BELIZE FISCAL POLICY PLANNING AND MANAGEMENT (505"0045) AND NATURAL RESOURCES MANAGEMENT AND PROTECTION (505-0043) PROJECTS - DAEC RESULTS.

1. SUMMARY: THE DAEC FOR THE SUBJECT PROJECTS WAS HELD ON 9/20/90 AND CHAIRED BY DAA/LAC FRED SCHIECK. USAID/BELIZE WAS ABLY REPRESENTED BY PDO PAUL BISEK WHO ASSISTED THE MEETING IN PUTTING THE PROJECTS INTO THEIR PROPER PERSPECTIVES. THE DAA REAFFIRMED THAT FISCAL POLICY PLANNING AND MANAGEMENT AND NATURAL RESOURCES MANAGEMENT ARE BOTH APPROPRIATE AREAS FOR MISSION INVOLVEMENT, BUT THE REAL LIKELIHOOD OF A DECREASING BUDGET AND THE LIMITED SIZE OF THE MISSION STAFF MUST BE CONSIDERED IN ANY PROJECT DECISION. THE DAEC DELEGATES AUTHORITY TO THE A.I.D. REPRESENTATIVE TO APPROVE THE PP FOR THE FISCAL POLICY PLANNING AND MANAGEMENT (FPPM) PROJECT, BUT AT A REDUCED LEVEL OF FUNDING, I.E:, ACTIVITIES ARE TO BE SCALED BACK AND FOCUSED IN REFERENCE TO THE SECOND PROJECT, IT WAS CONCLUDED, HOWEVER, THAT THE MISSION COULD PROCEED WITH THE DEVELOPMET OF A MORE NARROWLY FOCUSED NATURAL RESOURCES MANAGEMENT AND PROTECTION (NRMP) PROJECT, BUT THE PP SHOULDRESUBMITTED TO AID/W FOR REVIEW. APPROVED MODIFICATIONS TO BOTH PROJECTS ARE OUTLINED IN PARAGRAPH 3 BELOW. END SUMMARY:

2 ISSUES MEETINGS

THE RESULTS OF THE BUREAU ISSUES MEETINGS ON THE FPPM AND NRMP PIDS, HELD ON 8/30 AND 8/31/90, RESPECTIVELY, WERE OUTLINED IN ISSUES PAPERS FAXED TO MISSION: OVERALL BUREAU CONCERNS WITH BOTH PIDS WERE THE NUMBER OF COMPLEX ACTIVITIES PROPOSED AND THE USE OF SCARCE PD & S FUNDING FOR THE DESIGN EFFORTS:

3: DAEC REVIEW

(A) FPPM PROJECT - THE MISSION IS DELEGATED AUTHORITY TO APPROVE AND AUTHORIZE THE PROJECT IN THE FIELD, SUBJECT TO THE FOLLOWING MODIFICATIONS:

(I) SCOPE OF PROJECT - IN RESPONSE TO THE BUREAU'S CONCERN THAT THE PROJECT WAS OVERLY AMBITIKUS IN ITS PLAN TO UNDERTAKE A COMPREHENSIVE SET OF POLICY REFORMS

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IN FOUR YEARS, THE M_SSION REPRESENTATIVE EXPLAINED THAT USAID/BELIZE HAS HAD PRIOR EXPERIENCE WORKING WITH THE GOB IN A NUMBER OF THE AREAS PROPOSED IN THE PID: HE ADDED FURTHER THAT THE MISS ON'S PERCEPTION OF THE SCALE OF ACTIVITIES WAS MUCH SMALLER THAN APPARENTLY DEDUCED FROM THE PID.

CONCLUSION: THE MISSION&IS ADVISED TO EXPLORE WAYS OF NARROWING THE FOCUS AND REDUCING THE COST OF THE PROJECT: FOR EXAMPLE, WITH REGARD TO THE FORMER, THE PROJECT COULD, UNDER A TECHNICAL ASSISTANCE PACKAGE, LIMIT ITSELF TO CONDUCTING STUDIES AND RECOMMENDING CHANGES TO THE GOB IN THE DIFFERENT AREAS PROPOSED. IT IS THE SENSE OF THE BUREAU, BASED ON PAST AGENCY EXPERIENCE, THAT THERE IS A HIGH RISK THAT THE GOB WILL FIND IT DIFFICULT TO IMPLEMENT RECOMMENDED TAX REFORMS: THEREFORE THE MISSION SHOULD AVOID PUTTING A LOT OF MONEY INTO T'A' UNLESS IT IS VERY CLEAR THAT THE GOB WILL FOLLOW THROUGH. WITH RESPECT TO TRIMMING THE LIFE OF PROJECT FUNDING, IT WAS FELT THAT THE TECHNICAL ASSISTANCE PROPOSED WAS VERY HIGH (I.E., DOLS 1:3 MILLION OF A DOLS 2 MILLION PROJECT): THE PP DESIGN TEAM SHOULD LOOK AT WAYS OF REDUCING THE COST AND MANAGEMENT BURDEN OF TECHNICAL ASSISTANCE. FOR EXAMPLE, THE ROLE OF THE COORDINATOR COULD BE COMBINED WITH ONE OR MORE FUNCTIONS; TECHNICAL ASSISTANCE COULD BE

PURCHASED THROUGH INDIVIDUAL PERSONAL SERVICES CONTRACTS INSTEAD OF THE PLANNED INSTITUTIONAL CONTRACT:

(II) GOB COMMITMENT " WITH RESPECT TO THE GOB'S APPROACH TO TAX REFORM, THE MISSION REPRESENTATIVE STATED THAT THE GOB IS NOW MORE CONCERNED WITH ADMINISTRATIVE REFORMS THAN IN INTRODUCING WHOLESALE CHANGES IN ITS TAX SYSTEM. THE BELIZEAN ECONOMY IS RELATIVELY HEALTHY, AND THEREFORE IT WOULD BE DIFFICULTJTO EXTRACT THE KIND OF COMMITMENT FOR TAX REFORMS FROM THE GOB THAT WOULD REASONABLY BE EXPECTED IN LESS BUOYANT TIMES: THE MISSION STILL BELIEVES THAT IT IS PRUDENT TO DEVELOP THE FPPM PROJECT NOW, IN ORDER TO HAVE A PACKAGE OF APPROPRIATE REFORM MEASURES READY TO PRESENT TO THE GOB WITHIN THE NEXT YEAR, WHEN ECONOMIC CONDITIONS WHICH HAVE BEGUN WEAKENING ARE EXPECTED TO WORSEN BECAUSE OF THE INCREASE IN WORLD OIL PRICES.

(B) NRMP PROJECT - THE DAEC CONCLUDED THAT THE PID DID
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NOT PROVIDE AN ADEQUATE BASIS FOR DELEGATING PROJECT APPROVAL AUTHORITY TO USAID/BELIZE. THE MISSION, THEREFORE, WILL SUBMIT THE PP TO AID/W FOR BUREAU REVIEW THE FOLLOWING MODIFICATIONS ARE TO BE INCLUDED IN THE PP DESIGN:

(I) SCOPE OF PROJECT EACH OF THE AREAS PROPOSED FOR INTERVENTION IN THE PID IS POTENTIALLY A PROJECT IN ITS OWN RIGHT. THE PID APPEARS TO BE BITING OFF MUCH MORE THAN IT CAN REASONABLY CHEW, PARTICULARLY IN VIEW OF STAFF AND BUDGETARY CONSTRAINTS. THE MISSION REPRESENTATIVE CLARIFIED THAT THE MISSION HAD PLANNED TO REFINE THE LIST OF ACTIVITIES DURING PP DEVELOPMENT

CONCLUSION: THE PP DESIGN TEAM WILL LOOK AT WAYS OF REDUCING THE SCOPE AND COST OF THE PROPOSED ACTIVITIES AND MORE NARROWLY FOCUSSING THE PROJECT. THE BUREAU WOULD PREFER TO SEE FEWER COMPONENTS BUT IS WILLING TO CONSIDER EACH IF JUSTIFIED IN THE PP. HOWEVER, IN SUCH A CASE IT WOULD APPEAR THAT EACH ACTIVITY WOULD HAVE TO BE NARROWLY FOCUSED ON AN IMPORTANT "NICHE" THAT WOULD HAVE SOME REAL IMPACT GIVEN THE LIMITED BUDGET RESOURCES TO SPREAD ACROSS THESE ACTIVITIES. THE PP WILL OUTLINE AND PRIORITIZE OBJECTIVES AND SPELL OUT THE RATIONALE(S) FOR SELECTING EACH ACTIVITY. FINALLY TO ASSIST THE MISSION IN FOCUSSING ITS EFFORTS, THE PP DESIGN TEAM SHOULD REVIEW THE ECUADOR MISSION'S EXPERIENCE IN IMPLEMENTING COASTAL ZONE MANAGEMENT ACTIVITIES.

(II AGRICULTURAL DIVERSIFICATION - THE BUREAU SUPPORTS THE AG DIVERSIFICATION COMPONENT, BUT IT DOES NOT ENDORSE THE MISSION'S PLAN TO CONVERT BABCO IN ITS PRESENT FORM INTO A MARKETING PROFIT-MAKING VENTURE BECAUSE EXPERIENCE HAS SHOWN THAT THIS WILL NOT WORK: BABCO HAS BEEN STAFFED AND OPERATES AS A RESEARCH ENTITY AND SHOULD CONTINUE WORKING IN THAT DIRECTION:

CONCLUSION: THE MISSION SHOULD EXPLORE WAYS OF MAKING THE BABCO OPERATION SUSTAINABLE, E.G., SUCH AS GETTING THE GOB TO INCLUDE IT AS A RESEARCH ARM OF THE GOVERNMENT: THE PP DESIGN TEAM SHOULD FOCUS ON AG DIVERSIFICATION AS THE OBJECTIVE AND ONLY INCLUDE ASSISTANCE TO BABCO, IF THE MISSION BELIEVES IT IS NECESSARY, AS PART OF THE DESIGN. I.E., IF BABCO PROVES CRITICAL TO THE DIVERSIFICATION EFFORT FROM A RESEARCH PERSPECTIVE, ONE OPTION THE MISSION MAY WISH TO CONSIDER IS PROVIDING IT WITH BUDGETARY SUPPORT OVER THE NEXT

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LOGICAL FRAMEWORK

Project Title and Number: Natural Resources Management and Protection (505-0043)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
PROJECT GOAL: To protect and manage the natural resources upon which the sustainable economic and social development of Belize depends.	* Rate of deforestation have decreased * Water quality is maintained * Public sector investment guided by environmental considerations * Inter-sectoral land-use planning in use to guide public & private sector Development decisions.	* Cadastre & Agricultural Census. * Updated Environmental Profile. * Soil surveys, tests and water quality samples.	* GOB supports and implements project goals & priorities.
PROJECT PURPOSE: To improve conservation management in order to increase and sustain the economic benefits from agriculture, forestry and fisheries resources.	END-OF-PROJECT STATUS: * Indicators of environmental quality monitored continuously * Renewable natural resources managed for sustained yields * Agricultural extension, technology & efforts increasing farm production by 20% and net farm income by 15%	* MTE & MAF and other reports. * Project monitoring reports. * Specific research studies.	* Inter-agency coordination takes place & is effective. * LNGO, PVO and regional interest is generated and support obtained.
OUTPUTS: 1. Environmental Monitoring and Planning: a) Legislative & Regulatory Framework revised. b) Environmental & NR Strategy & Work Plan completed. c) DOE strengthened. d) Environmental indicators included in land use planning e) Heightened Public awareness of Environmental Issues.	* All major manufacturing, processing & service enterprises audited for environmental impact * Development concessions reviewed and monitor for environmental conpliance	MTE, field & site inspections independent confirmations and environmental impact assessments	* Trained MTE, MAF & LNGO personnel available and working on field assignments * Regulatory harmonization is implemented
2. Sustainable Agricultural Production: a) Farmers adopting sustainable agricultural cropping systems. b) Secure land titles issued to participating farmers. c) 20% decrease in post harvest losses of basic grains. d) Baseline production and sociological profiles of target group.	* All protected areas surveyed, information in data bank and being analysed. * Land capability surveys for critical settlement/agricultural expansion areas completed * Deforestation around settlements halted.	Protected area management plans Field surveys, MAF reports	Refugee migration patterns are not exacerbated. * Crop diversification & IPM practices accepted by settlers

OUTPUTS:

2. Sustainable Agricultural Production: e) Field application of land use planning capability f) Stabilization of deforestation		
3. Forestry Development: a) GOB & LNGO staff capable & carry out complementary mandates to manage protected areas. b) Protected areas (PAs) identified based on critical habitat surveys and other techniques. c) Boundaries of PAs delineated in field (where appropriate) and maintained. d) Legal status of PAs protected to immutability. e) Community support for PAs management costs. f) Maya Biosphere Reserve established.	* Forestry conservation & management plans completed; Forestry areas surveyed; patrolled; inventorized & management facilities and operations in plan. * Conservation Data Centers (CDC) operational and serving needs of land use planning efforts of MTE/MAF &MNR	Forestry Department plans and program reports. CDC records

Natural Resources Management & Protection Project
No. 505-0043

ASSISTANCE CHECKLIST

Listed below are statutory criteria applicable to the assistance resources themselves, rather than to the eligibility of a country to receive assistance. This section is divided into three parts. Part A includes criteria applicable to both Development Assistance and Economic Support Fund resources. Part B includes criteria applicable only to Development Assistance resources. Part C includes criteria applicable only to Economic Support Funds.

CROSS REFERENCE: IS COUNTRY CHECKLIST UP TO DATE? — Yes

A. CRITERIA APPLICABLE TO BOTH DEVELOPMENT ASSISTANCE AND ECONOMIC SUPPORT FUNDS

1. Host Country Development Efforts (FAA Sec. 601(a): Information and conclusions on whether assistance 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.

The project will promote agricultural production while preserving the environment. The increased agricultural production will expand international commerce, and the preservation measures will foster increased tourism.

2. U.S. Private Trade and Investment (FAA Sec. 601(b): Information and conclusions on how assistance 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).

Technical assistance to be provided under this project will involve the participation and resources of the U.S. private sector.

3. Congressional Notification

a. General requirement (FY 1991 Appropriations Act Secs. 523 and 591; FAA Sec. 634A): If money is to be obligated for an activity not previously justified to Congress, or for an amount in excess of amount previously justified to Congress, has Congress been properly notified (unless the notifications requirement has been waived because of substantial risk to human health or welfare)?

The project was included in the FY91 Congressional Presentation. A Technical Notification was sent to Congress on May 16, 1991.

b. Notice of new account obligation (FY 1991 Appropriations Act Sec. 514): If funds are being obligated under an appropriation account to which they were not appropriated, has the President consulted with and provided a written justification to the House and Senate Appropriations Committees and has such obligation been subject to regular notification procedures?

NA

c. Cash transfers and nonproject sector assistance (FY 1991 Appropriations Act Sec. 575(b)(3): If funds are to be made available in the form of cash transfer or nonproject sector assistance, has the Congressional notice included a detailed description of how the funds will be used, with a discussion of U.S. interests to be served and a description of any economic policy reforms to be promoted?	NA
4. Engineering and Financial Plans (FAA Sec. 611(a): Prior to an obligation in excess of $500,000, will there be: (a) engineering, financial or other plans necessary to carry out the assistance; and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?	NA
5. Legislative Action (FAA Sec. 611(a)(2): If legislative action is required within recipient country with respect to an obligation in excess of $500,000, what is the basis for a reasonable expectation that such action will be completed in time to permit orderly accomplishment of the purpose of the assistance?	Project activities may lead to legislative action, but such action is not a necessary precondition for implementation.
6. Water Resources (FAA Sec. 611(b); FY 1991 Appropriations Act Sec. 501): If project is for water or water-related land resource construction, have benefits and costs been computed to the extent practicable in accordance with the principles, standards, and procedures established pursuant to the Water Resources Planning Act (42 U.S.C. 1962, et seq.)? (See A.I.D. Handbook 3 for guidelines.)	NA
7. Cash Transfer and Sector Assistance (FY 1991 Appropriations Act Sec. 575(b): Will cash transfer or nonproject sector assistance be maintained in separate account and not commingled with other funds (unless such requirements are waived by Congressional notice for nonproject sector assistance)?	NA
8. Capital Assistance (FAA Sec. 611(e)): If project is capital assistance (e.g., construction), and total U.S. assistance for it will exceed $1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country' capability to maintain and utilize the project effectively?	NA
9. Multiple Country Objectives (FAA Sec. 601(a): Information and conclusions on whether projects 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.	See response to A.1 above

96

10. U.S. Private trade (FAA Sec. 601(b)): Information and conclusions 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).	See response to A.2 above.
11. Local Currencies	
a. Recipient Contributions (FAA Secs. 612(b), 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 in lieu of dollars.	Host Country will contribute 31% of project costs.
b. U.S.-owned Currency (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
c. Separate Account (FY 1991 Appropriations Act Sec. 575). If assistance is furnished to a foreign government under arrangements which result in the generation of local currencies:	NA
(1) Has A.I.D. (a) required that local currencies be deposited in a separate account established by the recipient government, (b) entered into an agreement with that government providing the amount of local currencies to be generated and the terms and conditions under which the currencies so deposited may be utilized, and (c) established by agreement the responsibilities of A.I.D. and that government to monitor and account for deposits into and disbursements from the separate account?	NA
(2) Will such local currencies, or an equivalent amount of local currencies, be used only to carry out the purposes of the DA or ESF chapters of the FAA (depending on which chapter is the source of the assistance) or for the administrative requirements of the United States Government?	NA
(3) Has A.I.D. taken all appropriate steps to ensure that the equivalent of local currencies disbursed from the separate account are used for the agreed purposes?	NA
(4) If assistance is terminated to a country, will any unemcumbered balances of funds remaining in a separate account be disposed of for purposes agreed to by the recipient government and the United States Government?	NA
12. Trade Restrictions	
a. Surplus Commodities (FY 1991 Appropriations Act Sec. 521(a)): 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	NA

91

substantial injury to U.S. producers of the same, similar or competing commodity?

b. Textiles (Lautenberg Amendment) (FY 1991 Appropriations Act Sec. 521(c)): Will the assistance (except for programs in Caribbean Basin Initiative countries under U.S. Tariff Schedule "Section 807," which allows reduced tariffs on articles assembled abroad from U.S.-made components) be used directly to procure feasibility studies, prefeasibility studies, or project profiles of potential investment in, or to assist the establishment of facilities specifically designed for, the manufacture for export to the United States or to third country markets in direct competition with U.S. exports, of textiles, apparel, footwear, handbags, flat goods (such as wallets or coin purses worn on the person), work gloves or leather wearing apparel?

NA

13. Tropical Forests (FY 1991 Appropriations Act Sec. 533(c)(3)): Will funds be used for any program, project or activity which would (a) result in any significant loss of tropical forests, or (b) involve industrial timber extraction in primary tropical forest areas?

To the contrary, the project is designed to protect and preserve tropical forests.

14. Sahel Accounting (FAA Sec. 121(d)): If a Sahel project, has a determination been made that the host government has an adequate system for accounting for and controlling recipient and expenditure of project funds (either dollars or local currency generated therefrom)?

NA

15. PVO Assistance

a. Auditing and registration (FY 1991 Appropriations Act Sec. 537): If assistance is being made available to a PVO, has that organization provided upon timely request any document, file, or record necessary to the auditing requirements of A.I.D., and is the PVO registered with A.I.D.?

Assistance will be provided only to and through PVOs registered with A.I.D. and meeting all requirements.

b. Funding sources (FY 1991 Appropriations Act, Title II, under heading "Private and Voluntary Organizations"): If assistance is to be made to a United States PVO (other than a cooperative development organization), does it obtain at least 20 percent of its total annual funding for international activities from sources other than the United States Government?

YES

16. Project Agreement Documentation (State Authorization Sec. 139 (as interpreted by conference report)): Has confirmation of the date of signing of the project agreement, including the amount involved, been cabled to State L/T and A.I.D. LEG within 60 days of the agreement's entry into force with respect to the United States, and has the full text of the agreement been pouched to those same offices? (See Handbook 3, Appendix 6G for agreements covered by this provision).

NA

17. Metric System (Omnibus Trade and Competitiveness ar of 1988 Sec. 5164, as interpreted by conference report, amending Metric Conversion Act of 1975 Sec. 2, and as implemented through A.I.D. policy): Does the assistance activity use the metric system of measurement in its procurements, grants, and other business-related activities, except to the extent that such use is impractical or is likely to cause significant inefficiencies or loss of markets to United States firms? Are bulk purchases usually to be made in metric, and are components, subassemblies, and semi-fabricated materials to be specified in metric units when economically available and technically adequate? Will A.I.D. specifications use metric units of measure from the earliest programmatic states, and from the earliest documentation of the assistance processes (for example, project papers) involving quantifiable measurements (length, area, volume, capacity, mass and weight) through the implementation stage?	The recipient country does not use the metric system; however, metric units will be used when practical.
18. Women in Development (FY 1991 Appropriations Act. Title II, under heading "Women in Development"): Will assistance be designed so that the percentage of women participants will be demonstrably increased?	Yes, through the involvement of LNGOs which are directed and managed predominantly by women and the proactive incorporation of women in each of the project components.
19. Regional and Multilateral Assistance (FAA Sec. 209): Is assistance more efficiently and effectively provided through regional or multilateral organizations? If so, why is assistance not so provided? Information and conclusions on whether assistance will encourage developing countries to cooperate in regional development programs.	Assistance under this project is most effective on a bilateral basis.
20. Abortions (FY 1991 Appropriations Act, Title II, under heading "Population, DA," and Sec. 525):	
a. Will assistance be made available to any organization or program which, as determined by the President, supports or participates in the management of a program of coercive abortion or involuntary sterilization?	NO
b. Will any funds be used to lobby for abortion?	NO
21. Cooperatives (FAA Sec. 111): Will assistance help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward a better life?	NA
22. U.S.-Owned Foreign Currencies	
a. Use of currencies (FAA Secs. 612(b), 636(h); FY 1991 Appropriations Act Secs. 507, 509): Describe steps taken to assure that, to the maximum extent possible, foreign currencies owned by the U.S. are utilized in lieu of dollars to meet the cost of contractual and other services.	NA

b. Release of currencies (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
23. Procurement	
a. Small business (FAA Sec. 602(a): Are there arrangements to permit U.S. small business to participate equitably in the furnishing of commodities and services financed?	Yes, the project procurement will comply with all A.I.D. regulations.
b. U.S. procurement (FAA Sec. 604(a)): Will all procurement be from the U.S. except as otherwise determined by the President or determined under delegation from him?	Yes
c. Marine insurance (FAA Sec. 604(d)): If the cooperating country discriminates against marine insurance companies authorized to do business in the U.S., will commodities be insured in the United States against marine risk with such a company?	NA
d. Non-U.S. agricultural procurement (FAA Sec. 604(e)): If non-U.S. procurement of agricultural commodity or product thereof is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity? (Exception where commodity financed could not reasonably be procured in U.S.)	NA
e. Construction or engineering services (FAA Sec. 604(g)): Will construction or engineering services be procured from firms of advanced developing countries which are otherwise eligible under Code 941 and which have attained a competitive capability in international markets in one of these areas? (Exception for those countries which receive direct economic assistance under the FAA and permit United States firms to compete for construction or engineering services financed from assistance programs of these countries.)	NA
f. Cargo preference shipping (FAA Sec. 603): Is the shipping excluded from compliance with the requirement in section 901(b) of the Merchant Marine Act of 1936, as amended, that at least 50 percent of the gross tonnage of commodities (computed separately fro dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S. flag commercial vessells to the extent such vessels are available at fair and reasonable rates?	NA
g. Technical assistance (FAA Sec. 621(a)): If technical assistance is financed, will such assistance be furnished by private enterprise on a contract basis to the fullest extent practicable? Will the facilities and resources of other Federal agencies be utilized, when they are particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?	Yes

h. U.S. air carriers (International Air Transportation Fair Competitive Practices Act, 1974): If air transportation of persons or property is financed on grant basis, will U.S. carriers be used to the extent such service is available? — Yes

i. Termination for convenience of U.S. Government (FY 1991 Appropriations Act Sec. 504): If the U.S. Government is a party to a contract for procurement, does the contract contain a provision authorizing termination of such contract for the convenience of the United States? — Yes

j. Consulting services (FY 1991 Appropriations Act Sec. 524): If assistance is for consulting service through procurement contract pursuant to 5 U.S.C. 3109, are contract expenditures a matter of public record and available for public inspection (unless otherwise provided by law or Executive order)? — Yes

k. Metric conversion (Omnibus Trade and Competitiveness Act of 1988, as interpreted by conference report, amending Metric Conversion Act of 1975 Sec. 2, and as implemented through A.I.D. policy): Does the assistance program use the metric system of measurement in its procurements, grants, and other business-related activities, except to the extent that such use is impractical or is likely to cause significant inefficiencies or loss of markets to United States firms? Are bulk purchases usually to be made in metric, and are components, subassemblies, and semi-fabricated materials to be specified in metric units when economically available and technically adequate? Will A.I.D. specifications use metric units of measure from the earliest programmatic states, and from the earliest documentation of the assistance processes (for example, project papers) involving quantifiable measurements (length, area, volume, capacity, mass and weight), through the implementation stage? — See No. 17 above.

l. Competitive Selection Procedures (FAA Sec. 601(e)): Will the assistance utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise? — Yes

24. Construction

a. Capital project (FAA Sec. 601(d)): If capital (e.g. construction) project, will U.S. engineering and professional services be used? — NA

b. Construction contract (FAA Sec. 611(c)): If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable? — NA

c. Large projects, Congressional approval (FAA Sec. 620(k)): If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not — NA

exceed $100 million (except for productive enterprises in Egypt that were described in the Congressional Presentation), or does assistance have the express approval of Congress?

25. U.S. Audit Rights (FAA Sec. 301(d)): If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights? NA

26. Communist Assistance (FAA Sec. 620(h). Do arrangements exist to insure that United States foreign aid is not used in a manner which, contrary to the best interests of the United States, promotes or assists the foreign aid projects or activities of the Communist-bloc countries? Yes

27. Narcotics

a. Cash reimbursements (FAA Sec. 483: Will arrangements preclude use of financing to make reimbursements, in the form of cash payments, to persons whose illicitly drug crops are eradicated? Yes

b. Assistance to narcotics traffickers (FAA Sec. 487): Will arrangements take "all reasonable steps" to preclude use of financing to or through individuals or entities which we know or have reason to believe have either: (1) been convicted of a violation of any law or regulation of the United States or a foreign country relating to narcotics (or other controlled substances); or (2) been an illicit trafficker in, or otherwise involved in the illicit trafficking of, any such controlled substance? Yes

28. Expropriation and Land Reform (FAA Sec. 620(g)): Will assistance preclude use of financing to compensate owners for expropriated or nationalized property, except to compensate foreign nationals in accordance with a land reform program certified by the President? NA

29. Police and Prisons (FAA Sec. 660): Will assistance preclude use of financing to provide training, advice, or any financial support for police, prisons or other law enforcement forces, except for narcotics programs? Yes

30. CIA Activities (FAA Sec. 662): Will assistance preclude use of financing for CIA activities? Yes

31. Motor Vehicles (FAA Sec. 636(i)): Will assistance preclude use of financing for purchase, sale, long-term lease, exchange or guaranty of the sale of motor vehicles manufactured outside U.S., unless a waiver is obtained? Yes

32. Military Personnel (FY 1991 Appropriations Act Sec. 503): Will assistance preclude use of financing to pay pensions, annuities, retirement pay, or adjusted service compensation for prior or current military personnel? Yes

33. Payment of U.N. Assessments (FY 1991 Appropriations Act Sec. 505): Will assistance preclude use of financing to pay U.N. assessments, arrearages or dues? Yes

34. Multilateral Organization Lending (FY 1991 Appropriations Act Sec. 506): Will assistance preclude use of financing to carry out provisions of FAA section 209(d) (transfer of FAA funds to multilateral organizations for lending)? Yes

35. Export of Nuclear Resources (FY 1991 Appropriations Act Sec. 510): Will assistance preclude use of financing to finance the export of nuclear equipment, fuel, or technology? Yes

36. Repression of Population (FY 1991 Appropriations Act Sec. 511: Will assistance preclude use of financing for the purpose of aiding the efforts of the government of such country to repress the legitimate rights of the population of such country contrary to the Universal Declaration of Human Rights? Yes

37. Publicity or Propaganda (FY 1991 Appropriations Act Sec. 516): Will assistance be used for publicity or propaganda purposes designed to support or defeat legislation pending before Congress, to influence in any way the outcome of a political election in the United States, or for any publicity or propaganda purposes not authorized by Congress? NO

38. Marine Insurance (FY 1991 Appropriations Act Sec. 563): Will any A.I.D. contract and solicitation, and subcontract entered into under such contract, include a clause requiring that U.S. marine insurance companies have a fair opportunity to bid for marine insurance when such insurance is necessary or appropriate? Yes

39. Exchange for Prohibited Act (FY 1991 Appropriations Act Sec. 569): Will any assistance be provided to any foreign government (including any instrumentality or agency thereof), foreign person, or United States person in exchange for that foreign government or person undertaking any action which is, if carried out by the United States Government, a United States official or employee, expressly prohibited by a provision of United States law? NO

B. CRITERIA APPLICABLE TO DEVELOPMENT ASSISTANCE ONLY

1. Agricultural Exports (Bumpers Amendment) FY 1991 Appropriations Act Sec. 521(b), as interpreted by conference report for original enactment). If assistance is for agricultural development activities (specifically, any testing or breeding feasibility study, variety improvement or introduction, consultancy, publication, conference, or training), are such activities: (1) specifically and principally designed to increase agricultural exports by the host country to a country other than the United States, where the export would lead to direct competition in that third country with exports of a similar commodity grown or produced in the United States, and can the activities reasonably be expected to cause substantial injury to U.S. exporters of a similar agricultural commodity; or (2) in support of research that is intended primarily to benefit U.S. producers?	NA
2. Tied Aid Credits (FY 1991 Appropriations Act, Title II, under heading "Economic Support Fund"): Will DA funds be used for tied aid credits?	NO
3. Appropriate Technology (FAA Sec. 107): Is special emphasis placed on use of appropriate technology (defined as relatively smaller, cost-saving, labor-using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor)?	NA
4. Indigenous Needs and Resources (FAA Sec. 281(b)): Describe extent to which the activity 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 civic education and training in skills required for effective participation in governmental and political processes essential to self-government.	The goal of the project is to protect and manage the natural resources upon which the sustainable economic and social development of Belize depends.
5. Economic Development (FAA Sec. 101(a)): Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth?	Yes, the project will increase and sustain the economic benefits from agriculture, forestry and fisheries resources.
6. Special Development Emphases (FAA Secs. 102(b), 113, 281(a)): Describe 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, dispersing investment from cities to small towns and rural areas, and	The project will support the self-help efforts of Belize by training staff in the key environmental ministry and related offices to preserve the natural resource base of the country. (a) Project emphasizes community and

104

insuring wide participation of the poor in the benefits of development on a sustained basis, using appropriate U.S. institutions; (b) 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.	LNGO involvement. One element focused on sustainable agriculture. (b) NA. (c) Project goal is to increase the country's capability to manage its resources. (d) Women are active in and lead many LNGOs which will be involve in the project. (e) Involvement of regional cooperation in natural resource management.
7. Recipient Country Contribution (FAA Secs. 110, 124(d)): Will the recipient country provide at least 25 percent of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or is the latter cost-sharing requirement being waived for a "relatively least developed country)?	Yes, the GOB is providing $3.9 million in cash and in-kind contributions representing over 31% of total project costs.
8. Benefit to Poor Majority (FAA Sec. 128(b)): If the activity attempts to increase the institutional capabilities of private organizations or the government of the country, or if it attempts to stimulate scientific and technological research, has it been designed and will it be monitored to ensure that the ultimate beneficiaries are the poor majority?	Yes, the staff of several Ministries will receive training in environmental monitoring and forestry preservation, and a monitoring and evaluation plan is included in the project. While protection of the country's environment is not specifically targetted to benefit the poor, they will benefit as the resources are better managed for sustainable use.
9. Abortions (FAA Sec. 104(f); FY 1991 Appropriations Act, Title II, under heading "Population, DA," and Sec. 535):	
a. Are any of the funds to be used for the performance of abortions as a method of family planning or to motivate or coerce any person to practice abortions?	NO
b. Are any of the funds to be used to pay for the performance of involuntary sterilization as a method of family planning or to coerce or provide any financial incentive to any person to undergo sterilizations?	NO
c. Are any of the funds to be made available to any organization or program which, as determined by the President, supports or participates in the management of a program of coercive abortion or involuntary sterilization?	NO
d. Will funds be made available only to voluntary family planning projects which offer, either directly or through referral to, or information about access to, a broad range of family planning methods and services?	NA
e. In awarding grants for natural family planning, will any applicant be discriminated against because of such applicant's religious or conscientious commitment to offer only natural family planning?	NA
f. Are any of the funds to be used to pay for any biomedical research which relates, in whole or in part, to methods of, or the performance of, abortions or involuntary sterilization as a means of family planning?	NO

g. Are any of the funds to be made available to any organization if the President certifies that the use of these funds by such organization would violate any of the above provisions related to abortions and involuntary sterilization?	NO
10. Contract Awards (FAA Sec. 601 (e)): Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?	Yes
11. Disadvantaged Enterprises (FY 1991 Appropriations Act, Sec. 567): What portion of the funds will be available only for activities of economically and socially disadvantaged enterprises, historically black colleges and universities, colleges and universities having a student body in which more than 40 percent of the students are Hispanic Americans, and private and voluntary organizations which are controlled by individuals who are black Americans, Hispanic Americans, or Native Americans, or who are economically or socially disadvantaged (including women)?	The US institutional contractors responsible for placement of participants are under the obligation to use minority firms, HBCUs and other minority colleges.
12. Biological Diversity (FAA Sec. 119(g): Will the assistance: (a) support training and education efforts which improve the capacity of recipient countries to prevent loss of biological diversity; (b) be provided under a long-term agreement in which the recipient country agrees to protect ecosystems or other wildlife habitats; (c) support efforts to identify and survey ecosystems in recipient countries worthy of protection; or (d) by any direct or indirect means significantly degrade national parks or similar protected areas or introduce exotic plants or animals into such areas?	(a) Yes, the project is designed specifically to address the problems of environmental degradation and preservation of bio-diversity; the project will also establish a biosphere reserve, and strengthen the GOB entities in enforcing regulations pertaining to the environment. (b) Yes, the agreement includes provisions which support long-term environmental protection benefits. (c) Yes (d) No
13. Tropical Forests (FAA Sec. 118; FY 1991 Appropriations Act Sec. 533(c)-(e) & (g)):	
a. A.I.D. Regulation 16: Does the assistance comply with the environmental procedures set forth in A.I.D. Regulation 16?	Yes
b. Conservation: Does the assistance place a high priority on conservation and sustainable management of tropical forests? Specifically, does the assistance, to the fullest extent feasible: (1) stress the importance of conserving and sustainably managing forest resources; (2) support activities which offer employment and income alternatives to those who otherwise would cause destruction and loss of forests, and help countries identify and implement alternatives to colonizing forested areas; (3) support training programs, educational efforts, and the establishment or strengthening of institutions to improve forest management; (4) help end destructive slash-and-burn agriculture by supporting stable and productive farming practices; (5) help conserve forests which have not yet been degraded by helping to increase production on lands already cleared or degraded; (6) conserve forested watersheds	(1) Yes, the project contains one element completely devoted to the protection and conservation of forest resources. (2) Yes, one element specifically addresses sustainable agricultural production to reduce slash and burn encroachment on forests. (3) Yes (4) Yes, see (2) above. (5) Yes, see (2) above. (6) Yes, see (1) above.

and rehabilitate those which have been deforested; (7) support training, research, and other actions which lead to sustainable and more environmentally sound practices for timber harvesting, removal, and processing; (8) support research to expand knowledge of tropical forests and identify alternatives which will prevent forest destruction, loss, or degradation; (9) conserve biological diversity in forest areas by supporting efforts to identify, establish, and maintain a representative network of protected tropical forest ecosystems on a worldwide basis, by making the establishment of protected areas a condition of support for activities involving forest clearance or degradation, and by helping to identify tropical forest ecosystems and species in need of protection and establish and maintain appropriate protected areas; (10) seek to increase the awareness of U.S. Government agencies and other donors of the immediate and long-term value of tropical forests; (11) utilize the resources and abilities of all relevant U.S. government agencies; (12) be based upon careful analysis of the alternatives available to achieve the best sustainable use of the land; and (13) take full account of the environmental impacts of the proposed activities on biological diversity?

(7) Timber harvesting is not a part of the project
(8) Yes, see (1) above.
(9) Yes, see (1) above.
(10) NA.
(11) Yes.
(12) Yes
(13) Yes

c. Forest Degradation: Will assistance be used for: (1) the procurement or use of logging equipment, unless an environmental assessment indicates that all timber harvesting operations involved will be conducted in an environmentally sound manner and that the proposed activity will produce positive economic benefits and sustainable forest management systems; (2) actions which will significantly degrade national parks or similar protected areas which contain tropical forests, or introduce exotic plants or animals into such areas; (3) activities which would result in the conversion of forest lands to the rearing of livestock; (4) the construction, upgrading or maintenance of roads (including temporary haul roads for logging or other extractive industries) which pass through relatively undergraded forest lands; (5) the colonization of forest lands; or (6) the construction of dams or other water control structures which flood relatively undergraded forest lands, unless with respect to each such activity an environmental assessment indicates that the activity will contribute significantly and directly to improving the livelihood of the rural poor and will be conducted in an environmentally sound manner which supports sustainable development?

(1) No
(2) No
(3) No
(4) No
(5) No
(6) No

d. Sustainable forestry: If assistance relates to tropical forests, will project assist countries in developing a systematic analysis of the appropriate use of their total tropical forest resources, with the goal of developing a national program for sustainable forestry?

Yes, that is precisely the objective of this project

107

e. Environmental impact statements: Will funds be made available in accordance with provisions of FAA Section 117(c) and applicable A.I.D. regulations requiring an environmental impact statement for activities significantly affecting the environment? — Yes

14. Energy (FY 1991 Appropriations Act Sec. 533(c)): If assistance relates to energy, will such assistance focus on: (a) end-use energy efficiency, least-cost energy planning, and renewable energy resources, and (b) the key countries where assistance would have the greatest impact on reducing emissions from greenhouse gases? — NA

15. Sub-Saharan Africa Assistance (FY 1991 Appropriations Act Sec. 562, adding a new FAA chapter 10 (FAA Sec. 496)): If assistance will come from the Sub-Saharan Africa DA account, is it: (a) to be used to help the poor majority in Sub-Saharan Africa through a process of long-term development and economic growth that is equitable, participatory, environmentally sustainable, and self-reliant; (b) to be used to promote sustained economic growth, encourage private sector development, promote individual initiatives, and help to reduce the role of central governments in areas more appropriate for the private sector; (c) being provided in accordance with the policies contained in FAA section 102; (d) being provided in close consultation with African, United States and other PVOs that have demonstrated effectiveness in the promotion of local grassroots activities on behalf of long-term development in Sub-Saharan Africa; (e) being used to promote reform of sectoral economic policies, to support the critical sector priorities of agricultural production and natural resources, health, voluntary family planning services, education, and income generating opportunities, to bring about appropriate sectoral restructuring of the Sub-Saharan African economies, to support reform in public administration and finances and to establish a favorable environment for individual enterprise and self-sustaining development, and to take into account, in assisted policy reforms, the need to protect vulnerable groups; (f) being used to increase agricultural production in ways that protect and restore the natural resource base, especially food production, to maintain and improve basic transportation and communication networks, to maintain and restore the renewable natural resource base in ways that increase agricultural production, to improve health conditions with special emphasis on meeting the health needs of mothers and children, including the establishment of self-sustaining primary health care systems that give priority to preventive care, to provide increased access to voluntary family planning services, to improve basic literacy and mathematics especially to those outside the formal educational system and to improve primary education, and to develop income-generating opportunities for the unemployed and underemployed in urban and rural areas? — NA

16. Debt-for-Nature Exchange (FAA Sec.463): If project will finance a debt-for-nature exchange, describe how the exchange will support protection of: (a) the world's oceans and atmosphere, (b) animal and plant species, and (c) parks and reserves; or describe how the exchange will promote: (d) natural resource management, (e) local conservation programs, (f) conservation training programs, (g) public commitment to conservation, (h) land and ecosystem management, and (i) regenerative approaches in farming, forestry, fishing, and watershed management. NA

17. Deobligation/Reobligation (FY 1991 Appropriations Act Sec. 515): If deob/reob authority is sought to be exercised in the provision of DA assistance, are the funds being obligated for the same general purpose, and for countries within the same region as originally obligated, and have the House and Senate Appropriations Committees been properly notified? NA

18. Loans

a. Repayment capacity (FAA Sec. 122(b)): Information and conclusion on capacity of the country to repay the loan at a reasonable rate of interest. NA

b. Long-range plans (FAA Sec. 122(b)): Does the activity give reasonable promise of assisting long-range plans and programs designed to develop economic resources and increase productive capacities? NA

c. Interest rate (FAA Sec. 122(b)): If development loan is repayable in dollars, is interest rate at least 2 percent per annum during a grace period which is not to exceed ten years, and at least 3 percent per annum thereafter? NA

d. Exports to United States (FAA Sec. 620(d)): If assistance is for any productive enterprise which will compete with U.S. enterprises, is there an agreement by the recipient country to prevent export to the U.S. of more than 20 percent of the enterprise's annual production during the life of the loan, or has the requirement to enter into such an agreement been waived by the President because of a national security interest? NA

19. Development Objectives (FAA Secs. 102(a), 111, 113, 281(a): Extent to which activity will: (1) effectively involve the poor in development, by expanding 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 basis, using the appropriate U.S. institutions; (2) 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 government institutions; (3) support the self-help efforts of

The purpose of the project is to improve conservation management in order to increase and sustain the economic benefits from agriculture, forestry and fisheries resources.

(1) See B.6(a) above.
(2) See A.21 above.
(3) See B.6(c) above.

developing countries; (4) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (5) utilize and encourage regional cooperation by developing countries?

(4) See B.6(d) above.
(5) See B.6(c) above.

20. Agriculture, Rural Development and Nutrition, and Agricultural Research (FAA Secs. 103 and 103A):

a. Rural poor and small farmers: If assistance is being made available for agriculture, rural development or nutrition, describe extent to which activity is specifically designed to increase productivity and income of rural poor; or if assistance is being made available for agricultural research, has account been taken of the needs of small farmers, and extensive use of field testing to adapt basic research to local conditions shall be made.

Under the project element dealing with sustainable agricultural production, assistance will be provided to train small farmers in adopting new cropping systems, thereby increasing their income..

b. Nutrition: Describe extent to which assistance is used in coordination with efforts carried out under FAA Section 104 (Population and Health) to help improve nutrition of the people of developing countries through encouragement of increased production of crops with greater nutritional value; improvement of planning, research, and education with respect to nutrition, particularly with reference to improvement and expand use of indigenously produced foodstuffs; and the undertaking of pilot or demonstration programs explicitly addressing the problem of malnutrition of poor and vulnerable people.

NA

c. Food security: Describe extent to which activity increases national food security by improving food policies and management and by strengthening national food reserves, with particular concern for the needs of the poor, through measures encouraging domestic production, building national food reserves, expanding available storage facilities, reducing post harvest food losses, and improving food distribution.

NA

21. Population and Health (FAA Secs. 104(b) and (c)): If assistance is being made available for population or health activities, describe 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 outreach.

NA

22. Education and Human Resources Development (FAA Sec. 105): If assistance is being made available for education, public administration, or human resource development, describe (a) extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, and strengthens management capability of institutions enabling the poor to participate in

NA

development; (b) extent to which assistance provides advanced education and training of people of developing countries in such disciplines as are required for planning and implementation of public and private development activities.

23. Energy, Private Voluntary Organizations, and Selected Development Activities (FAA Sec. 106): If assistance is being made available for energy, private voluntary organizations, and selected development problems, describe extent to which activity is: — NA

a. concerned with data collection and analysis, the training of skilled personnel, research on and development of suitable energy sources, and pilot projects to test new methods of energy production; and facilitative of research on and development and use of small-scale, decentralized, renewable energy sources for rural areas, emphasizing development of energy resources which are environmentally acceptable and require minimum capital investment; — NA

b. concerned with technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations; — Major project support including technical assistance and implementation of sustainable agricultural activities will be through a U.S. PVO.

c. research into, and evaluation of, economic development processes and techniques; — NA

d. reconstruction after natural or man-made disaster and programs of disaster preparedness; — NA

e. for special development problems, and to enable proper utilization of infrastructure and related projects funded with earlier U.S. assistance; — NA

f. for urban development, especially small, labor-intensive enterprises, marketing systems for small producers, and financial or other institutions to help urban poor participate in economic and social development. — NA

24. Sahel Development (FAA Secs. 120-21). If assistance is being made available for the Sahelian region, describe: (a) extent to which there is international coordination in planning and implementation; participation and support by African countries and organizations in determining development priorities; and a long-term, multi-donor development plan which calls for equitable burden-sharing with other donors; (b) whether a determination has been made that the host government has an adequate system for accounting for and controlling receipt and expenditure of projects funds (dollars or local currency generated thereform). — NA

Ministry of Economic Development

Fax: (501)08-23111
Tel: (501)08-22526/08-22527
Your Ref.:
Our Ref.: 2015/91(23)

P.O. Box 42
Unity Boulevard
Belmopan
Belize, Central America

September 11, 1991

Mrs. Barbara Sandoval
A.I.D. Representative
U.S.A.I.D. Mission to Belize
Gabourel Lane
Belize City, Belize

Dear Mrs. Sandoval:

The purpose of this letter is to formally request a U.S.A.I.D. grant in the amount of US$1,000,000 to assist the Government of Belize in improving the management of Belize's natural resources in order to increase and sustain the economic benefits from agriculture, fisheries, and tourism, while protecting and conserving the resource base upon which these industries depend.

After careful review of the documentation provided we are convinced that the proposed project will make a significant impact on the Belizean economy through the improvement of our environmental planning and monitoring capacity; through the continued movement towards sustainable agricultural production; and through forestry development.

I will be available for further discussions on the foregoing proposal at our mutual convenience.

Sincerely,

JOSEPH D. WAIGHT
Permanent Secretary
Ministry of Economic Development

cc: Permanent Secretary, Ministry of Natural Resources
Permanent Secretary, Ministry of Tourism & Environment
Permanent Secretary, Ministry of Agriculture & Fisheries
Financial Secretary

N.B. Amount is planned initial Agreement amount, not planned LOP funding.

Agency for International Development
Washington, D.C. 20523

LAC-IEE-91-72

ENVIRONMENTAL THRESHOLD DECISION

Project Location	:	Belize
Project Title	:	Natural Resource Management and Protection
Project Number	:	505-0043
Funding	:	$8.5 million (DA)
Life of Project	:	7 Years (FY 91-97)
IEE Prepared by	:	Jeffrey Allen, Natural Resource Officer, USAID/Belize
Recommended Threshold Decision	:	Negative Determination
Bureau Threshold Decision	:	Negative Determination for Environmental Monitoring and Planning; Forestry Development/Protected Areas; and Project Implementation/Support components. Positive Determination for Sustainable Agricultural Production component.
Comments	:	Negative Determination for three above components based on implementation of appropriate mitigations developed in project paper and initial environmental examination. Furthermore, project agreement must contain covenant with Government of Belize that, pursuant to Section 533{c}{3} of the FY 1991 Foreign Assistance Appropriations Act, no project funds shall be used to support industrial or commercial extraction of timber from primary tropical forests without first conducting an Environmental Assessment and having it approved by the LAC Bureau Environmental Officer. Positive Determination is made for the Sustainable Agricultural

Production component of the project. Per A.I.D. environmental procedures, Positive Determination must be followed by the preparation of an Environmental Assessment {EA} Scope of Work, and, subsequently, by the EA. The primary objective of the EA will be to examine pest and pesticide management and related issues pertaining to the project.

In order not to hold up project authorization, and recognizing that three major project components do not involve procurement or use of pesticides, USAID/Belize shall place a covenant in the project agreement specifically addressing pesticide use. This covenant shall stipulate that an EA must be completed and be approved by the LAC Bureau Environmental Officer, and that EA recommendations will be incorporated into the project prior to obligation of project funds for the procurement and/or use of pesticides. This covenant is limited to the above component so as not to interfere with project authorization or implementation of other project activities not involving procurement or use of pesticides.

Project evaluations will examine the success of mitigation measures in terms of minimizing any negative environmental impacts that may occur during implementation.

John O Wilson Date JUL 24 1991

John O. Wilson
Deputy Chief Environmental Officer
Bureau for Latin America
and the Caribbean

Copy to : Barbara Sandoval, Director
USAID/Belize

114

Copy to	:	Jeffrey Allen, USAID/Belize
Copy to	:	Wayne Williams, REA/CEN
Copy to	:	Ed Campbell, LAC/CAR
Copy to	:	Jim Hradsky, LAC/DR/CAR
Copy to	:	IEE File

INITIAL ENVIRONMENTAL EXAMINATION

Project Location: Belize
Project Title: Natural Resource Management and Protection
Project Number: 505-0043
LOP Funding: $8.5 million (DA)
Life of Project: 7 years (FY91 - FY97)
IEE Prepared By: Jeffrey H. Allen, Natural Resource Officer
USAID/Belize

I. Recommended Threshold Decision

A negative determination is warranted per 22 CFR 216.3(a)(3).

II. Project Goal and Purpose

The goal of the Natural Resource Management and Protection (NRMP) Project is to protect and manage the natural resources upon which the sustainable economic and social development of Belize depends. The purpose of the project is to improve conservation management in order to increase and sustain the economic benefits from agriculture, forestry, and fisheries resources.

Under the NRMP Project, A.I.D. will provide $8.5 million to the Government of Belize (GOB) and local non-governmental organizations (LNGOs) to carry out an integrated set of activities in environmental monitoring and planning, sustainable agricultural production and forestry development. Enhanced land use planning capability is the means of identifying cross-sectoral issues related to environmental quality, agricultural production and protected areas management. Project resources will be used to establish baseline environmental indicators of water quality dynamics. Watersheds will be adopted as units of environmental planning and as the basis for the coordination between the Ministries of 1) Tourism and Environment, 2) Agriculture and Fisheries and 3) Natural Resources.

Principal outputs include development of a national environmental and natural resource management strategy and its implementation; introduction of sustainable agricultural production practices among the small farmers occupying the fringes of protected areas, improved integrated pest management practices among small and large farmers of domestic and export crops, and a comprehensive system of protected areas management leading to the designation and operation of at least one biosphere reserve and several private sector oriented, community-based conservation initiatives.

116

III. Findings and Conclusions

Belize is at a crossroads in its development. The selective logging practices, low population densities and colonial stewardship that have helped preserve the largest proportional forested area of any country in the region are now a part of the past. Pursuit of economic development must not occur at the expense of environmental awareness and natural resource management, or the basis of Belize's growth will be irreparably compromised.

The Natural Resource Management and Protection Project provides the Government of Belize with the resources needed to face that challenge. As its title suggests, the project is strongly conservation oriented in all its components without dictating the course of the country's development. Instead, its role is to generate the information and to increase the awareness necessary to guide Belize's growth along sustainable paths.

Harmonization of the GOB's environmental regulatory provisions will be supported with the baseline information, criteria, periodic compliance monitoring and impact assessment necessary to enrich the planning process and direct mitigative measures as required. Food security and self sufficiency objectives will be approached through the active involvement of farmers and local communities in soil conservation, crop protection and post-harvest measures.

Notwithstanding the NRMP's explicit objective to promote the safe use of pesticides, an indepth and complete Environmental Assessment will be carried out before project funds are expended to procure pesticides under the Sustainable Agricultural Production component. Language to that effect will be incorporated into the Project Agreement.

Land tenure requirements, interest in agricultural production efficiency, and the desire to generate profit will form integral elements of the program to promote agricultural sustainability. Stabilization of protected areas will serve conservation management purposes and complement the development of the sustainable yield forestry management practices critical to Belize's balance of trade objectives.

No project funds will be used to support industrial or commercial extraction in primary tropical forests and therefore is excluded from Section 533[c][3] of the 1991 Foreign Assistance Act prohibitions. Furthermore, project resources will be used to fund several marine critical habitat surveys preparatory to identifying the coastal areas linking terrestrial protected areas for conservation management purposes and eventual establishment of a biosphere under the MAB (Man and the Biosphere) program. Upon completion, the list

117

of animal and plant species identified by the critical habitat surveys will be submitted to the U.S. Fish and Wildlife Service for review prior to the planned implementation as required by 32 CFR Ch.1 3.[b][3]. Given the NRMP's primary interest in conservation management, funding the project will have a direct, significant and positive effect on endangered or threatened species through conservation of critical habitats and is thus in direct compliance with the endangered species concerns under 22 CFR Section 216.5 and 45 CFR 70247, Oct. 23, 1980.

Finally, the Project's implementation strategy is designed to exploit the comparative advantages of public and private sector groups active in Belize's conservation movement. Respective institutional mandates and capacities are reflected in roles projected for both government and local non-governmental organizations. The GOB's role under the NRMP will reinforce its policy, regulatory, planning and monitoring capabilities. Resources programmed for LNGOs and community-based conservation efforts will foster development of indigenous sources of expertise, technology transfer and local support of natural resource management objectives.

Concurrence:

Patrick McDuffie
Acting A.I.D. Representative

6/7/91
Date

Approval:

James Hester
Chief Environmental Officer
LAC/DR/E

Date

Clearances: ADO:GELike in draft Date: 6/6/91
A/PDO:AQVillanueva in draft Date: 6/6/91

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118

ENVIRONMENTAL EXAMINATION

A. Project Goal and Purpose

The goal of the Natural Resource Management and Protection (NRMP) Project is to protect and manage the natural resources upon which the sustainable economic and social development of Belize depends. The purpose of the Project is to improve conservation management, in order to increase and sustain the economic benefits from agriculture, forestry and fisheries resources.

Under the NRMP Project, USAID will provide $US 8.5 million to the Government of Belize (GOB) and local non-governmental organizations (LNGOs) to carry out an integrated set of activities in environmental planning and monitoring, sustainable agricultural production and forestry development. Enhanced land use planning capability is the means of identifying cross-sectoral issues related to environmental quality, agricultural production and protected areas management. Project resources will be used to establish baseline environmental indicators of water quality dynamics. Watersheds will be adopted as units of environmental planning and as the basis for the coordination between the Ministries of; 1) Natural Resources (MNR), 2) Tourism and the Environment (MTE); and 3) Agriculture and Fisheries (MAF).

Principal outputs of the Project include development of a national environmental and natural resource management strategy and its implementation, introduction of sustainable agricultural production practices among the small farmers occupying the fringes of protected areas, improved integrated pest management practices among small and large farmers of domestic and export crops, and a comrehensive system of protected areas management leading to the designation and operation of at least one biosphere reserve and several private sector oriented and community based conservation initiatives.

B. Environmental Review and Assessment

In review of the NRMP Project, it is noted that the direct environmental impacts of the Project will be minimal because of limited land interventions and scope of activities. The project focuses primarily on improving conservation management and advancing field research and monitoring through assistance in local institution building. Pesticides, which represent the principal environmental concern, will be used during the Project in the context of experiments and field trials involving limited

acreage and a small number of cooperating farmers. These trials will be conducted under the direction and supervision of responsible contractors. It is further noted that the number of of crops investigated in the NRMP Project is far less than those identified in the USAID CAC Project (No. 505-0008) and the list of potential use pesticides is reduced and updated, and conforms to current regulations.

Agricultural research and development will focus primarily on assisting farmers to develop sustainable cropping systems and to safely manage the use of pesticides. Field trials on new and existing high value cash crops such as spices, tropical fruits and vegetables, will be incorporated into the cropping system packages extended to the farmers. Promissory crops targeted for investigation may include black pepper, carambola, passion fruit and rambutan.

It is not anticipated that new lands will be brought into agricultural production as a result of the this Project. Because no forested lands will be sought or utilized for agriculture, no adverse impacts on critical habitats or protected wildlife species are anticipated. However, if it is found appropriate to seek new lands for agricultural production as a result of the Project activities, additional environmental assessments will be required. Selection of cultivation sites will consider environmental constraints such as soil erosion and runoff potential, proximity to streams and natural water bodies, and impact on wildlife and fragile lands. Natural factors such as topography, soil suitability, critical habitat and fragile land status will be assessed and evaluated prior to any land intervention or modification. [OPTIONAL: Also, land tenure status and land titling procedures will considered and evaluated prior to recommendation for conversion of undeveloped land to agricultural use].

All efforts will be made to control pests through proper site selection, cultural practices, integrated pest managment techniques and a responsible management structure. As a first line of defense against pests, trial sites will be selected that suit specific crop requirements. Cultural practices such as alley cropping and wind breaks will be introduced to deter pests and provent spreading of disease. Technical assistance in integrated pest management will advise and assist Project participants in alternative pest control menthods and communication with the IPM Center (San Jose, Costa Rica, C.A.) will be encouraged for monitoring and evaluation assistance. Chemical pesticides will be introduced only as a last resort to protect crops.

Any pesticides used will be highly selective to control specific

pests and will be chosen from those approved by the U.S. Environmental Protection Agency and the Belize Pesticides Control Board.

However, the potential exists for more significant long term and indirect effects on the environment and people of Belize if the project is successful. The resulting crop production technologies developed during the Project, including crop protection methods, are intended to be adopted by a larger number of farmers. The major measures proposed to mitigate adverse impacts of pesticide use involve adoption of a crop protection package for species tested during the Project. It is beyond the scope of the Project to control the extent to which farmers adopt and maintain sustainable agricultural production practices after the life of the Project.

Pesticide safety programs are an integral part of public awareness programs designed to complement and reinforce the goals of this Project. Training in safe handling and proper application of pesticides will be provided to Project participants, agro-chemical distributors and agricultural extension agents. Awareness and safety training will be extended to the household level where pesticides are often stored and handled. Women and children will be included as primary target audiences in pesticides safety awareness. The public awareness activities will include training women to educate, in turn, other women, men, children and the elderly.

During the life of the Project, EIA capability will be developed in Belize to monitor environmental quality and recommend mitigating action. Crop development areas will be utilized as monitoring sites for environmental impact assessment and the program expanded as crop production packages are adopted by a larger user group.

The following actions will be incorporated into the proposed Project under the designated Sustainable Agricultural Production Component:

a) Only those pesticides so indicated in Table I are authorized for on-farm programs within the Project.

b) Only those uses approved by the Pesticides Control Board, the USEPA and/or the WHO/FAO are authorized for on-farm programs within the Project.

c) Pesticides identified for use subsequent to the preparation of the Project Paper and EA will require amendment of the EA and are subject to procedures dictated according to the regulatory status of the compound. Actual procurement or

use must be approved in writing by the A.I.D. Mission Director and the Environmental Officer.

d) The above actions do not apply where the pesticides are used for research or limited field evaluation purposes under supervision of project personnel. It is recommended that research sites yet to be designated, be limited to pesticides already approved unless alternatives are identified that possess significantly greater selectivity, reduced mammalian toxicity or other environmental advangates.

e) Pesticides, particularly those labeled as highly toxic to fish, do present significant hazards to aquatic organisms, and should not be used in a manner that will lead to contmination of any surface or ground water system. Where there is risk of water contamination, an appropriate monitoring system should be set in place and maintained during, and for an acceptable period beyond the use of the compound.

f) Technical assistance should be obtained for crop protection specialists for pesticide use and safety training and, as needed, for monitoring human and environmental exposure to pesticides.

g) Provisions should be made for needed analysis of pesticide residues on crops.

h) The Project should be reviewed annually to evaluate pesticide practices within the Project activities and to advise on any observed or potential hazards being promoted. For purposes of this review, pesticide use records should be maintained by Project personnel.

i) Storage of pesticides used by Project personnel and participating farmers must meet the following conditions:

1. Pesticides must be stored in a dry, secure area protected from water and extereme heat.
2. The storage area must be separated from living quarters and stored food products.
3. The storage building must display a sign in clear view that indicates "Danger - Poison" in Spanish and English.
4. Pesticides must be dated upon receipt and stored in non-corrosive containers.
5. Pesticides should be stored in their origional containers with labels on and intact. If repackaged, the container must carry a label indicating the product name, names and concentrations of active ingredients, directions and precaution of use, and appropriate

warning messages in Spanish and English. The label must be fastened securely on the container.

6. Disposal of pesticides and/or containers should conform to label instructions. Empty containers should be collected and destroyed to prevent reuse.

j) Handling and use of pesticides by Project personnel and cooperating farmers must meet the following conditions:

1. All pesticides must be used with strict adherence to label directions, including crop use registrations, field re-entry intervals and pre-harvest intervals.
2. Appropriate, properly maintained equipment and protective clothing must be made available and its use ensured.
3. Precautions must be taken to prevent pesticide contamination of drinking water.

k) The following materials should be used in the Project only for research purposes, applied by trained personnel, and should not form the basis of any crop protection packages developed and/or recommended: Monocrotophos, Fenamiphos, Methamidophos, Methomyl, Paraquat and Methyl-parathion.

l) Major elements of an Integrated Pest Management Program should be developed and implemented during the first year and expanded throughout the life of the Project.

A major component of this Project is to improve the capacity in Belize to monitor, assess, and regulate potential hazards to environmental quality through technical assistance, training, and infrastructure development. The newly-created DOE will have established policy and new regulations controlling industrial wastes, water pollutants, and solid and toxic wastes. Existing water quality testing lab facilities should be equipped and staffed with trained personnel. Also, effluents from the lab should be disposed of in an environmentally safe manner.

Under the NRMP Project, four candidates will be selected for degree or advanced degree training in environmental sciences. Also, the capability to assess environmental impacts due to development will be strengthened in GOB departments and LNGOs. An environmental data center and information networking system will facilitate the development of a country-wide environmental monitoring system.

The Forestry Development Component of the project will address the needs of the newly-created Conservation Division (MNR) in protected lands management. In addition, a sub-component will explore means by which the value of secondary timber species is

enhanced. Neither component will cause additional logging pressure or open new forest land to exploitation.

C. Findings and Conclusions

Belize is at a crossroads in its development. The selective logging practices, low population densities and colonial stewardship that have helped preserve the largest proportional forested area of any country in the region are now a part of the past. Pursuit of economic development must not occur at the expense of environmental awareness and natural resource management, or the basis of Belize's growth will be irreparably compromised.

The Natural Resource Management and Protection Project provides the Government of Belize with the resources needed to face that challenge. As its title suggests, the Project is strongly conservation oriented in all its components without dictating the course of the country's development. Instead, its role is to generate the information needed and to increase the awareness necessary to guide Belize's growth along sustainable paths. Harmonization of the GOB's environmental regulatory provisions will be supported with the baseline information, criteria, periodic compliance monitoring and impact assessments necessary to enrich the planning process and direct mitigative measures as required. Food security and self sufficiency objectives will be approached through the active involvement of farmers and local communities in soil conservation, crop protection and post-harvest measures.

Notwithstanding the NRMP's explicit objectives to promote the safe use of pesticides, an indepth and complete Environmental Assessment will be carried out before project funds are expended to procure pesticides under the Sustainable Agricultural Production Component. Language to that effect will be incorporated into the Project Agreement.

Land tenure requirements, interest in agricultural production efficiency, and the desire to generate profit will form integral elements of the program to promote agricultural sustainability. Stabilization of protected areas will serve conservation management purposes and complement the development of the sustainable yield forestry management practices critical to Belize's balance of trade objectives.

No project funds will be used to support industrial or commercial extraction in primary tropical forests and therefore is excluded from Section 533 [c][3] of the 1991 Foreign Assistance Act prohibitions. Furthermore, project resources will be used to fund several marine critical habitat surveys

preparatory to identifying the coastal areas linking terrestrial protected areas for conservation management purposes and eventual establishment of a biosphere reserve under the Man and the Biosphere (MAB) Program. Upon completion, the list of animals and plant species identified by the critical habitat surveys will be submitted to the U.S. Fish and Wildlife Service for review prior to the planned implementation as required by 32 CFR Ch.1 3.[b][3]. Given the NRMP's primary interest in conservation management, funding the Project will have a direct, significant and positive effect on endangered or threatened species through conservation of critical habitats and is thus in direct compliance with the endangered species concerns under 22 CFR Section 216.5 and 45 CFR 70247, October 23, 1980.

Finally, the Project's implementation strategy is designed to exploit the comparative advantages of public and private sector groups active in Belize's conservation movement. Respective institutional mandates and capacities are reflected in roles projected for both government and local non-governmental organizations. The GOB's role under the NRMP Project will reinforce its policy, regulatory, planning and monitoring capabilities. Resources programmed for LNGOs and community-based conservation efforts will foster development of indigenous sources of expertise, technology transfer and local support of natural resource management objectives.

NATURAL RESOURCES MANAGEMENT AND PROTECTION
USAID Funds

Element 1	Type	LOP No.	LOP Cost	LOP FX	LOP L.C.	LOP Totals	1992 No.	1992 Cost	1992 Totals	1993 No.	1993 Cost	1993 Totals	1994 No.	1994 Cost	1994 Totals	1995 No.	1995 Cost	1995 Totals	1996 No.	1996 Cost	1996 Totals
ENVIRONMENTAL MONITORING AND PLANNING				726.0	377.5	1103.5			366.5			282.5			200.5			158.5			95.5
1. Institutional Development				508.0	55.0	563.0			193.0			144.0			112.0			86.0			28.0
a. Technical Assistance				64.0	10.0	74.0			46.0			14.0			6.0			4.0			4.0
Policy/Regulatory Rev.	Local pm	2.0	10.0				2.0	10.0													
Org. Rev. & Staff Plan	Expat pm	1.0	20.0				1.0	20.0													
GIS Networking Survey	Expat pm	1.0	20.0				0.5	10.0		0.5	10.0										
RENARM GIS Buy-in	Expat pm	1.2	24.0				0.3	6.0		0.2	4.0		0.3	6.0		0.2	4.0		0.2	4.0	
b. Training				384.0	40.0	424.0			82.0			130.0			106.0			82.0			24.0
Univ. Scholarships	US py	12.0	288.0				1.0	24.0		3.0	72.0		4.0	96.0		3.0	72.0		1.0	24.0	
GIS Training	US/Rg pm	6.0	72.0				3.0	36.0		3.0	36.0										
ST Training	US/Rg pm	2.0	24.0				1.0	12.0		1.0	12.0										
ST Training	Local pm	8.0	40.0				2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0				
c. Equipment				60.0	5.0	65.0			65.0			0.0			0.0			0.0			0.0
Office/Communications	var		45.0					45.0													
Vehicle	4x4	1.0	20.0				1.0	20.0													
2. Environmental Monitoring				148.0	217.5	365.5			133.5			103.5			53.5			37.5			37.5
a. Technical Assistance				43.0	62.5	105.5			33.5			33.5			23.5			7.5			7.5
Environmental Assessments	Expat pm	1.0	10.0				0.5	5.0		0.5	5.0										
Marine Crit. Habitat Surv.	Expat pm	2.1	21.0				0.7	7.0		0.7	7.0		0.7	7.0							
Baseline Surveys	Local pm	5.0	25.0				2.0	10.0		2.0	10.0		1.0	5.0							
Local Data Collection	Local pm	25.0	37.5				5.0	7.5		5.0	7.5		5.0	7.5		5.0	7.5		5.0	7.5	
Lab Analysis	Expat pm	0.6	12.0				0.2	4.0		0.2	4.0		0.2	4.0							
b. Equipment				105.0	5.0	110.0			70.0			40.0			0.0			0.0			0.0
Vehicles	4x4	2.0	40.0				1.0	20.0		1.0	20.0										
Boat		1.0	20.0				1.0	20.0													
Field Monitoring Equip.	var		50.0					30.0			20.0										
c. Program Operations					150.0	150.0			30.0			30.0			30.0			30.0			30.0
Spec. Studies/M-use Plans	var		150.0					30.0			30.0			30.0			30.0			30.0	
3. Public Awareness				70.0	105.0	175.0			40.0			35.0			35.0			35.0			30.0
a. Technical Assistance				50.0		50.0			10.0			10.0			10.0			10.0			10.0
RENARM PVO Buy-ins	Expat pm	2.5	50.0				0.5	10.0		0.5	10.0		0.5	10.0		0.5	10.0		0.5	10.0	
b. Equipment				20.0	5.0	25.0			10.0			5.0			5.0			5.0			0.0
A/V Equip. & Airtime	var		25.0					10.0			5.0			5.0			5.0				
c. Program Operations					100.0	100.0			20.0			20.0			20.0			20.0			20.0
PA Programs		5.0	50.0				1.0	10.0		1.0	10.0		1.0	10.0		1.0	10.0		1.0	10.0	
Public Forum/Workshops		5.0	50.0				1.0	10.0		1.0	10.0		1.0	10.0		1.0	10.0		1.0	10.0	

Annex 6

NATURAL RESOURCES MANAGEMENT AND PROTECTION
USAID Funds

Element 2	Type	L O P No.	L O P Cost	L O P FX	L O P L.C.	L O P Totals	1992 No.	1992 Cost	1992 Totals	1993 No.	1993 Cost	1993 Totals	1994 No.	1994 Cost	1994 Totals	1995 No.	1995 Cost	1995 Totals	1996 No.	1996 Cost	1996 Totals
SUSTAINABLE AGRICULTURAL PRODUCTION				1710.0	393.0	2103.0			488.0			631.0			673.0			287.0			24.0
1. Institutional Development	-			432.0	0.0	432.0			48.0			96.0			168.0			96.0			24.0
a. Training				432.0		432.0			48.0			96.0			168.0			96.0			24.0
Univ. Scholarships	US py	15.0	360.0				1.0	24.0		3.0	72.0		6.0	144.0		4.0	96.0		1.0	24.0	
ST Training	US/Rg pm	6.0	72.0				2.0	24.0		2.0	24.0		2.0	24.0							
2. SAP Program - PVO				1278.0	393.0	1671.0			440.0			535.0			505.0			191.0			0.0
a. Technical Assistance				1012.0	350.0	1362.0			251.0			465.0			455.0			191.0			0.0
Cropping Systems Advisor	LT Ex py	3.0	420.0				0.5	70.0		1.0	140.0		1.0	140.0		0.5	70.0				
Soil Conserv. Advisor	LT Ex py	2.8	392.0				0.4	56.0		1.0	140.0		1.0	140.0		0.4	56.0				
Local Agronomists	LT Lo py	11.6	290.0				1.6	40.0		4.0	100.0		4.0	100.0		2.0	50.0				
Post Harvest Tech.	Expat pm	2.0	40.0				0.5	10.0		1.0	20.0		0.5	10.0							
Rural Soc. Extn.	Expat pm	2.0	40.0				1.0	20.0		0.5	10.0		0.5	10.0							
LNGO Tech Support	Local pm	20.0	60.0				5.0	15.0		5.0	15.0		5.0	15.0		5.0	15.0				
RENARM Crop Prot. Buy-in	Expat pm	6.0	120.0				2.0	40.0		2.0	40.0		2.0	40.0							
b. Training				66.0	18.0	84.0			24.0			30.0			30.0			0.0			0.0
Farmer Training	US/Rg pm	11.0	66.0				3.0	18.0		4.0	24.0		4.0	24.0							
Workshops/Field Days	Local pm	3.6	18.0				1.2	6.0		1.2	6.0		1.2	6.0							
c. Equipment/Commodities				200.0	25.0	225.0			165.0			40.0			20.0			0.0			0.0
Office/Communications	var		75.0					60.0			15.0										
Field Equip/Commod	var		25.0					10.0			10.0			5.0							
Materials/Supplies	var		45.0					15.0			15.0			15.0							
Vehicles	4x4	3.0	60.0				3.0	60.0													
Motorcycles		4.0	20.0				4.0	20.0													

NATURAL RESOURCES MANAGEMENT AND PROTECTION
USAID Funds

Element 3	Type	LOP No.	LOP Cost	LOP FX	LOP L.C.	LOP Totals	1992 No.	1992 Cost	1992 Totals	1993 No.	1993 Cost	1993 Totals	1994 No.	1994 Cost	1994 Totals	1995 No.	1995 Cost	1995 Totals	1996 No.	1996 Cost	1996 Totals
FORESTRY DEVELOPMENT				1200.0	252.0	1452.0			666.0			320.0			242.5			162.5			61.0
1. Institutional Development				951.0	70.0	1021.0			384.5			187.5			225.5			162.5			61.0
a. Technical Assistance				120.0	30.0	150.0			100.0			20.0			20.0			10.0			0.0
Conserv. Planning	Expat pm	2.0	40.0				2.0	40.0													
LNGOS Planning	Expat pm	2.0	40.0				2.0	40.0													
GIS Consultant	Expat pm	1.0	20.0				1.0	20.0													
Biosphere Planning	Expat pm	1.0	20.0							0.5	10.0		0.5	10.0							
Biosphere Planning	Local pm	1.5	30.0							0.5	10.0		0.5	10.0		0.5	10.0				
b. Training				641.0	30.0	671.0			104.5			152.5			200.5			152.5			61.0
Univ. Scholarships	US py	15.0	360.0				1.0	24.0		3.0	72.0		6.0	144.0		4.0	96.0		1.0	24.0	
GIS Training	US/Rg pm	4.0	48.0				2.0	24.0		2.0	24.0										
ST Training	US/Rg pm	9.0	108.0				2.0	24.0		2.0	24.0		2.0	24.0		2.0	24.0		1.0	12.0	
ST Training	Local pm	6.0	30.0				1.5	7.5		1.5	7.5		1.5	7.5		1.5	7.5				
Environ. Ed. Grants			125.0					25.0			25.0			25.0			25.0			25.0	
c. Equipment/Commodities				190.0	10.0	200.0			180.0			15.0			5.0			0.0			0.0
Training Mat'l.	var		30.0					20.0			10.0										
Audio/Visual Equip.	var		60.0					50.0			5.0			5.0							
Computer Hdwr.			40.0					40.0													
Computer Sftwr/Mat'l.			20.0					20.0													
GIS Workstation			50.0					50.0													
2. Protected Areas Program				50.0	57.0	107.0			50.0			40.0			17.0			0.0			0.0
a. Technical Assistance				20.0	47.0	67.0			30.0			25.0			12.0			0.0			0.0
Planning	Expat pm	1.0	20.0				0.5	10.0		0.5	10.0										
Planning	Local pm	4.7	27.0				2.0	10.0		2.0	10.0		0.7	7.0							
Legal Issues	Local pm	4.0	20.0				2.0	10.0		1.0	5.0		1.0	5.0							
b. Equipment/Commodities				30.0	10.0	40.0			20.0			15.0			5.0			0.0			0.0
Matls/Maps & Aerial Photos	var		25.0					15.0			10.0										
Educ. Matls./Svcs.	var		15.0					5.0			5.0			5.0							
3. Boundary Demarcation Program				199.0	125.0	324.0			231.5			92.5			0.0			0.0			0.0
a. Training					5.0	5.0			2.5			2.5			0.0			0.0			0.0
ST Guard Training	Local pm	1.0	5.0				0.5	2.5		0.5	2.5										
b. Equipment				199.0		199.0			199.0			0.0			0.0			0.0			0.0
Radios for Guard Sta.	var	15.0	30.0				15.0	30.0													
Equip. for Guard Sta.	var	12.0	9.0				12.0	9.0													
Vehicles	4X4	5.0	100.0				5.0	100.0													
Motorcycles		15.0	60.0				15.0	60.0													
c. Construction					60.0	60.0						60.0			0.0			0.0			0.0
Guard Stations		12.0	60.0							12.0	60.0										
d. Program Operations					60.0	60.0			30.0			30.0			0.0			0.0			0.0
Survey & Boundary Work	Local pm	40.0	60.0				20.0	30.0		20.0	30.0										

NATURAL RESOURCES MANAGEMENT AND PROTECTION
USAID Funds

Element 4	Type	LOP No.	LOP Cost	LOP FX	LOP L.C.	LOP Totals	1992 No.	1992 Cost	1992 Totals	1993 No.	1993 Cost	1993 Totals	1994 No.	1994 Cost	1994 Totals	1995 No.	1995 Cost	1995 Totals	1996 No.	1996 Cost	1996 Totals
PVO PROJECT SUPPORT				682.0	1150.0	1832.0			331.0			448.0			438.0			438.0			177.0
1. PVO Tech. and Admin. Support				682.0	650.0	1332.0			231.0			348.0			338.0			338.0			77.0
a. Technical Assistance				592.0	372.0	964.0			120.0			260.0			260.0			260.0			64.0
Nat. Res. Adv./C.O.P.	LT Ex py	3.7	592.0				0.5	80.0		1.0	160.0		1.0	160.0		1.0	160.0		0.2	32.0	
Program Manager	LT Lo py	3.7	148.0				0.4	16.0		1.0	40.0		1.0	40.0		1.0	40.0		0.3	12.0	
Admin/Support Staff	LT Lo py	11.2	224.0				1.2	24.0		3.0	60.0		3.0	60.0		3.0	60.0		1.0	20.0	
b. Office Operations					273.0	273.0			26.0			78.0			78.0			78.0			13.0
Rent	mo.	42.0	84.0				4.0	8.0		12.0	24.0		12.0	24.0		12.0	24.0		2.0	4.0	
Util./Misc. Oper.	mo.	42.0	126.0				4.0	12.0		12.0	36.0		12.0	36.0		12.0	36.0		2.0	6.0	
Field Operations	mo.	42.0	63.0				4.0	6.0		12.0	18.0		12.0	18.0		12.0	18.0		2.0	3.0	
c. Equipment/Commodities				90.0	5.0	95.0			85.0			10.0			0.0			0.0			0.0
Office Equip.	var		35.0					25.0			10.0										
Vehicles	4x4		60.0				3.0	60.0													
2. Conservation Fund				0.0	500.0	500.0			100.0			100.0			100.0			100.0			100.0
a. NGO/Commun. Proj. Grants					500.0	500.0			100.0			100.0			100.0			100.0			100.0

NATURAL RESOURCES MANAGEMENT AND PROTECTION
USAID Funds

Element 5	Type	LOP No.	LOP Cost	LOP FX	LOP L.C.	LOP Totals	1992 No.	1992 Cost	1992 Totals	1993 No.	1993 Cost	1993 Totals	1994 No.	1994 Cost	1994 Totals	1995 No.	1995 Cost	1995 Totals	1996 No.	1996 Cost	1996 Totals
PROJECT COORDINATION AND MANAGEMENT				957.0	370.0	1327.0			157.0			306.0			398.0			262.0			204.0
1. GOB Project Coordination				0.0	160.0	160.0			20.0			40.0			40.0			40.0			20.0
a. Technical Assistance					160.0	160.0			20.0			40.0			40.0			40.0			20.0
Project Coordinator	LT Lo py	4.0	160.0				0.5	20.0		1.0	40.0		1.0	40.0		1.0	40.0		0.5	20.0	
2 USAID Project Management				592.0	210.0	802.0			77.0			212.0			212.0			212.0			89.0
a. Technical Assistance				592.0	160.0	752.0			68.0			200.0			200.0			200.0			84.0
Natural Resources Mgr.	USPSC py	3.7	592.0				0.3	48.0		1.0	160.0		1.0	160.0		1.0	160.0		0.4	64.0	
Assistant Proj. Mgr.	LoPSC py	4.0	160.0				0.5	20.0		1.0	40.0		1.0	40.0		1.0	40.0		0.5	20.0	
b. Office Expenses					50.0	50.0			9.0			12.0			12.0			12.0			5.0
Rent	mo.	50.0	50.0				9.0	9.0		12.0	12.0		12.0	12.0		12.0	12.0		5.0	5.0	
3. USAID Direct Project Support				180.0	0.0	180.0			60.0			54.0			56.0			10.0			0.0
a. Technical Assistance				180.0		180.0			60.0			54.0			56.0			10.0			0.0
ST Tech. Assist (var.)	Expat pm	1.5	30.0							0.5	10.0		0.5	10.0		0.5	10.0				
CATIE Watershed Mgt.	Expat pm	2.5	50.0				1.0	20.0		0.7	14.0		0.8	16.0							
Crop Prot.	Expat pm	1.5	30.0				0.5	10.0		0.5	10.0		0.5	10.0							
RENARM PVO Consortium	Expat pm	1.5	30.0				0.5	10.0		0.5	10.0		0.5	10.0							
AID/W CZM Buy-in	Expat pm	1.5	30.0				0.5	10.0		0.5	10.0		0.5	10.0							
EPAT Buy-in	Expat pm	0.5	10.0				0.5	10.0													
4. Audit and Evaluation				185.0	0.0	185.0			0.0			0.0			90.0			0.0			95.0
a. Non-Federal Audits				90.0		90.0									45.0						45.0
b. Evaluations				95.0		95.0									45.0						50.0
SUBTOTALS ELEMENTS 1-5				5275.0	2542.5	7817.5			2008.5			1987.5			1952.0			1308.0			561.5

Element 6	Type	LOP No.	LOP Cost	LOP FX	LOP L.C.	LOP Totals	1992 No.	1992 Cost	1992 Totals	1993 No.	1993 Cost	1993 Totals	1994 No.	1994 Cost	1994 Totals	1995 No.	1995 Cost	1995 Totals	1996 No.	1996 Cost	1996 Totals
INFLATION AND CONTINGENCIES				459.7	221.6	681.3			100.4			198.8			195.2			130.8			56.2
1. Inflation				136.0	94.5	230.5			0.0			99.4			97.6			65.4			28.1
2. Contingencies				263.8	127.1	390.9			100.4			99.4			97.6			65.4			28.1
GRAND TOTAL PROJECT						8498.8			2108.9			2186.3			2147.2			1438.8			617.7

NRMP - USAID Funds	L O P No.	L O P Cost	L O P FX	L O P L.C.	L O P Totals	1992 No.	1992 Cost	1992 Totals	1993 No.	1993 Cost	1993 Totals	1994 No.	1994 Cost	1994 Totals	1995 No.	1995 Cost	1995 Totals	1996 No.	1996 Cost	1996 Totals
ENVIRONMENTAL MONITORING AND PLANNING			726.0	377.5	1103.5			366.5			282.5			200.5			158.5			95.5
1. Institutional Development			508.0	55.0	563.0			193.0			144.0			112.0			86.0			28.0
a. Technical Assistance		74.0					46.0			14.0			6.0			4.0			4.0	
b. Training		424.0					82.0			130.0			106.0			82.0			24.0	
c. Equipment		65.0					65.0			0.0			0.0			0.0			0.0	
2. Environmental Monitoring			148.0	217.5	365.5			133.5			103.5			53.5			37.5			37.5
a. Technical Assistance		105.5					33.5			33.5			23.5			7.5			7.5	
b. Equipment		110.0					70.0			40.0			0.0			0.0			0.0	
c. Program Activity		150.0					30.0			30.0			30.0			30.0			30.0	
3. Public Awareness			70.0	105.0	175.0			40.0			35.0			35.0			35.0			30.0
a. Technical Assistance		50.0					10.0			10.0			10.0			10.0			10.0	
b. Equipment		25.0					10.0			5.0			5.0			5.0			0.0	
c. Program Activity		100.0					20.0			20.0			20.0			20.0			20.0	
Summary by Budget Category																				
Technical Assistance		229.5					89.5			57.5			39.5			21.5			21.5	
Training		424.0					82.0			130.0			106.0			82.0			24.0	
Equipment/Commodities		200.0					145.0			45.0			5.0			5.0			0.0	
Program Operations		250.0					50.0			50.0			50.0			50.0			50.0	
Total					1103.5			366.5			282.5			200.5			158.5			95.5

NRMP - USAID Funds	L O P Cost	L O P FX	L O P L.C.	L O P Totals	1992 Cost	1992 Totals	1993 Cost	1993 Totals	1994 Cost	1994 Totals	1995 Cost	1995 Totals	1996 Cost	1996 Totals
SUSTAINABLE AGRICULTURAL PRODUCTION		1710.0	393.0	2103.0		488.0		631.0		673.0		287.0		24.0
1. Institutional Development		432.0	0.0	432.0		48.0		96.0		168.0		96.0		24.0
a. Training	432.0				48.0		96.0		168.0		96.0		24.0	
2. SAP Program - PVO		1278.0	393.0	1671.0		440.0		535.0		505.0		191.0		0.0
a. Technical Assistance	1362.0				251.0		465.0		455.0		191.0		0.0	
b. Training	84.0				24.0		30.0		30.0		0.0		0.0	
c. Equipment/Commodities	225.0				165.0		40.0		20.0		0.0		0.0	
Summary by Budget Category														
Technical Assistance	1362.0				251.0		465.0		455.0		191.0		0.0	
Training	516.0				72.0		126.0		198.0		96.0		24.0	
Equipment/Commodicies	225.0				165.0		40.0		20.0		0.0		0.0	
Total				2103.0		488.0		631.0		673.0		287.0		24.0

NRMP - USAID Funds	LOP Cost	LOP FX	LOP L.C.	LOP Totals	1992 Cost	1992 Totals	1993 Cost	1993 Totals	1994 Cost	1994 Totals	1995 Cost	1995 Totals	1996 Cost	1996 Totals
FORESTRY DEVELOPMENT		1200.0	252.0	1452.0		666.0		320.0		242.5		162.5		61.0
1. Institutional Development		951.0	70.0	1021.0		384.5		187.5		225.5		162.5		61.0
a. Technical Assistance	150.0				100.0		20.0		20.0		10.0		0.0	
b. Training	671.0				104.5		152.5		200.5		152.5		61.0	
c. Equipment/Commodities	200.0				180.0		15.0		5.0		0.0		0.0	
2. Protected Areas Program		50.0	57.0	107.0		50.0		40.0		17.0		0.0		0.0
a. Technical Assistance	67.0				30.0		25.0		12.0		0.0		0.0	
b. Equipment/Commodities	40.0				20.0		15.0		5.0		0.0		0.0	
3. Boundary Demarcation Program		193.0	125.0	324.0		231.5		92.5		0.0		0.0		0.0
a. Training	5.0				2.5		2.5		0.0		0.0		0.0	
b. Equipment	199.0				199.0		0.0		0.0		0.0		0.0	
c. Construction	60.0				0.0		60.0		0.0		0.0		0.0	
d. Program Operations	60.0				30.0		30.0		0.0		0.0		0.0	
Summary by Budget Category														
Technical Assistance	217.0				130.0		45.0		32.0		10.0		0.0	
Training	676.0				107.0		155.0		200.5		152.5		61.0	
Equipment/Commodities	439.0				399.0		30.0		10.0		0.0		0.0	
Construction	60.0				0.0		60.0		0.0		0.0		0.0	
Program Operations	60.0				30.0		30.0		0.0		0.0		0.0	
Total				1452.0		666.0		320.0		242.5		162.5		61.0

NRMP - USAID Funds	LOP Cost	LOP FX	LOP L.C.	LOP Totals	1992 Cost	1992 Totals	1993 Cost	1993 Totals	1994 Cost	1994 Totals	1995 Cost	1995 Totals	1996 Cost	1996 Totals
PVO PROJECT SUPPORT		682.0	1150.0	1832.0		331.0		448.0		438.0		438.0		177.0
1. PVO Tech. and Admin. Support		682.0	650.0	1332.0		231.0		348.0		338.0		338.0		77.0
a. Technical Assistance	964.0				120.0		260.0		260.0		260.0		64.0	
b. Office Operations	273.0				26.0		78.0		78.0		78.0		13.0	
c. Equipment/Commodities	95.0				85.0		10.0		0.0		0.0		0.0	
2. Conservation Fund		0.0	500.0	500.0		100.0		100.0		100.0		100.0		100.0
a. NGO/Commun. Proj. Grants	500.0				100.0		100.0		100.0		100.0		100.0	
Summary by Budget Category														
Technical Assistance	964.0				120.0		260.0		260.0		260.0		64.0	
Equipment/Commodities	95.0				85.0		10.0		0.0		0.0		0.0	
Program Operations	773.0				126.0		178.0		178.0		178.0		113.0	
Total				1832.0		331.0		448.0		438.0		438.0		177.0

NRMP - USAID Funds	L O P Cost	L O P FX	L O P L.C.	L O P Totals	1992 Cost	1992 Totals	1993 Cost	1993 Totals	1994 Cost	1994 Totals	1995 Cost	1995 Totals	1996 Cost	1996 Totals
PROJECT COORDINATION AND MANAGEMENT		957.0	370.0	1327.0		157.0		306.0		398.0		262.0		204.0
1. GOB Project Coordination		0.0	160.0	160.0		20.0		40.0		40.0		40.0		20.0
a. Technical Assistance	160.0				20.0		40.0		40.0		40.0		20.0	
2. USAID Project Management		592.0	210.0	802.0		77.0		212.0		212.0		212.0		89.0
a. Technical Assistance	752.0				68.0		200.0		200.0		200.0		84.0	
b. Office Expenses	50.0				9.0		12.0		12.0		12.0		5.0	
3. USAID Direct Project Support		180.0	0.0	180.0		60.0		54.0		56.0		10.0		0.0
a. Technical Assistance	180.0				60.0		54.0		56.0		10.0		0.0	
4. Audit and Evaluation		185.0	0.0	185.0		0.0		0.0		90.0		0.0		95.0
a. Non-Federal Audits	90.0				0.0		0.0		45.0		0.0		45.0	
b. Evaluations	95.0				0.0		0.0		45.0		0.0		50.0	
Summary by Budget Category														
Technical Assistance	1092.0				148.0		294.0		296.0		250.0		104.0	
Program Operations	50.0				9.0		12.0		12.0		12.0		5.0	
Audits	90.0				0.0		0.0		45.0		0.0		45.0	
Evaluations	95.0				0.0		0.0		45.0		0.0		50.0	
Total				1327.0		157.0		306.0		308.0		262.0		109.0

NRMP - USAID Funds	L O P Cost	L O P FX	L O P L.C.	L O P Totals	1992 Cost	1992 Totals	1993 Cost	1993 Totals	1994 Cost	1994 Totals	1995 Cost	1995 Totals	1996 Cost	1996 Totals
PROJECT TOTALS BY BUDGET CATEGORY		5734.7	2764.1	8498.8		2108.9		2186.3		2147.2		1438.8		617.7
Technical Assistance				3864.5		738.5		1121.5		1082.5		732.5		189.5
Training				1616.0		261.0		411.0		504.5		330.5		109.0
Equipment/Commodities				959.0		794.0		125.0		35.0		5.0		0.0
Construction				60.0		0.0		60.0		0.0		0.0		0.0
Program Operations				1133.0		215.0		270.0		240.0		240.0		168.0
Audit and Evaluation				185.0		0.0		0.0		90.0		0.0		95.0
Inflation and Contingency				681.3		100.4		198.8		195.2		130.8		56.2

NATURAL RESOURCES MANAGEMENT AND PROTECTION
Host Country Contributions

Element I	Type	LOP No.	LOP Cost	LOP Totals	1992 No.	1992 Cost	1992 Totals	1993 No.	1993 Cost	1993 Totals	1994 No.	1994 Cost	1994 Totals	1995 No.	1995 Cost	1995 Totals	1996 No.	1996 Cost	1996 Totals
ENVIRONMENTAL MONITORING AND PLANNING				745.0			74.0			149.5			179.0			170.0			172.5
1. Institutional Development				585.0			42.0			117.5			147.0			138.0			140.5
a. Counterpart Personnel				425.0			25.0			75.0			100.0			100.0			125.0
DCE Staff Increases	Local py	17.0	425.0		1.0	25.0		3.0	75.0		4.0	100.0		4.0	100.0		5.0	125.0	
		0.0	0.0																
		0.0	0.0																
		0.0	0.0																
b. Training Salaries/Airfares				140.0			17.0			37.5			42.0			33.0			10.5
Univ. Scholarships	US py	12.0	123.0		1.0	10.5		3.0	31.0		4.0	40.0		3.0	31.0		1.0	10.5	
GIS Training	US/Rg pm	6.0	7.0		3.0	3.5		3.0	3.5										
ST Training	US/Rg pm	2.0	2.0		1.0	1.0		1.0	1.0										
ST Training	Local pm	8.0	8.0		2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0				
c. Equipment				20.0			0.0			5.0			5.0			5.0			5.0
Office/Communications	var		20.0			0.0			5.0			5.0			5.0			5.0	
2. Environmental Monitoring				50.0			10.0			10.0			10.0			10.0			10.0
a. Counterpart Personnel (Included in Activity I)				0.0			0.0			0.0			0.0			0.0			0.0
b. Equipment				0.0			0.0			0.0			0.0			0.0			0.0
c. Program Operations				50.0			10.0			10.0			10.0			10.0			10.0
Spec. Studies/M-use Plans	var		50.0			10.0			10.0			10.0			10.0			10.0	
3. Public Awareness				110.0			22.0			22.0			22.0			22.0			22.0
a. Counterpart Personnel (Included in Activity I)				0.0			0.0			0.0			0.0			0.0			0.0
b. Equipment				10.0			2.0			2.0			2.0			2.0			2.0
A/V Equip. & Airtime	var		10.0			2.0			2.0			2.0			2.0			2.0	
c. Program Operations				100.0			20.0			20.0			20.0			20.0			20.0
PA Programs		5.0	50.0		1.0	10.0		1.0	10.0		1.0	10.0		1.0	10.0		1.0	10.0	
Public Forum/Workshops		5.0	50.0		1.0	10.0		1.0	10.0		1.0	10.0		1.0	10.0		1.0	10.0	

NATURAL RESOURCES MANAGEMENT AND PROTECTION
Host Country Contributions

Element 2	Type	L O P No.	L O P Cost	L O P Totals	1992 No.	1992 Cost	1992 Totals	1993 No.	1993 Cost	1993 Totals	1994 No.	1994 Cost	1994 Totals	1995 No.	1995 Cost	1995 Totals	1996 No.	1996 Cost	1996 Totals
SUSTAINABLE AGRICULTURAL PRODUCTION				704.6			110.7			151.7			181.2			156.0			105.0
1. Institutional Development				160.5			13.0			33.5			63.0			41.0			10.0
a. Training Salaries/Airfares				160.5			13.0			33.5			63.0			41.0			10.0
Univ. Scholarships	US py	15.0	153.0		1.0	10.5		3.0	31.0		6.0	60.5		4.0	41.0		1.0	10.0	
ST Training	US/Rg pm	6.0	7.5		2.0	2.5		2.0	2.5		2.0	2.5							
2. SAP Program - PVO				544.1			97.7			118.2			118.2			115.0			95.0
a. Counterpart Personnel				535.0			95.0			115.0			115.0			115.0			95.0
Min. of Agriculture	equiv py	5.0	125.0		1.0	25.0		1.0	25.0		1.0	25.0		1.0	25.0		1.0	25.0	
LNGOs/Communities	equiv py	10.0	150.0		2.0	30.0		2.0	30.0		2.0	30.0		2.0	30.0		2.0	30.0	
PVO & Volunteers	equiv py	6.5	260.0		1.0	40.0		1.5	60.0		1.5	60.0		1.5	60.0		1.0	40.0	
b. Training (Salaries, etc.)				9.1			2.7			3.2			3.2			0.0			0.0
Farmer Training	US/Rg pm	11.0	5.5		3.0	1.5		4.0	2.0		4.0	2.0							
Workshops/Field Days	Local pm	3.6	3.6		1.2	1.2		1.2	1.2		1.2	1.2							
c. Equipment/Commodities				0.0			0.0			0.0			0.0			0.0			0.0

NATURAL RESOURCES MANAGEMENT AND PROTECTION
Host Country Contributions

Element 3	Type	LOP No.	LOP Cost	LOP Totals	1992 No.	1992 Cost	1992 Totals	1993 No.	1993 Cost	1993 Totals	1994 No.	1994 Cost	1994 Totals	1995 No.	1995 Cost	1995 Totals	1996 No.	1996 Cost	1996 Totals
FORESTRY DEVELOPMENT				1761.1			229.5			344.0			419.7			400.7			367.2
1. Institutional Development				928.5			164.5			189.0			215.5			196.5			163.0
a. Counterpart Personnel				437.5			87.5			87.5			87.5			87.5			87.5
Dep. of Lands	equiv py	7.5	187.5		1.5	37.5		1.5	37.5		1.5	37.5		1.5	37.5		1.5	37.5	
DOF, Forest Opns.	equiv py	5.0	125.0		1.0	25.0		1.0	25.0		1.0	25.0		1.0	25.0		1.0	25.0	
Conserv. Div.	equiv py	5.0	125.0		1.0	25.0		1.0	25.0		1.0	25.0		1.0	25.0		1.0	25.0	
b. Training Salaries/Airfares				225.0			27.0			47.5			74.0			55.0			21.5
Univ. Scholarships	US py	15.0	153.0		1.0	10.5		3.0	31.0		6.0	60.0		4.0	41.0		1.0	10.5	
GIS Training	US/Rg pm	4.0	5.0		2.0	2.5		2.0	2.5										
ST Training	US/Rg pm	9.0	11.0		2.0	2.5		2.0	2.5		2.0	2.5		2.0	2.5		1.0	1.0	
ST Training	Local pm	6.0	6.0		1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5				
Environ. Ed. Grants			50.0			10.0			10.0			10.0			10.0			10.0	
c. Equipment/Matls./Facilities				266.0			50.0			54.0			54.0			54.0			54.0
Training Mat'l.	var		12.0						3.0			3.0			3.0			3.0	
Office/Computer supplies	var		14.0			2.0			3.0			3.0			3.0			3.0	
CDC Space and Util.	mo.		240.0		12.0	48.0		12.0	48.0		12.0	48.0		12.0	48.0		12.0	48.0	
2. Protected Areas Program				113.0			21.0			23.0			23.0			23.0			23.0
a. Counterpart Personnel				100.0			20.0			20.0			20.0			20.0			20.0
Dep. of Forestry	equiv py	5.0	100.0		1.0	20.0		1.0	20.0		1.0	20.0		1.0	20.0		1.0	20.0	
(Other counterparts included in Activity 1)																			
b. Equipment/Commodities				13.0			1.0			3.0			3.0			3.0			3.0
Matls/Maps & Aerial Photos	var		8.0			0.0			2.0			2.0			2.0			2.0	
Educ. Matls./Svcs.	var		5.0			1.0			1.0			1.0			1.0			1.0	
3. Boundary Demarcation Program				719.6			44.0			132.0			181.2			181.2			181.2
a. Counterpart Personnel				610.0			40.0			120.0			150.0			150.0			150.0
Forest Guards	equiv py	61.0	610.0		4.0	40.0		12.0	120.0		15.0	150.0		15.0	150.0		15.0	150.0	
b. Equipment/Commodities				61.0			4.0			12.0			15.0			15.0			15.0
Equip./Matl. for Guards	py	61.0	30.5		4.0	2.0		12.0	6.0		15.0	7.5		15.0	7.5		15.0	7.5	
Vehicle Fuel/lube/tires	py	61.0	30.5		4.0	2.0		12.0	6.0		15.0	7.5		15.0	7.5		15.0	7.5	
c. Construction				3.6						0.0			1.2			1.2			1.2
Guard Station Maintenance		36.0	3.6								12.0	1.2		12.0	1.2		12.0	1.2	
d. Program Operations				45.0			0.0			0.0			15.0			15.0			15.0
Survey & Boundary Work	Local pm	30.0	45.0								10.0	15.0		10.0	15.0		10.0	15.0	

NATURAL RESOURCES MANAGEMENT AND PROTECTION
Host Country Contributions

Element 4	Type	L O P No.	L O P Cost	L O P Totals	1992 No.	1992 Cost	1992 Totals	1993 No.	1993 Cost	1993 Totals	1994 No.	1994 Cost	1994 Totals	1995 No.	1995 Cost	1995 Totals	1996 No.	1996 Cost	1996 Totals
PVO PROJECT SUPPORT				299.9			56.4			68.1			67.1			67.1			41.0
1. PVO Tech. and Admin. Support				133.2			23.1			34.8			33.8			33.8			7.7
a. Counterpart Personnel				0.0			0.0			0.0			0.0			0.0			0.0
(Included in other elements)		0.0	0.0																
b. PVO Contribution				133.2			23.1			34.8			33.8			33.8			7.7
Home Office Costs		0.0	133.2			23.1			34.8			33.8			33.8			7.7	
c. Equipment/Commodities				0.0			0.0			0.0			0.0			0.0			0.0
2. Conservation Fund				166.7			33.3			33.3			33.3			33.3			33.3
a. NGO/Commun. Proj. Grants	3:1 match			166.7			33.3			33.3			33.3			33.3			33.3

NATURAL RESOURCES MANAGEMENT AND PROTECTION
Host Country Contributions

Element 5	Type	LOP No.	LOP Cost	LOP Totals	1992 No.	1992 Cost	1992 Totals	1993 No.	1993 Cost	1993 Totals	1994 No.	1994 Cost	1994 Totals	1995 No.	1995 Cost	1995 Totals	1996 No.	1996 Cost	1996 Totals
PROJECT COORDINATION AND MANAGEMENT				69.5			12.5			12.5			15.5			11.0			18.0
1. GOB Project Coordination				45.0			9.0			9.0			9.0			9.0			9.0
a. Counterpart Personnel Coordinating Committee	equiv py	1.5	45.0	45.0	0.3	9.0	9.0	0.3	9.0	9.0	0.3	9.0	9.0	0.3	9.0	9.0	0.3	9.0	9.0
2 USAID Project Management				0.0			0.0			0.0			0.0			0.0			0.0
a. Counterpart Personnel (Included in other Elements)				0.0			0.0			0.0			0.0			0.0			0.0
b. Office Expenses	mo.			0.0			0.0			0.0			0.0			0.0			0.0
3. USAID Direct Project Support				4.5			1.5			1.5			1.5			0.0			0.0
a. Counterpart Personnel Dep. of Fisheries (Other counterparts included in other Elements)	pm	1.5	4.5	4.5	0.5	1.5	1.5	0.5	1.5	1.5	0.5	1.5	1.5			0.0			0.0
4. Audit and Evaluation				20.0			2.0			2.0			5.0			2.0			9.0
a. GOB AG Audits				10.0			2.0			2.0			2.0			2.0			2.0
b. Evaluations				10.0									3.0						7.0
SUBTOTALS ELEMENTS 1-5				3580.1			483.1			725.8			862.5			804.8			703.7

Element 6	Type	LOP No.	LOP Cost	LOP Totals	1992 No.	1992 Cost	1992 Totals	1993 No.	1993 Cost	1993 Totals	1994 No.	1994 Cost	1994 Totals	1995 No.	1995 Cost	1995 Totals	1996 No.	1996 Cost	1996 Totals
INFLATION AND CONTINGENCIES				333.9			24.2			72.6			86.3			80.5			70.4
1. Inflation				154.8			0.0			36.3			43.1			40.2			35.2
2. Contingencies				173.0			24.2			36.3			43.1			40.2			35.2
GRAND TOTAL PROJECT				3913.9			507.3			798.4			948.8			885.3			774.1

38

NRMP - Host Country	L O P		1992		1993		1994		1995		1996	
	No.	Cost Totals	No.	Cost Totals	No.	Cost Totals	No.	Cost Totals	No.	Cost Totals	No.	Cost Totals
ENVIRONMENTAL MONITORING AND PLANNING		745.0		74.0		149.5		179.0		170.0		172.5
1. Institutional Development		585.0		42.0		117.5		147.0		138.0		140.5
a. Counterpart Personnel		425.0		25.0		75.0		100.0		100.0		125.0
b. Training Salaries/Airfares		140.0		17.0		37.5		42.0		33.0		10.5
c. Equipment		20.0		0.0		5.0		5.0		5.0		5.0
2. Environmental Monitoring		50.0		10.0		10.0		10.0		10.0		10.0
a. Counterpart Personnel		0.0		0.0		0.0		0.0		0.0		0.0
b. Equipment		0.0		0.0		0.0		0.0		0.0		0.0
c. Program Operations		50.0		10.0		10.0		10.0		10.0		10.0
3. Public Awareness		110.0		22.0		22.0		22.0		22.0		22.0
a. Counterpart Personnel		0.0		0.0		0.0		0.0		0.0		0.0
b. Equipment		10.0		2.0		2.0		2.0		2.0		2.0
c. Program Operations		100.0		20.0		20.0		20.0		20.0		20.0
Summary by Budget Category												
Counterpart Personnel		425.0		25.0		75.0		100.0		100.0		125.0
Training Salaries/Airfares		140.0		17.0		37.5		42.0		33.0		10.5
Equipment/Commodities		30.0		2.0		7.0		7.0		7.0		7.0
Program Operations		150.0		30.0		30.0		30.0		30.0		30.0
Total		745.0		74.0		149.5		179.0		170.0		172.5

NRMP - Host Country	L O P		1992		1993		1994		1995		1996	
		Cost Totals		Cost Totals		Cost Totals		Cost Totals		Cost Totals		Cost Totals
SUSTAINABLE AGRICULTURAL PRODUCTION		704.6		110.7		151.7		181.2		156.0		105.0
1. Institutional Development		160.5		13.0		33.5		63.0		41.0		10.0
a. Training Salaries/Airfares	160.5		13.0		33.5		63.0		41.0		10.0	
2. SAP Program - PVO		544.1		97.7		118.2		118.2		115.0		95.0
a. Counterpart Personnel	535.0		95.0		115.0		115.0		115.0		95.0	
b. Training (Salaries, etc.)	9.1		2.7		3.2		3.2		0.0		0.0	
c. Equipment/Commodities	0.0		0.0		0.0		0.0		0.0		0.0	
Summary by Budget Category												
Counterpart Personnel	535.0		95.0		115.0		115.0		115.0		95.0	
Training (Salaries, etc.)	169.6		15.7		36.7		66.2		41.0		10.0	
Equipment/Commodities	0.0		0.0		0.0		0.0		0.0		0.0	
Total		704.6		110.7		151.7		181.2		156.0		105.0

NRMP - Host Country	L O P Cost Totals	1992 Cost Totals	1993 Cost Totals	1994 Cost Totals	1995 Cost Totals	1996 Cost Totals
FORESTRY DEVELOPMENT	1761.1	229.5	344.0	419.7	400.7	367.2
1. Institutional Development	929.5	164.5	189.0	215.5	196.5	163.0
a. Counterpart Personnel	437.5	87.5	87.5	87.5	87.5	87.5
b. Training Salaries/Airfares	225.0	27.0	47.5	74.0	55.0	21.5
c. Equipment/Matls./Facilities	266.0	50.0	54.0	54.0	54.0	54.0
2. Protected Areas Program	113.0	21.0	23.0	23.0	23.0	23.0
a. Counterpart Personnel	100.0	20.0	20.0	20.0	20.0	20.0
b. Equipment/Commodities	13.0	1.0	3.0	3.0	3.0	3.0
3. Boundary Demarcation Program	719.6	44.0	132.0	181.2	181.2	181.2
a. Counterpart Personnel	610.0	40.0	120.0	150.0	150.0	150.0
b. Equipment/Commodities	61.0	4.0	12.0	15.0	15.0	15.0
c. Construction/Maintenance	3.6	0.0	0.0	1.2	1.2	1.2
d. Program Operations	45.0	0.0	0.0	15.0	15.0	15.0
Summary by Budget Category						
Counterpart Personnel	1147.5	147.5	227.5	257.5	257.5	257.5
Training Salaries/Airfares	225.0	27.0	47.5	74.0	55.0	21.5
Equipment/Commodities	340.0	55.0	69.0	72.0	72.0	72.0
Construction/Maintenance	3.6	0.0	0.0	1.2	1.2	1.2
Program Operations	45.0	0.0	0.0	15.0	15.0	15.0
Total	1761.1	229.5	344.0	419.7	400.7	367.2

NRMP - Host Country	L O P Cost Totals	1992 Cost Totals	1993 Cost Totals	1994 Cost Totals	1995 Cost Totals	1996 Cost Totals
PVO PROJECT SUPPORT	299.9	56.4	68.1	67.1	67.1	41.0
1. PVO Tech. and Admin. Support	133.2	23.1	34.8	33.8	33.8	7.7
a. Counterpart Personnel	0.0	0.0	0.0	0.0	0.0	0.0
b. PVO Contribution (HQ costs)	133.2	23.1	34.8	33.8	33.8	7.7
c. Equipment/Commodities	0.0	0.0	0.0	0.0	0.0	0.0
2. Conservation Fund	166.7	33.3	33.3	33.3	33.3	33.3
a. NGO/Commun. Proj. Grants match	166.7	33.3	33.3	33.3	33.3	33.3
Summary by Budget Category						
Counterpart Personnel	0.0	0.0	0.0	0.0	0.0	0.0
Equipment/Commodities	0.0	0.0	0.0	0.0	0.0	0.0
Program Operations	299.9	56.4	68.1	67.1	67.1	41.0
Total	299.9	56.4	68.1	67.1	67.1	41.0

NRMP - Host Country	L O P Cost Totals	1992 Cost Totals	1993 Cost Totals	1994 Cost Totals	1995 Cost Totals	1996 Cost Totals
PROJECT COORDINATION AND MANAGEMENT	69.5	12.5	12.5	15.5	11.0	18.0
1. GOB Project Coordination	45.0	9.0	9.0	9.0	9.0	9.0
a. Counterpart Personnel	45.0	9.0	9.0	9.0	9.0	9.0
2. USAID Project Management	0.0	0.0	0.0	0.0	0.0	0.0
a. Counterpart Personnel	0.0	0.0	0.0	0.0	0.0	0.0
b. Office Expenses	0.0	0.0	0.0	0.0	0.0	0.0
3. USAID Direct Project Support	4.5	1.5	1.5	1.5	0.0	0.0
a. Counterpart Personnel	4.5	1.5	1.5	1.5	0.0	0.0
4. Audit and Evaluation	20.0	2.0	2.0	5.0	2.0	9.0
a. GOB AG Audits	10.0	2.0	2.0	2.0	2.0	2.0
b. Evaluations	10.0	0.0	0.0	3.0	0.0	7.0
Summary by Budget Category						
Counterpart Personnel	49.5	10.5	10.5	10.5	9.0	9.0
Program Operations	0.0	0.0	0.0	0.0	0.0	0.0
Audits	10.0	2.0	2.0	2.0	2.0	2.0
Evaluations	10.0	0.0	0.0	3.0	0.0	7.0
Total	69.5	12.5	10.5	10.5	9.0	9.0

NRMP - Host Country	L O P Cost Totals	1992 Cost Totals	1993 Cost Totals	1994 Cost Totals	1995 Cost Totals	1996 Cost Totals
PROJECT TOTALS BY BUDGET CATEGORY	3913.9	507.3	798.4	948.8	885.3	774.1
Counterpart Personnel	2157.0	278.0	428.0	483.0	481.5	486.5
Training Salaries/Airfares, etc.	534.6	59.7	121.7	182.2	129.0	42.0
Equipment/Matls./Facilities	370.0	57.0	76.0	79.0	79.0	79.0
Construction/Maintenance	3.6	0.0	0.0	1.2	1.2	1.2
Program Operations	494.9	86.4	98.1	112.1	112.1	86.0
Audit and Evaluation	20.0	2.0	2.0	5.0	2.0	9.0
Inflation and Contingency	333.9	24.2	72.6	86.3	80.5	70.4

EPMMPLN

Natural Resources Management & Protection
(A.I.D. Project 505-0043)

Environmental Planning & Monitoring Component
(EPMM)

	Outputs	Yr 1				Yr 2				Yr 3				Yr 4				Yr 5				Responsible
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
A.	DOE formulate a policy strategy on the environment, defining policies and objectives, and develop environmental quality standards and enabling legislation for enforcement.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	MTE, GOB, ST TA
A.1.	Begin review of ministerial responsibilities and legislation.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Local TA
A.2.	Assist in review process for development concession applications.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	MTE & local TA
A.3	Continue review of legislation governing natural resource management.	.	X	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	MTE, MNR, MAF
A.4.	Determine natural resource management jurisdiction and identify gaps.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	MTE, MNR & LNGO
A.5.	Assist in formulating policy strategy, defining policies and objectives.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Intl PVO, USAID,
A.6.	Develop specific environmental quality standards and enabling legislation for enforcement.	X	X	X	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Intl PVO, USAID,
B.	Building infrastructure in DOE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
B.1.	Create effective management structure.	X	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	GOB
B.2.	Identify staff profile needs	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	GOB; LNGOs; Intl
B.3.	Hire staff	.	.	X	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	GOB
B.4.	Train staff DOE, MOM, LNGOs in effluent and chemical monitoring, collection and analysis, survey techniques, reporting requirements, hazardous waste management	.	.	X	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Intl PVO
B.5.	Establish environmental data base.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	GOB; LNGO; Intl P
B.6.	Train staff in benefit/cost analysis information management.	.	.	X	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	USAID; CATTE

EP&MIMPLN

Natural Resources Management & Protection
(A.I.D. Project 505-0043)

Environmental Planning & Monitoring Component
(EP&M)

Outputs (page 2)		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Responsible
B.7.	Procure vehicles.	. . . .	. . . .	. . . .	. . . .	. . . .	Intl PVO, USAID
B.8.	Identify appropriate lab, facility, stock as appropriate.	. . X X	. . . .	. . . .	. . . .	. . . .	Intl PVO, USAID
B.9.	Train lab technicians.	. . . X	X X X X	X X . .	. . . .	. . . .	Intl PVO, USAID
C.	DOE and NGO's will have created public awareness for EOC/EIA, planning and monitoring.	. . . .	. . . .	. . . .	. . . .	. . . .	GOB
C.1.	Create awareness among targeted legislatures and public of necessity for appropriate legislation for EOC/EIA.	X X X X	X X X X	X X X X	X X X X	X X X X	GOB, Intl PVO
C.2.	Train GOB/NGO's in environmental planning and community participation strategies, biosphere reserve model.	. X . .	. X . .	. X . .	. X . .	. X . .	Intl PVO, LNGOS
C.3.	Procure training materials, audiovisual equipment for training and PA programs.	. X . .	. X . .	. X . .	. X . .	. X . .	Intl PVO, USAID
D.	DOE, other GOB department and NGO's will be trained in EOA/EIA.	. . . .	. . . .	. . . .	. . . .	. . . .	
D.1.	Institutionalize environmental impact assessment (EIA) procedure.	. . . .	X X X X	X X X X	. . . .	. . . .	MTE, MNR
D1.2.	Meet conditions attached to development agreements.	. . . .	. . . .	. . . .	. . . .	. . . .	GOB
D.3.	Assist in developing technical capability for environmental quality monitoring (EQM.)	X X X X	X X X X	X X . .	X . . .	X . . .	Intl PVO, AID
D.4.	Expand EQM to include NGO's.	. . X X	X X . .	. . . .	. . . .	. . . .	
D.5.	Develop EQM short course training for DOE and NGO's.	. . X .	. . X .	. . X .	. . X .	. . X .	Intl PVO
D.6.	Institutionalize training program in	. . . .	. . . .	. . . .	. . . .	. . . .	

EIA for DOE, GOB, MGO. | . . . . X . . . . X . . . . X . . . . X . . . | Intl PVO & GOB

EPLMIMELW

Natural Resources Management & Protection
(A.I.D. Project 505-0043)

Environmental Planning & Monitoring Component
(EPLM)

	Outputs (page 3)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Responsible
D.7.	Train two BS and 2 MS in Environmental Sciences.	X	X	X	X	X	GOB, USAID
E.	DOE will have monitoring and analysis system in place with GOB and MGO participants.						GOB
E.1.	Collect, collate and analyze existing water quality data.	X					LMGO, Intl PVOs
E.2.	Survey existing water quality capability including personnel, equipment and facilities to identify gaps.	X	X				LMGO, Intl PVOs
E.3.	Locate and upgrade appropriate lab facility for use by GOB departments.						GOB Intl PVO
E.4.	Coordinate water quality monitoring stations among GOB departments.	X	X	X	X	X	GOB
F.	Expand environmental monitoring capability.						GOB
F.1.	Institutionalize systematic monitoring of rivers, wetlands, lagoons, estuaries, and marine environment among GOB departments.	X	X	X	X	X	GOB Intl PVO
F.2.	Expand environmental quality monitoring to include status of priority marine resources.		X	X	X	X	GOB Intl PVO
F.3.	Evaluate monitoring data to assess impact of run off related to changes in land use.	X	X	X	X	X	Intl PVO
F.4.	Perform policy related research for improved forestry, agriculture, tourism and coastal zone management.	X	X				Intl PVO, GOB

144

EP&MIMPLN

Natural Resources Management & Protection
(A.I.D. Project 505-0043)

Environmental Planning & Monitoring Component
(EP&M)

Outputs (page 4)		Yr 1				Yr 2				Yr 3				Yr 4				Yr 5				Responsible
G.	GOB department has installed computer networking system including GIS.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	GOB
G.1.	Survey of networking interest, possible users, training needs, equipment.	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Intl PVO; USAID
G.2.	Identify equipment needs, systems design, location of networking center.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	USAID
G.3.	Procurement of hardware, installation.	.	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	USAID
H.	GOB and NGO are trained in data management, networking including GIS, financial planning.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Equipment provide Intl PVO
H.1.	Long term academic training in information management, data entry and retrieval for two persons.	X	X	X	X	X	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	USAID
H.2.	Short term US and short term regional training in information management and networking.	.	.	X	X	.	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	GOB; USAID
H.3.	Procure T/A to train through periodic workshops.	.	.	.	X	.	.	.	X	.	.	.	X	.	.	.	.	.	.	.	.	USAID
H.4.	T/A short courses and workshops.	.	.	.	X	.	.	.	X	.	.	.	X	.	.	.	X	.	.	.	X	USAID & CATIE
H.5.	Consultant for training in financial management, recurrent costs, user fees.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	USAID
H.6.	Consultant for review analysis and evaluation of networking.	.	.	.	X	.	.	.	X	.	.	.	X	.	.	.	.	.	.	.	.	USAID
I.	Develop public awareness campaign.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	GOB; Intl PVO
I.1.	Training in computer graphics.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Intl PVO
I.2.	Public awareness campaign.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	GOB, Intl PVO
J.	Special studies/analyses.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	LNGOs
J.1.	T/A for special studies consultant through REMARM.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	LNGOs

SAFIMFLN

Natural Resources Management & Protection
(A.I.D. Project 505-0043)

Sustainable Agricultural Component
(SAP)

Outputs	Yr 1				Yr 2				Yr 3				Yr 4				Yr 5				Responsible
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
A. Individual farmers located in and around protected areas are adopting sustainable cropping systems and soil conservation practices.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Intl PVO, w/ LNGO support and coordination of GOB
	.	.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
A.1. Resident advisors contracted, local field staff hired and oriented	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	USAID & GOB
	.	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
A.2. Rapid cadastral survey conducted by LNGO	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	LNGO
	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
A.3. Cropping & soils profiles developed	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Intl PVO,
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
A.4. Community organization, tenure status gender issues, cultural and social characteristics identified	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Intl PVO
A.5. Initial technical assistance program developed focusing on:	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
	.	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Intl PVO
o Alternative crop mixes;	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
o Recommendations on IPM	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
o Soil conservation practices	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
o Replicable experiences from existing LNGO activities	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
A.6. Target areas delineated, 'hot spots' pinpointed, including:	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
	.	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Intl PVO
o Extent of degradation, NR depletion and vulnerability of protected areas	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
o Impact of large and small farmer on E/NR base	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
A.7. Individual work plans of priority areas	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Revised (R) annually by Intl PVO & GOB
	.	.	.	X	.	.	.	R	.	.	.	R	.	.	.	R	.	.	.	R	
A.8. Staff training support plan developed	.	.	X	.	.	.	X	.	.	.	X	.	.	.	X	.	.	.	X	.	Intl PVO

Natural Resources Management & Protection
(A.I.D. Project 505-0043)

Sustainable Agricultural Component
(SAE)

Outputs	Yr 1				Yr 2				Yr 3				Yr 4				Yr 5				Responsible
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
B. Critical skills training required for staff, career agricultural extension and long term training needed in sustainable agricutural technology is underway.	.	.	X	.	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	X	Provided intermittently by Intl PVO
B.1. Short courses, workshops, field days and farmer exchanges are taking place	.	.	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	X	
B.2. Training related to extending sustainable agricultural production technology is being offered to field staff	.	.	.	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	
B.3. Specific workshops in integrated pest management, soil conservation practices, and post harvest technology is being given to field staff	.	.	.	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	X	.	
B.4. Long term academic training program is being implemented in conjunction with Mission CAPS Program	X	X	X	X	X	X	X	X	X	X	X	X	.	.	.	.	.	.	.	.	USAID/Intl PVO/GOE
B.5. Acquire training materials, supplies and audio-visual equipment and incorporate use of these resources into training and extension activities	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	USAID/Intl PVO

Natural Resources Management & Protection
(A.I.D. Project 505-0043)

Forestry Development Component
(FD)

Outputs		Yr 1				Yr 2				Yr 3				Yr 4				Yr 5				Responsible
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
A.	GOB and the Belizean conservation LNGOs have enough qualified staff to maintain and manage the declared protected areas have complementary mandates, have the necessary tools and are working harmoniously together towards the management of these areas.																					
A.1.	In collaboration with WWF, advise and assist the Conservation Division of the FD in evolving its strategy and work plans, including the division of tasks with the NGO's.		X	X		X	X															Conservation Division
A.2.	Advise and assist the Belizean conservation NGO's in developing their strategy and work plans, as a complement to the government role.		X	X		X	X															RENARM Consortium
A.3.	Assist Belizean conservation NGO's in improving their managerial and administrative capacity.		X	X			X	X				X	X									Intl PVO & RENARM
A.4.	Assign six academic scholarships for study related to forest conservation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						CD; USAID
A.5.	Send personnel from CD and NGO's to short courses, seminars and workshops abroad, for training related to planning/management of protected areas.		X	X	X	X	X	X	X	X	X	X	X	X	X	X						CD; USAID
A.6.	Conduct short-courses to be given in Belize, for the guard/ranger level, covering protected area management, community relations, law enforcement.					X	X			X	X			X	X			X	X			RENARM Consortium
A.7.	Send personnel from CD and NGO's abroad on internships in protected area management (total max. 4 person-months/year)		X	X			X	X			X	X			X	X			X	X		RENARM Consortium

Natural Resources Management & Protection
(A.I.D. Project 505-0043)

Forestry Development Component
(FD)

Outputs		Yr 1				Yr 2				Yr 3				Yr 4				Yr 5				Responsible
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
*A.8.	Acquire training materials, extension materials and audio-visual equipment, and integrate use of these resources into the training and extension activities of the CD and the NGO's	.	.	.	.	.	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	Conservation Divisi
A.9.	Encourage activation of the Environmental Council which includes the most important constituencies concerned with conservation, and support its operation.	.	.	X	X	.	.	.	X	.	.	.	X	.	.	.	.	.	.	.	.	Conservation Divisi
A.10.	Reach agreement among the interested parties, with respect to goals, work plans, operation and long-term financing of a Conservation Data Center for Belize.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
A.11.	Support creation and operation of a single Conservation Data Center with access to GIS facilities, for collaborative use, to support the work related to protected areas.	.	.	.	.	.	.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Conservation Divisic
A.12.	Strengthen the ability of the NGO's and the CD to raise funds to cover the minimum recurrent costs of the protected areas.	.	.	.	X	X	X	.	.	X	X	.	.	X	X	.	.	.	.	.	.	RENARM Consortium
B.	The number and extent of the protected areas needed to preserve representative critical habitats of Belize are legally fixed in a manner not easily reversible, and are based on objective land use capability studies, present land use, gap analyses and other techniques.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
B.1.	Through refined application of gap analysis, determine habitats currently not protected.	X	X	X	X	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	CD; LNGOs
B.2.	Analyze current land use information and new land suitability studies for	X	X	X	X	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	CD; LNGOs

Natural Resources Management & Protection
(A.I.D. Project 505-0043)

Forestry Development Component
(FD)

Outputs		Yr 1				Yr 2				Yr 3				Yr 4				Yr 5				Responsible
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
	candidate protected areas.																					
B.3.	Analyze type and status of protection forest inside Forest Reserves and possible complementarity to other protected areas.					X	X	X	X													Conservation Division
B.4.	Reach agreement with Forestry Department as to boundary adjustments of Reserves to accomodate protected areas, and make boundaries compatible with archeological sites, mining activities, and activities in buffer zones.					X	X	X	X													Conservation Division
B.5.	Using a synoptic approach for the whole country, prepare a conservation land use plan which delineates tentative boundaries of existing and proposed protected areas on map and justifies their location.					X	X	X	X	X	X	X										CD; Lands & Surveys;
B.6.	Educate general public as to rationale, value and implications of proposed protected areas.					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	LNGOs
B.7.	Revise ministerial decrees, regulations and agreements for creation of protected areas system based on the proposed boundaries.							X	X			X	X			X	X					Conservation Division
B.8.	Define management criteria for the various categories of protected areas.							X	X	X	X											Conservation Division
B.9.	Educate government officials, legislators and other decision makers with respect to proposed legislation.																					
C.	The threatened segments of the boundaries of the protected areas are delineated in the field, and the areas are adequately patrolled.																					
C.1.	Determine the priority boundaries in	X	X	X																		Conservation Division;

Natural Resources Management & Protection
(A.I.D. Project 505-0043)

Forestry Development Component
(FD)

	Outputs	Yr 1				Yr 2				Yr 3				Yr 4				Yr 5				Responsible
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
	urgent need of protection.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
C.2.	Deploy guards to critical boundaries and equip them.	.	.	.	.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Conservation Division
C.3.	Carry out extension campaign aimed at involving local communities in protection of critical areas.	.	.	.	.	.	.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	LNGOs
C.4.	Reach agreement between government, NGO's and local communities on relative roles and responsibilities for patrol of protected areas.	.	.	X	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Conservation Division;
C.5.	Design funding mechanisms and find long term funding sources to cover recurrent costs of patrolling protected areas.	.	.	.	.	X	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	REMARM Consortium; GO
C.6.	Train guards for government, NGO s and communities, in protection with emphasis on community relations.	.	.	X	X	.	.	X	X	.	.	X	X	.	.	X	X	.	.	.	.	REMARM Consortium; GO;
C.7.	Survey and demarcate those critical segments of boundaries with firm administrative basis so not likely to change.	.	.	.	.	.	.	X	X	X	X	X	X	X	.	.	.	.	.	.	.	Conservation Division;
C.8.	As new boundaries of protected areas are decreed or legislated, survey and demarcate them in the field, in coordination with parallel work being done for Forest Reserves.	.	.	.	.	.	.	.	.	.	X	X	X	X	X	X	X	X	.	.	.	Conservation Division
D.	The system of reserved lands of the Maya Mountains and the surrounding buffer zones have been officially declared a biosphere reserve, whose management is gradually being intensified according to a comprehensive strategy.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
D.1.	Educate the decision makers and the general public about the concept and implications of a biosphere reserve.	.	.	.	.	.	.	X	X	X	X	X	X	.	.	.	.	.	.	.	.	LNGOs

Natural Resources Management & Protection
(A.I.D. Project 505-0043)

Forestry Development Component
(FD)

Outputs		Yr 1				Yr 2				Yr 3				Yr 4				Yr 5				Responsible
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
D.2.	Use the Environmental Council, with representation from government, NGO, local communities and private enterprise, to coordinate activities related to the proposed biosphere reserve.	.	.	.	.	.	.	.	.	X	X	X	X	X	X	X	X	X	X	X	X	Environmental Council
D.3.	Develop a strategy for creation and management of the biosphere reserve, by harmonizing management aims of the Forest Reserves, protected areas and private interests.	.	.	.	.	.	.	.	.	.	.	X	X	.	.	.	.	.	.	.	.	Forestry Department
D.4.	Generate support, including financial, for the strategy in Belize and abroad.	.	.	.	.	.	.	.	.	.	.	X	X	X	X	X	X	X	X	X	X	RENARM Consortium
D.5.	Apply to UNESCO Man and the Biosphere Programme for international designation of the Maya Mountain Biosphere Reserve.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	.	.	.	.	Forestry Department
D.6.	Concentrate land management activities supported by the government, private groups, AID and other donors so as to support the Biosphere Reserve.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X	X	X	X	Environmental Council
E.	The local population near the protected areas, and the Belizean public in general, are aware of the existence, value and need for rational use of the protected areas.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
E.1.	Invite proposals from Belizean NGO's, possibly as joint ventures, for design of a campaign for environmental education, with special emphasis on protected areas.	.	.	.	.	.	X	X	X	X	X	.	.	.	.	.	.	.	.	.	.	RENARM Consortium
E.2.	Select winning proposal, negotiate agreement and monitor environmental work.	.	.	.	.	.	.	.	X	X	X	X	X	X	X	X	X	X	X	X	X	RENARM Consortium
E.3.	Demonstrate the benefits from the protected areas to the population that lives near them, by giving them	.	.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Conservation Division

Natural Resources Management & Protection
(A.I.D. Project 505-0043)

Forestry Development Component
(FC)

Outputs	Yr 1				Yr 2				Yr 3				Yr 4				Yr 5				Responsible
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
preference in all activities that generate income (employment as guards, laborers, guides, concessions, business stimulated by tourist & scientists).																					

153

ASSESSMENT OF GIS SYSTEM FOR LAND TITLING SYSTEM
MINISTRY OF NATURAL RESOURCES/LANDS AND SURVEYS DEPT.

USAID/BELIZE
AGRICULTURAL DEVELOPMENT OFFICE
JEFFREY ALLEN, CAC/NRPM PROJECT OFFICER

AUGUST 1991

DEAN SALPINI, EXECUTIVE REOURCE ASSOCIATES
UNDER CONTRACT TO AID/IRM/CLS

TABLE OF CONTENTS

I. INTRO
II. ASSESSMENT OF EXISTING ENVIRONMENT
-LANDS AND SURVEYS DEPT.
-CURRENT INFORMATION SYSTEMS
-LAND TITLING PROCESS
-CONSERVATION DATA CENTER
-FISHERIES DEPT.
-VENDOR SURVEY
III. LAND INFORMATION SYSTEM
-LIS VS. GIS
-DATA COLLECTION
-DATA INTEGRITY
-SYSTEM IMPLEMENTATION
IV. GIS SYSTEMS
-TYPES OF SPATIAL INFORMATION SYSTEMS
-GIS SOFTWARE
-LIS APPLICABILITY
V. ESRI PROPOSAL
VI. RECOMMENDATIONS
-SYSTEM PREPARATION
-PILOT PROJECT
-LIS IMPLEMENTATION
-SYSTEM SPECIFICATIONS
-MAINTENANCE/SUPPORT
-TRAINING
-PROCUREMENT
-FUTURE OPTIONS
-TECHNICAL SUPPORT
VII. CONCLUSION

APPENDICES
-GIS SYSTEM CONFIGURATION
-GIS TRAINING AND TECHNICAL SUPPORT
-LIS FLOOR PLAN
-LANDS & SURVEYS DEPT ORG CHART

INTRO

The purpose of this two-week TDY was to assess the need for a GIS system at the Lands and Surveys Dept., under the Ministry of Natural Resources in Belmopan. Officials at the Conservation Division of the Forestry Dept. and Fisheries Dept. were also interviewed regarding their potential use of an expanded GIS system. Mr. Dean Salpini of Executive Resource Associates, Inc., under contract to AID/IRM/CLS, was the analyst performing the assessment.

ASSESSMENT OF EXISTING ENVIRONMENT

Lands & Surveys Dept.

The Lands and Surveys Dept (L&S) is one of the primary departments within the Ministry of Natural Resources (MNR) in the Government of Belize (GOB). Their are 8 divisions within this department covering the following functions:

Land Registry
Surveys
Tax
Valuation
Drawing
National Estate
Districts
Lands Officers

The primary function of this department is to manage public lands in Belize. Thus, they handle land registration, titling, surveying mapping and valuation for tax purposes. The bulk of their professional staff are surveyors, draftsman, land officers, and land inspectors without formal college degrees (full surveyors do have 3yr degrees and some lands officers have BS degrees). Between the Lands and Surveys Divisions, there are some 50 of these positions with 13 surveyors represented. Current staff levels are expected to increase approx. 10-15% over their current complement in 1992, depending on actual budget amounts approved. Further, under a proposed reorganization, the land information center (LIC) will be created to merge some surveying, physical planning and land information system functions together into a new division. Most other divisions will remain the same although some additional computer science or mathematics oriented personnel are envisioned to be recruited.

To incorporate the staff and equipment for the new LIC, the Ministry of Natural Resources has budgeted BZ250,000 ($125,000) for Land Registration activities and BZ200,000 ($100,000) for Extension of the Ministry Building. In addition, some new surveyor technicians and planning teams are being budgeted for once the total functionality of the unit is known. Thus, it is clear that the MNR has made a committment to creating a land information

system.

Current Information Systems

Though the current land titling process is very labor intensive and involves numerical calculations, they presently use only calculators for the surveyors and one PC 286 computer for transforming land coordinates to Universal Transverse Mercator (UTM) system and tracking private surveyor's data. There are two other PCs in the Ministry, but only one is now used for word processing and spreadsheet applications; the other is not working properly. Computer literacy is only just beginning to appear throughout both the Lands & Surveys Dept and the Ministry of Natural Resources at large. Mr. Lindsay Belisle, Principal Surveyor, who is probably the most knowledgable of information technology in the MNR, has developed a few small BASIC language and dbase III applications on his PC. Also, one other staff member appears to have been even exposed to computer systems through an effort to develop an information system for the National Estate Section. This application was never implemented and required loaned computer resources from the GOB Computer Center. There may be one or two staff in the MNR overall with any exposure to computers.

At this point, all land parcel files and maps are stored in cabinets and manually indexed and accessed. The parcel files are stored by registration block, registration section and parcel no. within the particular section (eg, block 45, Toledo section, parcel no. 1861). They have indexes by owner names and registration sections, which allow them to speed up basic searches. However, they do not keep actual survey plot drawings with the parcel file; rather they merely refer to the specific plot by area and number compiled on a map of several land plots or development zone (eg, area with 25-30 plots with roads and other physical data displayed). This would seem to add some confusion regarding actual area owned by a title (ie, 1/2 acre vs. 1 acre, boundaries for improvements, location of easements, mineral rights, etc).

The actual survey maps themselves are stored in multiple rooms due to their size and number. For areas already "declared" by the GOB, there are approx. 1000 maps in good condition developed under the UTM coordinate system. There are another approx. 1700 maps done from isolated surveys during the past 50-60 yrs which are not under the UTM system, and are on parchment or other materials that are degrading. Finally, there are an additional 2000-2500 maps that are more recent and are a mixture of UTM and non-UTM standard coordinates on mylar or other longer-lasting map materials. The physical sizes (eg, 2'x4') and scale (eg, 1:1,000) varies greatly among these maps leading to some difficulty in comparing land information. As requested, individual parcel lot descriptions are drawn as "rough sketches" to respond to title inquiries. These are not highly detailed or accurate enough for boundary delineations, however.

All other functions from the tax valuation to revenue collection are done manually (as also described in detail in the Hyde Report, 1989). Further, it is clear that accurate tax assessments and lease payment terms would be enhanced by better land parcel information. In the Drawing and Mapping Sections, all drafting work and map production is done manually with drafting tools. This results in somewhat of a further delay since one map may take several days to complete.

Land Titling Process

The land titling process (as described by Hyde Report and Mr. Belisle) begins with designation of a new area as "declared area". This requires private lands to become registered within this zone and all owners to file an application for first registration listing all physical information regarding the parcel. Then, the adjudication process begins including verifying boundaries, resolving property disputes and resurveying the area to UTM coordinates for proper identification. Next, a Registry Index Map (RIM) is drawn up by the Drafting Section. Finally, a lease or title application is completed on the parcel including owner names, district, registration section, block no., parcel no., lot no., etc.

When the title is issued or a lease is executed, the property is added to the tax roles by way of the land registry. The valuation and tax divisions also keep similar owner information in determining the rent or cost of the parcel, and drawing up the payment or sale terms. Tax statements are then mailed to owners with follow-up collections made by the national estate section. Final title is issued after all payments are made and taxes are current.

During this complete process, several forms are completed including parcel information sheet, lease application, survey request, valuation sheet, land register and finally title application (These are described in great length in the Hyde Report as well). As these forms are completed, they become part of the dossier or parcel file folder for each parcel. These folders are then stored by district as stated above. However, at each section or division along the process, similar parcel data is recorded again, lengthening the process unnecessarily and creating a data overlap among divisions.

Conservation Data Center

In discussions with the Conservation Division of the Forestry Dept., it is believed that they could benefit from use of a GIS system in the future. Currently, they have 3 PCs, two IBM PS/2s and one clone PC, which are only used for word processing and spreadsheet applications. The approx. 6 professionals in the Conservation Division have a basic level of computer literacy, yet they obviously could benefit from computer training being offered locally through various vendors. In addition, the conservation

data center envisions visiting researchers, consultants and other private institutions (eg, Smithsonian) needing to access GIS data for conservation purposes (up to 5/day). For example, analysis of the distribution of animals, forest types, zoological inventory and characteristics of various species compared against potential conservation preserve sites. Also, location of major reserves-mountain vs. reef-and wildlife/mangrove preservations will be potential applications for this division since approx. 30% of the land in Belize is reserved for conservation.

As a result of the move to a new building next year, the Forestry Dept. will be located next to the L&S Dept. Thus, this group could link to the GIS system by hard wired cable assuming the distances were not great. However, the Conservation Data Center would be need a remote connection from a PC by modem since they are at least a mile away. As the GIS system becomes implemented, they could make good use of the U.K. team land use planning data as well. In order to be able to use satellite produced, remotely sensed information (such as vegetation, elevation or soil data) in a GIS, an add-on capability for the current package (ARC/INFO) would be needed. This additional package (eg, ERDAS) would handle raster data formats and then possibly convert them in vector format--the type of data ARC/INFO handles. For now though, there needs are for more basic computer training and familiarization with the potential systems applications from their existing data.

Fisheries Dept.

The Fisheries Dept. of the Ministry of Agriculture is also interested in making use of a GIS system. However, currently they have only 3 PCs: IBM PC/XT w/30MB HD; AST 286 w/70MB HD, 1MB RAM; and a Compaq portable. Also, they have two dot matrix, NLQ printers--an Epson FX 1050 wide carriage and Epson FX 85 models. Software includes dbase III+, Lotus 2.2, WP 5.0 and 5.1, Windows 3.0, Pagemaker, SPSS and Superproject. Despite this reasonable portfolio of programs, a third of the packages are not operational and few staff have computer literacy (approx. 3 of 18). They do have a systems manager who has a BS degree from a Belizean college and has provided some training and developed some small applications for the Dept. For instance, there is a dbase III+ file that provides an index of coastal resources development in the Key Islands. It tracks areas within the each island by owner/lessee, development type, size of parcels and whether reef or fish camps are present. In addition, Fisheries Dept. has an NGO assistant from Jamaica that has done extensive research on fish stocks and uses large Lotus 123 spreadsheets regularly in analyzing fish yields/generation of cohorts. She also uses two assessment modeling programs that work on the PC--LFSA and ELEFEN. However, the research effort she is working on lasts only a few months and no transfer of her knowledge is currently taking place.

One other application of note that they are in the process of developing deals with licensing of commercial fisherman. Although they have a large file of information on those licensed fisherman,

there are several blanks in the database, such as demographic background of licensee, that they want to correct. Further, they are increasing the fee structure and shortening the length of time before renewal (1 yr vs. 3 yrs). This new application will be run on dbase III+ and should help them better analyze the 2500 or so fisherman known to be licensed, and catch some of the other 1000 or so they suspect of fishing without licenses. Finally, they do have some map overlays with data on aquaculture areas, reef designations, shrimp/fish farms, current flows, etc. This information has been partly collected by Fisheries Dept. and part from the U.K. and other studies. It could benefit from a basic mapping package, but does not require the level of GIS system analysis.

In summary, the Fisheries Dept. has a good level of computers and software now and needs to continue automating existing applications and training professionals to make use these tools for decisionmaking. Once some of these other applications are implemented, then they in coordination with other Ministries and/or the University in Belize City, could look at having a remote connection to the GIS system at L&S Dept.

Vendor Survey

During a brief survey of existing computer vendors in Belize, most vendors sold microcomputer products and offered minimal repair and maintenance capability. However, there were 5-7 companies selling computers, such as Wang, IBM, Epson, Tandy and U.S. compatible clones. The cost of a basic PC/286 system seems to be slightly higher than the U.S. (approx. $2000), but six month-one year warranties make up some of the differences. There were also UPS dealers Sola and American Power, and computer training firms providing basic systems and PC packages courses. The Wang dealer was one of the best represented since they have several VS 5000 installations, small maintenance/repair shop and can support Novell LANs (though none were yet installed). Though there was an authorized IBM dealer in-country, they only sell PS/2 microcomputers and have just begun operations last month. IBM/Honduras had sold some System/34 computers to various banks and other businesses, but they were all maintained by IBM/Honduras. Unisys had a similar arrangement with Unisys/Guatemala for a Unix installation with the Belize Telephone Corporation. **Thus, there are no Unix workstation vendors of the type needed to support the GIS computer hardware in Belize. Further, there are very few high-end U.S. computer system vendors represented in Belize.**

The ARC/INFO GIS software is not sold by any vendors in-country. It will need to be supported from the U.S. ESRI will also provide the technical support and training program as discussed under their previous proposal. The workstation would probably be supported from the U.S. as well, although it may be necessary to arrange for maintenance through dealers in Guatemala, Mexico or Honduras.

LAND INFORMATION SYSTEM

LIS vs. GIS

The proposed LIS system will provide a capability to store and retrieve attribute and spatial data regarding land parcels in Belize. This application can also provide spatial relationships of a land parcel or group of parcels with their surrounding municipal boundaries, roads and other basic land marking features. Thus, analysis of a parcel at a scale of 1:1,000 could be combined with review of the neighborhood or section of the city under development at a 1:10,000 or 1:20,000 scale. However, the LIS is merely an information system focused on cadastral data making use of the geographical information system (GIS) software and hardware tools. In effect, the LIS has its own database of spatial and aspatial data, which is a subset of a multi-functional GIS system.

Likewise, other functional areas of study that make use of GIS technology and can be incorporated into a GIS system, such as land use planning, urban planning, infrastructure (sewage, water, electricity), topography, geology, vegetation, wildlife, etc. Each area of study brings with it spatial data collected at various map scales and timeframes that can be overlayed against existing images to identify coverages, boundaries and characteristics. Once these images are corrected and stored, they can be retrieved for comparison against other spatial information to model and project certain behaviors.

Generally, if base cadastral and land development maps are accurate, it is preferable to develop a GIS system based on cadastral information first. Since this level of information is usually at a more precise scale, the additional layers of the GIS can then be added with reference to the base land maps. This also makes "zooming" in from a particular zone or area to specific land parcels a more effective analysis tool. However, it is not recommended to attempt the implementation of both a cadastral-based GIS (LIS) and land use planning-based (soils, topography, watersheds, etc) GIS system at the same time. There is too much room for error and neither system application can be dealt with adequately.

Data Collection

Before any new information system is developed, it is important to identify data sources and clarify data collection procedures. In the case of the LIS, the Lands and Surveys Dept. should eliminate redundant information formats/procedures and identify similar data collected by different divisions. As Mr. Hyde clearly indicated, certain key data fields are evident among land registry, survey, land valuation and tax functions. These elements,

Property owner name
Address
District

Registration Section
Block No.
Parcel No.
Lot No.
Plan No.
Grant No.

could be linked through a relational database management system and several separate--yet common--tables of data. A specific numerical identifier would be assigned to each land parcel for ease of tracking. The database would then be available for queries from multiple divisions within Lands & Surveys Dept.

Once these common elements were determined, one file could could be created for the land parcel and just updated as various stages of approval were reached. However, to be truely useful, the LIS must have some built-in "checks and balances" to protect the data from abuse. The access and authority for quality control procedures should be determined before the system is implemented. Also, initially functional databases could be created and populated by different divisions on other computers and uploaded at a later date, as long as the file formats were compatible. This same principle would apply with other Depts within the MNR and/or other GOB Ministries in the future.

Another important point is data sharing and cooperation, especially if more than one department or ministry is involved. Being overprotective of organizational data can lead to mistrust, lack of confidence in the system and reduced system potential. Thus, agreed upon data exchange procedures and querying access can considerably reinforce the positive effects of a LIS system.

As mentioned by the Hyde Report, certain legislative changes in the adjudication process need to be implemented to reduce title processing as well. According to Mr. Belisle, legislation is now proceeding to be passed in order to resolve disputes quickly and effectively at the district level. Teams of surveyors, inspectors and lands officials will be available to be dispatched to newly "declared areas" for adjudication purposes. Perhaps the increased use of private surveyors could further speed up the titling process since a portion of the backlog relates to a lack of fully-trained survey personnel being staffed at Lands & Surveys Dept.

Data Integrity

Because there are many interests in land transactions in Belize, the potential for manipulation and misuse of land titling data is great. Although the lengthy registration process guarantees that both on-site surveys and an inspection have taken place, it does not assure the owner his file (in its entirety) will not be modified before or after title is issued. Similarly, since many current land transactions go unregistered, the actual owner information may be invalid. Security is not very tight and hand-written documents can be easily forged and amendments made to a

record due to the many steps and staff involved in the recording of a land deed. Therefore, in the proposed land information system (LIS), certain security and quality control features need to be built-in to prevent future alterations of land records. Also, permanent media-based records of both actual plot and title information should be archived for retrieval to verify future claims.

System Implementation

Given the lengthy and complicated process now existing for receiving a title or leasing a government-owned land parcel, the systematic automation of an LIS should provide welcome relief to the MNR. As mentioned above, integration of existing databases into one physical location with multiple files will simplify current reporting procedures and assist with future title searches. The LIS being introduced now, however, will assist the Lands & Surveys Dept to standardize data entry for land registration to better utilize existing resources. For example, the land registry database should be available for querying the status of taxes, lease payments, encumbrances, etc by owner, district, registration section and other elements. An image of the exact lot should be accessable to compare with the attribute information. Thus, many current procedures and the 250,000 estimated records now should be streamlined greatly to ensure proper title registry.

In addition to the establishment of data entry procedures and file formats, the maps and survey plots previously developed must be input into the LIS. This task can be performed through scanning (if map is in good condition), or digitizing by forming polygons of spatial regions across a map. Either method involves significant manhours (up to one month/map sheet in some cases). In fact, according to estimates given by the L&S Dept. surveying staff, with two digitizers being used full-time and approx. two days/map of work, it would take 2 years to complete this task for the UTM system maps only. Therefore, in order to enter this information quicker, ESRI or other data entry option may be worth the additional cost.

To make this LIS a reality, all divisions within L&S Dept will need to form a technical committee to discuss the revised process when the LIS is introduced. The Hyde Report has a good list of possible participants in this system definition effort. From this group also will need to be selected those technically qualified (through aptitude or education) to participate in the LIS training and development pilot project. These staff should be both managers and technicians who could benefit from use of the system. As the system is institutionalized, they will become the trainers of their own staff. It should be further understood, that implementation of the LIS system will not supplant current manual systems, yet. Parallel operations will continue for several months until all pilot data sets have been loaded, tested and successfully used.

GIS SYSTEMS

Types of Spatial Information Systems

In the analysis and development of spatial information systems, there are three basic types or categories: Digital Mapping Systems (DMS), Thematic Mapping Systems (TMS) and Geographic Information Systems (GIS). Each type of system has a different data layer focus, but all have information management, processing and analysis capability. The DMS is for graphic design and automated drafting for architects, builders and map developers. In TMS systems, the focus is on relating spatial and aspatial attribute information simultaneously for decision-making purposes. For example, inputing socio-economic data to a population map to track characteristics in a geographic area. Lastly, a true GIS system performs analysis that combines multiple databases and factors which are too time consuming and costly to be done manually. Examples of these include digital terrain analysis, calculating sun intensity, watersheds, slopes, and overlay of multiple map sheets to clarify land relationships. A GIS is also used for simulations involving conceptual models for evaluation of scientific or policy criteria over periods of time (eg, "What If" inquiries).

It is also important to note that GIS systems (like any other information systems) should be used to better manage data that are already defined and effectively organized. For example, loading a large database of information for each land parcel in Belize into a computer and displaying it graphically will present more data faster, but not resolve data integration or collection problems that invalidate the spatial relationships being shown. Therefore, for a GIS to work, it is necessary to have mapping data that exists in a digital format, defined procedures for collecting, organizing and updating data for the database(s), a supportive and developed organizational structure in which the GIS can reside, and technical information systems expertise to maintain the computer hardware/software. If these minimum conditions do not exist, implementation of a GIS is likely to be difficult and less productive.

GIS Software

There are several GIS software packages on the market with different target audiences. ARC/INFO, developed by ESRI, continues to garner a majority of the GIS market and is generally acknowledged for its data input and data interpretation capabilities. Further, it does link with many dbms products and runs on a variety of computer hardware. It does not have a smooth image processing module or program to convert raster format (satellite photos) data to vector format (terrain elevation models) data, which ARC/INFO uses. However, a new image processing module (GRID) is being developed to meet this need. Other GIS software packages include MCE by Intergraph; GeoBased Systems; Computervision and SPANs from Canada. Each GIS package has its

niche and special applications it supports.

LIS Applicability

In the case of the LIS system envisioned, land titling fits more of a DMS or TMS classification, eg, developing maps and relating attribute data to those land maps. As the base maps (Registry Index Maps and survey maps) are digitized and made available for storage and retrieval, the LIS may expand to become a full-fledged GIS system. It might then include other layers of spatial information to be matched against the existing index maps covering infrastructure, environmental or ecological concerns, and vegetation or crop monitoring. **However, the expansion of the GIS system will not occur for at least a 2 year period.** For example, the land use data collected over the last several years by the UK Land Resource Team and digitized into ARC/INFO coverages could be available for access overlayed against the city base map for San Ignacio. Still later yet, modeling relationships could be tested for prediction of vegetation or animal population growth within sectors of the country.

ESRI PROPOSAL

In general, the ESRI proposal provides the basic services of installing and training users on the ARC/INFO GIS package. **However, it provides too much system capability for the MNR and Lands & Surveys Dept at this time and lacks more definition with regard to design and programming support being offered.** Training should be expanded to cover more than the introductory course for ARC/INFO (eg, COGO), and accomodate multiple groups of users (ie, technical personnel, users and managers). Also, their role in the suggested pilot project needs to be defined. Finally, some additional options could be suggested to cover digitizing or scanning existing maps for the L&S Dept.

Although there is some advantage to purchasing a "turn-key system" from ESRI, the project may be able to obtain better pricing and terms directly from the individual computer vendors themselves. For instance, buying plotters and digitizers from Calcomp, workstations from Sun US or Guatemala, and UPS from Sola or American Power rep. in Belize. Since the procurement is AID direct, some US vendors have allowed AID to use their GSA Schedule contracts in the past--provided a separate maintenance contract was signed with the local rep. ESRI could still train and maintain ARC/INFO and provide database design and application development support.

The database design effort should be keyed to the land titling application process resulting in a deliverable of a prototype database application. The technical assistance for database design and application development of 20 days might be split with 10 days for 2 people now and then a month break for assimilation before the final 10 days assistance. The pilot project could probably be

expanded to 10 or 15 days ESRI support in developing an application, yet more defined results and transfer of ARC/INFO knowledge during a 3 month period.

Regarding ARC/INFO pricing, although ESRI does not have a GSA Schedule contract with the USG, it does offer other agencies large discounted prices. For example, the ARC/INFO workstation package in the single-user version has been sold for approx. $7100, while the other modules have cost approx. $1200 each. This represents a significant savings over their existing proposal price of $24,000, but is a "volume purchase arrangement" not available to every purchaser and does not include maintenance or installation. Even accounting for those elements would not yield this difference. Thus, there may be some room for negotiation with ESRI/USA over their software pricing, especially given the likelihood of them providing technical support to the project.

Also, ESRI recommended RDBI, COGO and TIN modules. At this point, only COGO is needed and should be purchased. The TIN module could be added when land elevation analysis becomes integrated into the dbms, and RDBI could be purchase if Oracle or other more robust database package is chosen later in the implementation of the LIS. The single-user version of ARC/INFO is probably sufficient for a RISC type workstation as well. As demand increases and LIC personnel become more computer systems oriented, an upgrade to a multi-user package would be appropriate. For reference, the multi-user package costs from $30,000-44,000 depending on the modules added.

ESRI should provide an estimate for scanning and/or digitizing the existing map base (1000 or so) in order to help the L&S Dept. fully populate the LIS database in a more rapid manner. Although each map is different, perhaps they could give a manhour time or cost per map with some basic knowledge about map scales, level of detail and basic attribute data. This will probably range from $500-1,000 per map. ESRI should give an application development rate/hr or cost/day for additional application development support should it be needed during the first year or so.

RECOMMENDATIONS

System Preparation

Management information systems (MIS) are successful because they are:

- **Linked to a strategic objective or goal of the organization**
- **Based on a clearly defined functional process; and**
- **Supportable by top management and IS infrastructure.**

The LIS meets these tests, yet some steps remain before this system is completed. Since the LIS will be one of the primary MIS applications in the MNR, consideration should be given to building an information systems group to support it. This group would

initially be composed of a systems administrator, systems analyst and programmer. These staff would support the LIS for now, but as automation progressed throughout the MNR, they could assist other divisions and Depts to design and implement applications (eg, Conservation and Fisheries). These staff could come from within the MNR, but may have to be recruited outside since they will need computer science or systems experience. If in-house staff are chosen from other professions, they will probably need college level training at a U.S. or U.K. institution for several months. Caution should be taken in choosing a productive and somewhat tenured employee for this type training.

In order to make this system succeed, an LIS development committee should be formed including all divisions who will represent users of the final product. This group can help ensure that a phased system implementation plan is developed and carried out. Selecting an appropriate pilot project application for system implementation would also need to be accomplished ahead of the installation of GIS hardware and software. This means estimating the timeframe for hardware/software purchase, installation and training, selecting and prioritizing training candidates, finalizing staffing decisions, and populating the database with attribute and image data. LIS system procedures will need to be established, too, for data entry, file access, database maintenance, file backup and archiving, printing priorities and other activities. A training schedule will have to be defined for both basic computer training and GIS specific training since operational duties and staffing levels will only permit certain numbers of staff can be trained at one time (eg, 5/class/wk).

Pilot Project

L&S Dept. should select a District(s) for a pilot project using the new LIS system. These areas should have a reliable database of information, maps that are readable, have used the UTM coordinate system in land surveying, and be representative of land titling problems in Belize as a whole. Once this region is selected, its data set of information (including maps/land parcel images) should be entered into the LIS application and tested. Adjustments to the application would then be made by L&S Dept staff (with assistance from ESRI) and lessons learned during the process could be incorporated into the final LIS system design.

At the end of this pilot project, there should be an evaluation by L&S Dept., ESRI and USAID/Belize (with possibly IRM assistance) of the success of the LIS. If only minor fixes are required, then parallel conversion of the land titling process to the LIS should begin; on the other hand, if major restructuring of the process or application was required, then the timetable for execution would be adjusted. Also, a discussion of next priority applications and/or populating of the LIS database decisions would be addressed. Further training and technical support needs would be assessed at this time, too.

LIS Implementation

Because of the complex nature of implementing GIS systems in general, and lack of other automation with the L&S Dept, several gradual steps should be taken to introduce the LIS. In the MNR, this system implementation should be accompanied by an introduction to computers and gradual conversion of manual to automated procedures. This will allow for continued operation of the land titling process without interruption, while acclimating Lands and Survey Dept staff to both computers and the GIS software. Full implementation of the GIS system in this scenario would then happen over a 3 yr period allowing for entry of data on several priority districts and digitizing a majority of existing maps for declared areas (eg, 500 or so). Other Depts and Ministries would contribute and have access to GIS data by Phase III of the system implementation.

Phase I of the LIS system would involve agreeing on common data formats between Lands and Surveys Dept. divisions and deciding which district or sections will be the first to be pilot-tested on the GIS system. The next step would be proper equipping of the LIC with air conditioning, multiple power outlets, and secure lock; metal file cabinet for diskettes/tapes storage; computer supplies including paper, diskettes and extra plotter pens; and allocation of one room for computer equipment and peripherals only. Also, procurement and installation of the initial GIS system, plotter, digitizers, UPSes, dot matrix printer and other basic supplies. Maintenance agreements regarding software and hardware would be initiated. Training program including basic and GIS systems would begin as well with three-tiered approach covering: systems administrators, high-level users, and regular users. This would take several months to complete allowing some computer exposure for all staff. **Phase I would be completed when all appropriate staff have received training on system operation, GIS system has been installed and pilot application developed and tested, and at least one IS type programmer/analyst has been hired/trained.**

Phase II would begin only after the pilot data sets and maps have been completed and entered into the GIS system to form the basis for the LIS. This could be up to one year after the initial system purchase and installation. LIS systems staff should be fully in place and performing hardware/software periodic maintenance including file backups and archiving of data. If demand has accelerated to a level that would justify it, the GIS system could be expanded from single-user to multi-user version of ARC/INFO in addition to the purchase of the TIN module (approx. $40,000). This would allow for additional analyses and land use planning.

PCs or graphic terminals could be added to concurrently access the GIS system (approx. $3000-4000/ea). Other plotters (approx. $4500) and/or printers ($750) could be also procured. PCs for some pilot remote MNR offices, such as for the Conservation Data Center in the Forestry Dept or Fisheries Dept. in Ministry of Agriculture,

could also be added with modems/communications software and terminal emulation software (Graphpoint) in order to query the GIS database ($2500/PC; $1000/graphic emulation package). Other layers of spatial data covering land use, environment, ecology, geology, etc could be considered for addition to the GIS, too. An expansion of the digitizing task to include other land maps within the L&S Dept. This phase would be completed when the LIS is fully automated and functioning, user communities within the MNR are making queries of the system, further system expansion has been installed, and the IS Group is providing technical support to other L&S divisions.

Phase III covers the maturity of the LIS system into a full blown GIS with many layers of spatial data available to most GOB Ministries depending on their needs. An image processing package, such as ERDAS, could be considered to interpret remotely sensed data by satellite imagery in raster format for analysis and conversion to vector format, ARC/INFO coverages. Staff may expand to hire other GIS or computer science professionals who not only know the hardware/software architecture, but can train MNR personnel in-house. An in-house training program is developed on GIS technology covering at least managers and technical professionals. At this point, the systems architecture may expand to include a local area network (LAN) connecting various PCs in the MNR to the GIS system and allowing for distributed storage and access of data. Optical disk drives would be purchased and used for archiving all maps and image coverages, along with "good" titles to keep them from being altered. Specialized advanced GIS or IS systems (eg, LAN or Unix) training might be pursued by the top systems staff. Users would include the public and private businesses and revenue streams should be good based on solid demand for title searches and other urban or environmental planning information. Phase III is completed when a method of simple data transfer is acheived through a LAN, images of maps/data are stored and retrieved on optical drives, image processing data is being incorporated into the GIS, and the LIS technical support group has become an IS technical support section with budget and resources for meeting MNR systems application requirements.

System Specifications

Based on the above analysis and in order to provide an appropriate information technology solution for the LIC, a basic GIS system (ARC/INFO from ESRI) is proposed for the Lands and Surveys Dept in the Ministry of Natural Resources. Since ARC/INFO has been used by the U.K. in their land use planning studies (including digitized maps that could be used) and other local institutions are familiar with it, there seems to be adequate justification for this package. However, the L&S Dept. and MNR are only just beginning to fully appreciate information systems and computer technology, and it would be premature to force a highly sophisticated, multi-user system on them without time to understand its potential. Therefore, the initial recommendation deals with a single-user workstation GIS system with digitizer and an additional

PC outfitted with digitizer. The ARC/INFO software with COGO (coordinate geometry) module is recommended for the workstation, while PC ARC/INFO is suggested along with a powerful 386/33 mhz PC. One 8-pen plotter could be split between the workstations and a high speed dot matrix printer could be purchased for printouts of queries and file dumps. A UPS should accompany both computers--1.5KVA and 500VA--for the workstation and PC, respectively.

The main workstation should be capable of performing fast mathematical calculations as well as transforming graphical data into numerical representations. **Thus, a RISC-based architecture is preferred with graphics processors as needed.** These type workstations generally run in a multi-user, multi-tasking environment, such as Unix, and have the capability of supporting multiple graphics or other terminals through a multi-port serial card inserted in an open slot. Manufacturers, such as Sun, DEC, IBM, HP and DG, make this type of workstation and all use a variant of Unix operating system. Thus, although a Sun sparcstation 2 was proposed here, other computer platforms could suffice for the GIS software.

From a storage perspective, the software programs of ARC/INFO will occupy 100MB, operating system approx. 50MB, and for miscellaneous swap space approx. another 50MB. Data needs within the L&S Dept. will be relatively small initially--entering attribute data on the 23,000 existing parcel files (approx. 10KB/record = 230MB total). In addition, the digitized maps already in the UTM format (1000) would add approx. 100MB of additional data requirements. This could easily triple to 300MB with the inclusion of all known maps (approx. 3000 more) over the next 3 years. Thus, an initial storage capability of 500-800MB of storage should suffice as a minimum. As the system grows and more data is loaded, another 30% of storage space could be appended up to approx. 1GB.

These systems will enable the L&S Dept to begin LIS development and implementation, while learning to use GIS tools (hardware and software). Training can be carried out on either machine and compatibility of data is ensured. Further, if the L&S Dept chooses, they can perform data entry on other PCs and upload the data to ARC/INFO through a variety of interfaces (including ASCII). The plotters and digitizers recommended are Calcomp or equivalent units with manual parts that are not expensive to replace and will require less complex--and costly--maintenance. **The 386/33mhz PC should have 8MB of memory, 200MB IDE, <20ms hard disk, 150MB, QIC tape unit, 14" VGA color monitor, 1.2MB, 5.25in and 1.44MB, 3.5in floppy drives, parallel and 2 serial ports, and at least 3 expansion slots (1 32bit min) after all above components have been added.**

Maintenance/Support

The maintenance and support of the GIS system will be critical to its long-term success. Because of the lack of GIS software and

even minimal hardware support in-country, the L&S Dept. will probably have to accept 12-24hr response time for GIS system maintenance. Regarding the GIS software, ESRI does cover the first year support in their initial price and will be available by phone for critical questions. Since two ARC/INFO packages are being purchased, L&S Dept. should be able to reduce costs by purchasing one primary support and one secondary support agreement. However, this service will need to be used sparingly due to the cost of long distance calls. Regarding the PC, L&S Dept. staff may (with sufficient training) be able to perform basic diagnosis of system problems and send the damaged part for repair--either locally or in the U.S. A one year warranty should come with most of the computer systems and peripherals. Installation of the system will be an additional charge depending on how the equipment is purchased.

As discussed above, ESRI will provide GIS software support and a basic GIS training program as part of their proposal. Further, they have proposed some additional database design and application development assistance to speed up the implementation process. This will give the LIS a good start, but it must be planned for additional technical support and software/hardware maintenance for at least 2 years more. These activities could run $25,000-30,000/yr, and should be budgeted by USAID/Belize or MNR.

Training

To effectively use any computer system in the MNR, there are several training needs that must be met. First, an internal training program should be established to introduce those unfamiliar with computers how to use the computer, store files, print documents, etc. It could be accomplished through a local vendor in Belize City as well. Also, at least 2 of those computer literate staff (approx. 5 now) should pursue advanced computer systems training either through the University College in Belize or a short-term course in the U.S. This should cover requirements analysis, structured analysis and design, programming and system administration issues. They could further train other L&S Dept staff upon their return.

Next, the GIS training should be defined to include three levels of users: managers, technical professionals and data entry/clerks. All groups should receive Introduction to GIS course of 5 days. The technical professionals should continue with Using COGO 2-day course--especially surveyors. Those technical staff involved with programming/developing applications should consider Introduction to AML, another 2-day course. As the LIS system implementation progresses, other optional training may be required as well, but should be results-oriented for specific needs.

As the technical capability of the IS group at L&S Dept increases, they should develop a basic in-house training program to familiarize new users with the GIS system. This would involve viewing images, storage and retrieval and understanding of system functions. Managers would be an important beneficiary of this use

of the developed system type training.

Procurement

There are two basic procurement options for the GIS system. First, the software, training and application development assistance can be purchased through ESRI/US. The other computer hardware and peripherals could be procured from the GSA Schedule contracts of various vendors--eg, Sun, Calcomp and GTSI for the PC and UPSes. If this option is chosen, then a separate maintenance agreement covering installation and regular maintenance with the local rep. covering Belize for each vendor would be needed (eg, Budde Intl of Mexico for Calcomp plotters and digitizers, Sun Guatemala for Sun workstations, etc). This could save significant equipment costs (over 100%) and time, though it would present more difficulties in coordinating the various local contracts and all vendors do not guarantee these prices for non-U.S. sales. Second, all equipment could be purchased through local contracts with the dealers or rep. that would include maintenance/support in the total bid. This method would probably result in a little easier implementation, but pricing for the computers would almost certainly be more. It would probably take more time as well.

Although ESRI could also supply all equipment through their various dealer agreements, it is not clear this method provides any better pricing than could be achieved by individual contracts. Thus, the preferred route would be to solicit bids from GSA Schedule contract computer vendors in the U.S. for the Unix workstation and sign separate maintenance agreements with their partner firms in Central America. The PC and UPSes could be bought directly from GTSI or other microcomputer GSA Schedule holder.

Future GIS Options

In the future, L&S Dept. and the MNR may want to consider such options as the TIN and NETWORK modules of ARC/INFO software. These would allow them to model terrain characteristics and handle utility networking for sewage, electricity and water to new areas, respectively. These should be considered only when the LIS system is functioning properly in either Phase II or III of the implementation. To simplify the parcel mapping and surveying function, L&S Dept. could purchase a 386 PC and Autocad package for their Drawing Division (approx. $4500). This would allow maps to be automated, stored and exchanged with the ARC/INFO GIS system since it accepts the DXF format of Autocad. Also, they may want to convert to optical storage for image storage and retrieval since it offers much greater capacity and the ability to store permanently parcel plots and area maps for archival purposes. Write Once, Read Many (WORM) disk drives allow users to record images and data onto them only once (to prevent modification of original records), but access them many times for viewing. These drives cost between $2000-4000 and can store up to 1GB/disk of data currently, with price/performace expected to increase in the future.

After the system has been operating effectively for some time, the L&S Dept. may consider purchasing a more robust relational database management system, such as Oracle or Ingres for the Unix environment. This would allow better organization of basic data for the MNR as a whole and enable links to be constructed between the GIS and other databases. ARC/INFO has interface utilities with these database management packages through SQL commands to make their use somewhat transparent to users. Lastly, the addition of graphics terminals with high resolution color screens or PCs with graphics emulation cards and modems/LAN connections could be implemented in the GOB compound area in Belmopan. This would enable an expanded group of users to have access to the GIS system for varied queries and data updates.

These terminals are made by Tektronix and GraphOn at a cost of approx. $3000, while the PC emulation cards come from Graphpoint at approx. $1000 each. A 9600 Baud modem runs approx. $500 and an Ethernet LAN card averages $200 for a standard PC. This expansion of users would have to be accompanied by the multi-user purchase of ARC/INFO and some additional memory and multi-user board for the workstation as well. These additions would cost approx. $30,000 under current prices.

Technical Support

Since many steps and years of effort will be involved, the L&S Dept. and MNR will need technical support both from experienced systems personnel and GIS software vendors, such as ESRI. AID/IRM/CLS will be happy to continue to support the project-both with desktop reviews of pilot database designs and on-site evaluations of systems installation and development. ESRI will also be available on an as-needed basis through their "rent-a-tech" program to offer GIS software assistance.

CONCLUSION

In conclusion, the L&S Dept. and MNR are embarking on a course that could provide them with a capability not found anywhere else in Belize. If the LIS implementation is well-planned and the database concept proves viable, this system could significantly improve not only the land registry process, but planning for a multitude of urban development and environmental activities. The most important step for L&S Dept. however, will be to ensure all divisions participate and contribute to the initial database application development. This will build confidence in the computer system and yield a more productive system. As important, is the upgrading of current staff capability on information systems in general--and GIS systems in particular. A training program should be on-going and will help the LIS and future systems to be properly supported.

A better system of registering and tracking land parcels along with increased revenues through improved tax assessments should

result from this LIS. However, reaching this goal will be a gradual phased process of coordination and integration of data, training and systems development and implementation to produce an effective spatial information system that could be a model for the rest of the country to emulate.

SUMMARY OF RECOMMENDATIONS

System Preparation:

- Develop an Information Systems (IS) Group within the MNR
- Select District or area for LIS Pilot Project
- Develop Phased LIS system implementation plan
- Devise common data formats and LIS database design
- Form LIS development committee w/all potential users represented

Implementation Phase I:

- Assure computer room has power/space needed
- Procure GIS hardware/software
- Install GIS and begin ARC/INFO training program
- Hire/Train computer specialist for the LIS system
- Begin basic computer literacy training program
- Develop Pilot Application
- Evaluate GIS system/Pilot Project application
- Contract with ESRI for technical support/maintenance

Implementation Phase II:

- Develop LIS database access and maintenance procedures
- Purchase additional ARC/INFO software modules
- Upgrade to mulit-user version of ARC/INFO
- Purchase graphics terminals/PCs for GIS system access
- Purchase additional system hardware for GIS workstation
- Populate GIS system with other spatial/attribute data
- Begin digitizing inventory of maps
- Test remote user access to GIS system

Implementation Phase III:

- Develop in-house GIS system training program
- Hire additional computer specialists for IS Group
- Consider ERDAS image processing/Raster-Vector format software
- Identify satellite imagery data available for Belize
- Purchase optical disk drives for GIS system
- Consider implementation of LAN in MNR
- Send computer analysts for advanced training (GIS/IS management)

System Configuration

- Procure ARC/INFO workstation GIS software w/COGO module
- Procure PC ARC/INFO w/TGRAF module
- Buy Unix based workstation and 386 PC for GIS software
- Purchase two digitizers, one plotter, one dot matrix printer and two UPS
- Select system that is easily upgraded for storage and multi-user applications
- Ensure computer hardware can be integrated into LAN if desired

Maintenance/Support

- Request one year warranty for all hardware
- Purchase Primary ARC/INFO support for workstation/Secondary support for PC
- Request local maintenance contract for workstation, plotter and digitizers
- Use local vendors for on-call maintenance of PC, printer, UPS

Training

- Establish internal basic computer training program
- Train two computer analysts in advanced systems analysis/design and programming at college level

- Split GIS training into 3 groups: managers, technical staff and admin/clerks
- Include COGO and AML training courses in ESRI proposal

Procurement

- Two options: GSA Schedule w/local maintenance contract; or Competitive Bid with all conditions included
- Justification exists for ESRI ARC/INFO software and technical support to be sole sourced
- GSA Schedule route may be quicker/less costly, but vendors may not offer maintenance terms
- PCs, UPS and printer can be bought from GSA vendor in US
- ESRI turn-key system is more expensive

Future Options

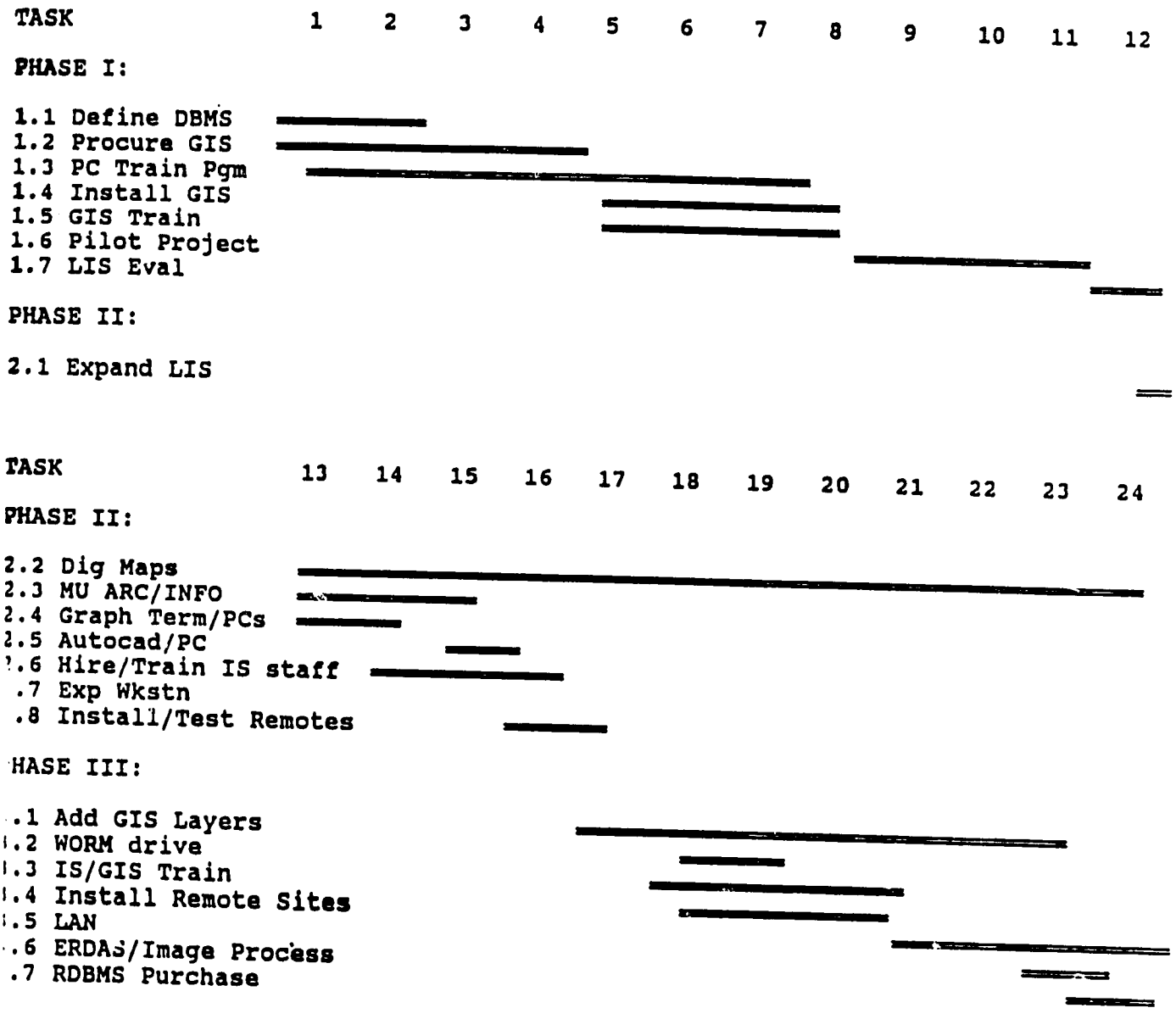
- TIN/NETWORK modules for ARC/INFO package
- WORM optical storage disks
- Unix based RDBMS (eg, Oracle)
- Graphics terminals/PC graphic emulation packages
- Modems and LAN cards/cable
- Multi-user ARC/INFO package upgrade
- Add-on workstation disk storage, memory, multi-user card

Technical Support

- ESRI database application design/development
- IRM pilot project/GIS implementation evaluation

LIS IMPLEMENTATION SCHEDULE

TIME IN MONTHS



GIS HARDWARE CONFIGURATION SINGLE-USER

QTY	MODEL	COST
1	SUN SPARCSTN 2 GX W/16" COLOR MON, 16MB RAM 207MB SCSI HD, 1.44MB, 3.5FD SERIAL PTS-2	$14,036.0
1	SUN COUNTRY KIT	INCL
1	SCSI 669MB HD AND 150MB, 1/4 IN TAPE UNIT	$5,200.0
1	SUN OS LIC AND MANUALS	$0.0
2	Calcomp 23480 model or equiv digitizer, 36x48 inch, rs-232 pt, 1000 lines/in res. acc. +-.010 in, A1-A0 sht sizes, 16 btn cursor	$1,946.0
1	Calcomp 1026 or equivalent plotter, 8 pen, ISO A4-A0/AE modes, paper cutter, startup kit	$6,371.0
1	UPS, AM POW 1500 or equiv.,1.5KVA min, 15 MIN BKUP	$2,177.0
1	PC 386/33,8MB RAM, VGA COLOR MONITOR 14",1.44MB,3.5IN, 200MB <20ms IDE HD, 2 SER/1 PAR PORTS, 3 EXP SLOTS 80387 coprocessor	$4,300.0 $595.0
1	Epson LQ1050 or equiv., 240cps min, 24pin, dot matrix wide carr	$630.0
1	PC UPS, AM POW 520ES or equiv.,500VA, 10 MIN BCKUP	$320.0
1	WKSTN MAINTENANCE/YR--US LIST USUALLY 10-15% OF SYSTEM COST; SUN GUAT. EST $3900/YR	$2,820.0
1	SUPPLIES KIT--PENS, RIBBONS, DISKETTES, ETC	$2,000.0
	OPTIONS:	
1	8 PORT SERIAL CARD FOR SUN WKSTN	$854.0
1	SUN WKSTN HARD DISK 669MB SCSI	$4,080.0
1	WORM OPTICAL DRIVE, 650MB-1GB/DISK OPTICAL DISKS (5*150 EA)	$2,996.3 $750.0

GIS SOFTWARE CONFIGURATION

QTY	MODEL	COST
1	ARC/INFO single user	$14,400.0
1	COGO MODULE	$2,040.0
1	WKSTN MAINT/SUPPORT	$3,500.0
1	PC ARC/INFO MODULES: PC ARC/INFO START KIT DATA CONVERSION ARCPLOT NETWORK TGRAF	$5,945.8
1	PC ARC MAINTENANCE	$1,250.0
	OPTIONS:	
1	ORACLE DBMS (2-16USERS)	$7,700.0
1	ORACLE REPORT WRITER	$2,310.0
1	AUTOCAD	$750.0
1	MULTIUSER ARC/INFO	$33,000.0
1	TIN MODULE	$5,100.0
1	RDBI MODULE	$5,100.0
	TOTAL OPTIONS	$10,760.0

TOTAL SOFTWARE COST	$27,135.8
TOTAL SOFT W/OPTIONS	$37,895.8

1	TEKTRONIX 4207 GRAPH TERMINALS, 640X480, 13IN MONITOR	$3,671.3
1	GRAPHPOINT GRAPH EMUL SOFTWARE	$1,000.0
1	9600 BAUD, HAYES COMP. MODEM W/COMMS SOFT	$569.0
1	ETHERNET CARD, WEST DIG ETHERCARD PLUS	$226.0
1	16MB RAM UPGRADE FOR SUN WKSTN	$2,730.0
1	ETHERNET CABLING--50FT/UNIT * 5 PCS	$500.0
	TOTAL OPTIONS	$17,376.5
	TOTAL HARDWARE COST	$38,395.0

ESRI TRAINING/TECHNICAL SUPPORT

LENGTH (DAYS)	COURSE	PP/COURSE		COST
5	BASIC ARC/INFO TRAINING HARDWARE/SOFTWARE W/MODULES	10 EA		$8,500.0
2	INTRO TO COGO	5 EA		
20	DATABASE DESIGN/APPL SUPPORT TWO PERS 10 DAYS * 2 TRIPS	5 EA		$12,200.0
10	PILOT APPL DEVELOPMENT	2 EA		$3,050.0
30	PER DIEM/TRAVEL			$5,700.0
5	IMPLEMENT GIS USING ARC/INFO	3-5 EA	?	
5	DATABASE DESIGN/AML PROGRAMMING	3-5 EA	?	
	OPTIONS:			
15	OPTIONAL APPL DEV SUPT BASED ON $50/HR RATE			$6,000.0
	SCANNING MAPS OPTION (EST $500*100 MAPS) DEPENDS ON SIZE, QUALITY OF MAPS			$50,000.0
	TOTAL OPTIONS			$56,000.0
	TOTAL SOFTWARE COST			$29,450.0
	TOTAL SOFTWARE COST W/OPTIONS			$85,450.0

182

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TECHNICAL ANALYSIS

Overview

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In the past, Belize had a sparse population with a very small economic base. There was very little reason to be concerned about natural resource management and protection. However, the country has embarked on expanded economic activities that will increase dramatically the use of natural resources in ways that could set off an uncontrolled spiral of misuse and depletion. Technical, participatory approaches must be put into place whereby better planning and management can identify appropriate alternatives and avoid the many costly mistakes that have been made in neighboring countries. The growing population of subsistence farmers (largely through migration), the expansion of new commercial crops, inroads into the forests and a growing tourism industry are all areas needing attention. A set of implementable policies and regulations governing resource use are generally, in place and a small body of technical expertise available to use existing relevant technical information such as soil surveys, land suitability studies, and biodiversity data on flora and fauna. Still the system is in need of expansion and more accelerated programs that will assess the macro trade-offs between development of economic activities and preservation/conservation of the natural resource base.

Technical information complimenting what is already in place in Belize will be the basis for defining land use and a long range land use policy. This will set the stage for defining what is best for agriculture, forest/marine use and what is necessary

183

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Technical information complimenting what is already in place in Belize will be the basis for defining land use and a long range land use policy. This will set the stage for defining what is best for agriculture, forest/marine use and what is necessary

for bio-diversity. Technology enhancement will require systematic approaches for comprehensive environmental impact assessments and an appreciation for long term agricultural yields under better development systems. In Belize, technology of all levels and innovativeness will succeed only as the support systems are concurrently developed and put into place. To go beyond these absorptive capacities in such a small country will probably not succeed.

A) Forestry Development

Two primary documents written in the past twenty-four months extensively address a wide range of technical issues in the forestry sector. These documents are:

Forestry Technical Analysis for Commercialization of Alternate Crops (505-0008) Project Paper Amendment Annex for USAID/Belize - Prepared by Loren Ford, Regional Forestry Advisor/Caribbean USDA Forest Service, Rio Piedras, Puerto Rico (July 1989)

and

Belize Tropical Forestry Action Plan Report to the Government of Belize - Prepared by a team provided by ODA, CIDA, USAID and FAO/UN - Printed/collated by Overseas Development Administration, London (September 1989)

B) Crop Diversification

a) Current Situation

This analysis for crop diversification updates and supplements comments found in the Commercialization of Alternative Crops and Toledo Agricultural Marketing project papers - much of which still remain valid.

Expanded production of major export agricultural commodities (sugar, bananas, cattle) remain limited by market constraints and high costs of production. Citrus has been the only crop in extensive expansion over the last few years. Agricultural production still is concentrated within a narrow range of products.

Efforts to diversify agriculture in Belize has been weak. Attempts by farmers and investors to produce and export non-traditional crops have largely failed for lack of adequate R and D support. As pointed out in the original technical analyses, more adaptive research is needed to determine what crops are

suitable for production and export, and how such crops fit present farming systems and land use. It remains valid that without stronger research and development support, the limited range of productive activities in agriculture will continue to hamper economic development of the country. Government has elected not to provided this out of their own programs.

Concern has been expressed in recent years about traditional milpa agriculture. This has been exacerbated by the arrival of several thousand migrants from neighboring countries, who also practice shifting agriculture and add to the increasing degradation of the environment. Although extensive land degradation brought about by milpa agriculture has yet to occur, there is evidence of a considerable reduction in the length of the fallow period after initial clearing and use of the land. There also is general acceptance in the country that shifting agriculture restricts opportunities for socio-economic development.

b) Production Potential/Constraints

Considerable variability exist in texture, chemistry and topography of soils in Belize and within the target district. Wright et al., described the principal land form found in the Corozal and Orange Walk Districts as calcareous, with a variety of soil types ranging from sandy to heavy clays and exhibiting neutral to alkaline pH conditions. The soil topography in these districts is flat to rolling with few slopes above 5 degrees.

The Toledo District soils also show considerable physical and chemical variability. The parental materials of these soils include calcareous sandstone, limestone, shale, mudstone and siltstone. Fertility under natural vegetation is high, but tends to be quickly lost when soils are cleared for cultivation.

One of the underlying determinants for the success and long term viability in crop diversification is physical feasibility. The selection of the production sites, particularly for permanent crop-species, represents one of the most critical decisions to be made by the farmer. Specific assessments of soil texture,

pruning, as well as reasonable pesticide applications, i.e. copper base products, if justified for both environmental and agronomic reasons.

As cacao farmers make long-term investments, it is essential they begin and pursue a well planned pest and disease management program. This is to be fostered through training and technical assistance specifically adapted to the local conditions and farmer capabilities.

Lack of technology, infrastructure or management in postharvest marketing of perishable products often precludes crop diversification programs from being successful. Building upon the CAC and TAMP experience, this project will provide special support in strengthening postharvest technology of its target crops.

Proper fermentation and drying will determine by enlarge the final quality of the cacao produced in Belize with current cultivars. This lead TAMP to adapt and promote the use of fermentation and drying technologies appropriate to the small cacao farmers in Toledo. Fermentation boxes and three types of solar dryers were tested with good results. A larger 2,000 lbs solar dryer demonstrated at the San Antonio Multipurpose Service Center (MSC) was bought by a local entrepreneur. Sales of higher grade cacao by small farmers in Toledo could reach 35,000 lbs by late 1990. It should be noted sales of quality cacao to Hershey were only 7,000 lbs in 1986. This significant increase was made possible through organizing a marketing network, built around three Multipurpose Service Centers (MSC's) located in strategic communities of the district. This marketing network eased farmer problems in transporting cacao or from selling their produce to middlemen.

The Belize Agri-Business Company (BABCO) has proposed to concentrate its R and D diversification program on tropical fruits, postharvest and marketing. Present diversification opportunities in winter vegetables are very minimal. Lack of adequate postharvest and transportation facilities are major limiting factors. Papaya, black pepper, carambola, rambutan, passion fruit and pineapple appear to be viable options for diversification in Belize.

The production and marketing of Solo papaya began in 1986 in Belize. The level of technology used by the three farmer cooperatives engaged in the effort was quite low. This included poor quality control in harvesting, packing and shipping of the produce. Shipments suffered spoilage enroute to the USA via sea lanes and had to be dumped or sold at a loss on arrival. BABCO involvement in papaya also began in 1986. On-farm trials were established under guidance of a Hawaiian papaya producer/exporter assisting the project. Several investors and farmers became interested in the crop and acreage under cultivation has grown to

structure, chemical composition, aeration and topography must be stressed and adopted, prior to the implementation of production programs by large and small scale commercial farmers. Recent production experience under the CAC project as well as that of independent farmers have demonstrated the suitability of selected soil sites for successful commercial production of non-traditional export crops in Northern Belize, i.e. papaya. The Toledo District alone is estimated to have about 40,000 acres with potential for sustained production of cacao. Additional diversification crops will be tested under this project. It is anticipated that several promissory crops can be adapted to the environmental conditions found in the target districts. Among these are black pepper, carambola, rambutan, annatto, passion fruit and pineapple.

In Belize, irrigation is not common. There are a few farms where irrigation is used for the production of some fruits and vegetables. In general, irrigation systems are rudimentary and might consist of 55 gallon drums mounted on a small tractor. The topography of the northern Corozal and Orange Walk Districts is such that large flat areas are rare where furrow irrigation could be readily established. Also, the prevalence of shallow soils would eliminate the possibility of leveling tracts of land for this purpose. Other considerations that have to be studied are the availability and quality of groundwater, and the economics of using these waters for irrigation. The use of drip irrigation systems must be considered in the absence of existing irrigation systems, topography and potential problems of irrigation water availability, cost and quality. Although more costly to install, drip irrigation may be the most economic and viable irrigation system for non-traditional export crops in northern Belize.

Pests and diseases in Belize are not expected to be greatly different from similar environments in neighboring countries, such as Guatemala, Honduras and Mexico. Pest and disease presence and management for the proposed diversification crops also are expected to be similar to other nearby tropical and subtropical zones.

Although pests and diseases are inevitable with any intensively cultivated crop, the experience in Belize does not indicate that any unmanageable problems will arise. For example, cacao is an indigenous plant to the American tropics. It has a host of native pests and diseases which the farmer must manage in order to get a satisfactory return. TAMP experience to date has shown relatively minor problems with this crop. In some respects, small farmers in the Toledo District may have an advantage over the larger cacao plantations since smaller, dispersed fields of cacao may be less vulnerable to serious epidemics or infestations. The project will emphasize an integrated strategy to plant protection. This includes introduction of resistant cultivars, shade adjustment, adequate

about 100 acres in the last few years. Currently, papaya exports have reached 12,000 boxes per week and could reach 125,000 boxes by late 1991.

In March 1990, a Mediterranean fly outbreak developed in southern Belize. The country was then placed under quarantine by USDA/APHIS. This highlights the vulnerability of these emerging promissory crops to such special problems. BABCO is currently developing minimal facilities for postharvest handling of papaya and other perishable produce. High-temperature forced-air (HTFA) quarantine treatment for papaya is a technology worth developing for Belize. The HTFA treatment was approved by USDA/APHIS in 1989. Facilities are less expensive to build than those for vapor heat treatment.

Rambutan, litchi and some citrus fruits do not tolerate this treatment and undergo changes in appearance. Mangos and other fruits tolerate the treatment well.

Crop management practices vary greatly throughout Belize. Toledo District in the southernmost region of the country, for example, is the most isolated. Its distinctive regional character is defined by a predominantly rural, traditional Maya Indian population living off a subsistence oriented migratory agriculture. Local farmers practice slash-and-burn shifting cultivation, often on hillsides.

Corn is planted during the rainy season (May to November), after the vegetation is cut and burned. Upland rice, black beans, red kidney beans, cacao, and annatto are also planted at that time. Farmers supplement shifting cultivation with a subsistence buffer crop of corn called "matahambre", which is planted in the dry season (December to April) using natural vegetation for mulch. Many other crops of lesser importance are grown for subsistence including plantain, cassava, cocoyam, medicinal herbs, and vegetables.

The slash-and-burn or traditional "milpa" farming system involves clearing the forest lands and using that area for one year or more, after which the farmer moves to another forested area in pursuit of better production. The soil on the farm left behind is so worn out, unproductive, and easily subjected to soil erosion and flooding that it requires years to regenerate. Unfortunately, land pressure is such that farmers very often are not able to leave the land unused for such long periods, and in ever shorter cycles the same plot of land is again slashed, burned, and planted.

Rapid population growth has led to increased pressure on the available land in the area. This has resulted in both greater migration of farmers elsewhere, and to an even shorter fallow period. A shorter fallow period in turn results in loss of soil

fertility, greater weed problems, soil erosion, and, ultimately, a lower standard of living for the farmer.

Traditionally a family could expect to obtain access to enough land to assure self-sufficiency, but this is no longer the case. Some farmers now have to walk several miles every day to reach their fields. Increased land pressure resulting from population growth, dwindling soil fertility, and limited availability of land has intensified the need to improve subsistence agriculture and land use systems.

Farmers can protect hilly land from soil erosion. The improved milpa system (IMICS) promoted under TAMP brings together soil conservation, soil rebuilding, and food production techniques. Nitrogen-fixing trees or shrubs are planted in rows along contour lines 3 to 5 meters or more apart depending on the slope. Crops are grown between the rows of trees. The trees are important not only for the nitrogen they contribute to the system, but also for their role in controlling erosion and recirculating nutrients.

The choice of tree crops for hedgerows includes leguminous trees, which are nitrogen-fixing, fast growing, and adaptable to a variety of environmental conditions. They produce protein-rich foliage and a large amount of seed for further plantings. Leucaena leucocephala is a good example of an excellent multipurpose tree. It is nitrogen fixing, yields nutritious forage, firewood, and lumber, and is good for windbreaks and shade. The variety "Acapulco" has been used in other countries with cacao, coffee, pepper, and vanilla.

"Madre de cacao" (Gliricidia sepium) makes a very good hedge or fence. It grows fast, fixes nitrogen, and is good for windbreaks, shade, and serves as a source of green manure. It associates well with cacao, vanilla, and coffee.

Other examples of nitrogen fixing trees are Flemingia congesta, Acacia villosa, Leucaena diversifolia, and members of the Desmodium family (gyroides, distortum, and discolor).

The trees are thickly planted in double rows to make hedgerows. Seedlings are placed 5 to 7.5 cm apart within the row, with 0.5 to 1 meter between rows. The close spacing of seedlings turns the tree strip into an effective barrier that blocks downward movement of soil eroded from the cultivated strip directly above.

In two or three years, the hillside begins to change into a series of natural terraces with the hedgerows serving as risers. The terraces add stability to the slope, retain soil particles, and allow time for the water to soak into the soil by slowing runoff, thus serving as an effective soil conservation measure.

When a hedge is 1 to 2 meters tall, depending on how much sunshine is needed by the crops grown between the hedgerows, it is trimmed down to about 40 centimeters and the cuttings are placed in the alleyways as a mulch for the crops. The mulch helps the soil retain moisture and as it decays releases nutrients to the topsoil.

If this is done on a regular basis, the need for commercial fertilizer may be reduced by as much as 75 percent. Where very high yield is relatively unimportant or commercial fertilizer expensive, there may be little need to use any commercial fertilizer at all. This is a consideration of high order in the Toledo District.

It is recommended that 30 to 50 percent of the total cropping area be planted in permanent trees that can provide fruit, spice or other products. The strips not used or permanent crops are planted alternately with rice, corn, beans, or other crops to help reduce disease and pest buildup in the soil. This rotational cropping system, which should include as many legumes as possible, provides the farmer some income throughout the year.

The improved milpa system is a simple, appropriate, low-cost method of soil conservation and crop production. It restores and maintains soil structure and fertility, as it provides an efficient method of food and cash crop production. It is widely applicable to hillside farms, where it is easily duplicated by farmers with few tools, little capital, and little training.

If farmers leave the farm for some time, the nitrogen fixing trees will continue to grow and overshadow the crop area. By the time the land is cultivated again, the soil will be enriched by the large quantity of leaves that have fallen from the trees, and erosion reduced. Some of the trees may be harvested for firewood or charcoal.

Permanent crops such as cacao, annatto, citrus, and others of the same height may be planted in the alleys at the same time the hedgerow trees are planted. Only the spots for planting are cleared. It is only necessary to weed immediately around the plant until the hedgerow trees are big enough to hold the soil so that full cultivation can begin.

Short and medium-term crops can be planted on strips between permanent crops as a source of income before the permanent crops bear fruit. Rice, corn, beans, yams and sweet potato, are some examples of short-term crops.

Under the TAMP project, a low-input system has been already adopted and promoted for the small cacao farmer. This responds to the capabilities and priorities of the small cacao farmers, who need a reasonable return but can not afford the high initial capital investment. This model emphasizes the sustained use of

non-purchased farm inputs. The outcome is a minimization of costs and the generation of reasonable income and employment through the year. This approach is also applicable to other cash crops that could be researched and developed for the area, i.e., black pepper, rambutan, annatto, passion fruit.

To the North, the Milpa approach is practically non-existent. Crop management guidelines were developed and adopted by farmers for the commercial production of the Hawaiian Solo papaya, cultivar "Sunrise". Planting material and technology was introduced by a tropical fruit consultant, who had personal experience in producing and exporting the fruit from Hawaii.

The cultivar shows high adaptability to local conditions. Yields of 40,000 lbs export fruit per acreage are normally obtained and fruit quality is highly positive. A few independent farmers are already exporting papaya successfully and increasing acreage. Pest and agricultural chemical management may require further refinement as the industry develops along. Thus far, there appears to be no limitation to crop production in this respect.

The Carambola or "star fruit" represents another potential non-traditional export crop for Belize. Trials are underway with the sweet varieties Arkin (Florida) and Kary (Hawaii) in the Corozal and Orange Walk Districts. Thus far, 2.5 acres have been planted and the trees present vigorous lush green growth. Fruiting occurs throughout the year, with intervals of 2-3 months between harvests. Fruits are sizing well and field observations denote adequate potential for fruit quality and yields (estimated at 60,000 lbs per acre) for the export market.

Some additional factors need to be understood for sound development of this crop. The length of harvest and peak production time needs to be established better, although it appears that fruit production may be at its height during the U.S. market window of April through July. Southern Florida, the main supplier, is unable to produce carambola during this period. The establishment of windbreaks may be necessary to facilitate fruit set and quality control. Alley cropping with selected nitrogen-fixing leguminous trees may represent a viable crop management model in this promissory crop. In addition, a sound pest and fertilizer management program must be set in place.

In summary, adequate crop management is feasible for commercial production for cacao, papaya and carambola. Other promissory crops, such as rambutan, black pepper annatto and passion fruit also have potential for entering into commercial production programs. In addition improved soil and water management technologies are already available for promotion among small farmers of southern Belize.

c) Agricultural Chemical Management

For purposes of this analysis, agricultural chemicals include pesticides and fertilizers used for agricultural purposes.

Use of both pesticides and fertilizers in developing countries has increased rapidly in recent decades. Belize is not different in this respect. There are some 150 pesticides registered for use. About 50 are in the restricted use category. All pesticides and fertilizers are imported. Data for 1989 show that the country imported about 800,000 kg of pesticides for that year. The principal crops on which these agro-chemicals are used are sugarcane, citrus, bananas, rice and vegetables. Users are basically large and medium commercial farms. Organophosphates, carbamates and copper based pesticides predominate in the country.

There is little information on the effects of agricultural chemical usage in the country. Impacts on human health, food quality, riverine and coastal waters, wildlife, etc., need to be scientifically established as soon as possible. Negative impacts of agricultural chemical mismanagement need to be mitigated, in order to preserve human health and protect emerging non-traditional crops exports. In addition, Belize must conserve its unique natural resource endowment, if tourism is to flourish as proposed in its national development strategy.

A number of factors contribute to sound agricultural chemical management. Among these are governmental policies and economic conditions. In Belize public laws and regulations are more than adequate. Adequate enforcement, however, is a factor limiting sound agrochemical use in the country. Although traditional export crops presently face a contraction in production, it is expected that Belize will continue to increase its overall usage of agricultural chemicals.

This project will focus on factors that influence farmer attitudes towards pesticide and fertilizer use. Increasing farmer and general public awareness on Agricultural chemical usage impacts will be preeminent in the process. Information targeting farmer groups selectively, i.e. women and children, will be disseminated through existing communications channels. The Multiple Purpose Centers (MSCs), farmer associations, technical schools and extension groups will be involved in the effort.

Agricultural technologies developed, adapted and promoted will contain a strong environmental conservation focus. Sustainable improved cropping systems for small farmers will be fostered, especially in transition areas of biosphere reserves. Integrated Pest Management (IPM) and judicious agricultural chemical use, if needed, will play an important function in the

overall program. IPM programs will be developed and adopted for non-traditional export crops, i.e. papaya, carambola, cacao. To this effect, a Pest Management Specialist will be hired to guide and develop such programs. Information is already available to model and test IPM for these crops. Refinements will be introduced as the crops develop and phytosanitary problems express themselves more widely. Linkages will be established with RENARM's Integrated Pest Management Project and the Pan American Agricultural School, at Zamorano, Honduras, to assure wider technical support in this activity. Short term consultancies will be programmed with tropical fruit IPM specialists from Hawaii and Florida to further support the prpgram. Moreover, specific studies will be conducted to establish impacts of pesticide and fertilizers on human health and residue contaminations of domestic and export foods and on ground and coastal water resources of the country.

Improving current agricultural chemical usage is a long term endeavor. It should be primarily seen as an educational process. Developing national human resources in this field is paramount to the success of the program. This project will contribute by training two Belizean professionals in IPM at the postgraduate level. The most appropriate setting appears to be the MSc degree program at CATIE, although other programs will also be considered. In addition, in service training will be emphasized for technical staff, through workshops and short courses served in Belize by outside consultants. Both CATIE and the Pan American School have the regional expertise and experience to provide this training.

Long term sustainability of an Agricultural Chemical Management program in Belize will depend on the larger institutional setting in which it evolves. Thus, this project will support the proposed initiatives of the participating NGOs toward economic self-sustainability. This includes obtaining an endowment to support a core R and D program for agricultural diversification in Belize. It also anticipates their involvement in commercial operations, i.e. papaya, carambola, to help finance the process. Sound agricultural chemical management, as well as conservation of the soil and water resource base, will be included as part of the mandate and objectives of this national R and D long-term program.

D) <u>Marine Resources (Coastal Zone Management)</u>

Recent years have seen a considerable development of consciousness of the needs for establishment of marine and coastal reserves and other protective measures in relation to our complex and potentially very valuable coastal system. This initiative exists in recognition of the value of reserves as tourist attractions, breeding havens for commercial and other marine species and genetic resource and bio-diversity protection. So far, however, marine conservation in Belize has tended to

operate in response to specific threats or exigencies, rather than as a steady process of long-term planning and implementation. For example, several areas of the coastal system have been identified as of primary and urgent need of proper management or protection. (Sapodilla Cayes, Port of Honduras, South Water Caye area, Glover's Reef, Turneffe, and Ambergris Caye). Half Moon Caye and Hol Chan are operating as protected areas and MNR has declared a moratorium on further leasing of government-owned cayes until a proper inventory is completed.

Other initiatives include the embargo on unlicensed mangrove clearance, whilst manatee and crocodile have absolute protection. Other commercially utilized marine species are protected by closed season and size-limit regulations, but do not yet have designated safe breeding areas set aside.

While responses to emergency situations should not be set aside, the basic need is for an integrated coastal zone management approach and the development of a planned, long-term strategy of coastal management to complement the rapidly expanding economic development of the country. While much dialogue still goes forth on the subject and the fact that the USAID Amendment to Commercial Alternate Crops (CAC) makes a start to such a process, the fact remains that much of these approaches have not been activated. The need still exists to pursue an approach that addresses some of the following points:

(1) The present favorable climate and initiative for establishment of protected areas. This includes the high degree of national pride that resulted from favorable press and other publicity, and the international response to reserves such as the Hol Chan Marine Reserve.

(2) The current and on-going impetus within Belize in relation to coastal zone management planning (i.e. Wildlife Conservation International, World Wildlife Fund, and local entities).

(3) The specialized expertise and funding necessary to establish a comprehensive and effective coastal management plan.

(4) The need for continued implementation of protected areas as an ongoing process during the development of this plan. It is important that, at this ecologically sensitive phase of Belize's general development, the management plan development should not function as a break on present initiatives to establish core areas. There should be visible, ongoing results directed towards specific localized concerns.

(5) The need for a strong implementation and functional management structure to be developed concurrently with the establishment of suitable management strategies.

Thus, the long range goals would be the establishment of a coastal zone advisory board and the preparation of an ecosystem management plan that features a mosaic of zones for special uses throughout the reef complex-coastal areas which range from strict protection to development.

The environmental liabilities to the coastal zones are primarily man made. Over-fishing, and the catering to tourism are big culprits. Numerous and widespread problems are occurring and are complimented by commercial enterprises and urban centers who look at economics first and environment second. A whole array of these alterations, degradations, and destructions interface with hotel/marine operations, marine fisheries and corals damaged by contaminated sewage, garbage and industrial effluents, as well as erosion of shorelines by removal of vegetation. The choking of coral from siltation because of dredging and filling operations, deforestation (mangroves), and agricultural chemical runoff contribute to this state of affairs.

Another consideration is the trinket market where jewelry and carvings made of black coral, shells, hawksbill turtle shell and manatee bone are sold to tourists. Finally, the trash problem on the beaches and shallow waters are an everyday part of the tourist scene in Belize.

The fact is most of the deterrents to understanding the marine resources and the restoration activities are not technologically imposing. The poor awareness and education programs both to Belizeans and the users - be they the private entrepreneurs or tourists - are critically needed. To work on these problems are basically putting into effect what already is known. Legislated public awareness and enforcement should be undertaken first. When that is done and a review of the situation is made - then the next order of the day is to address those concerns that require more intensive and appropriate technological tools.

E) <u>Agroforestry</u>

Rural people in Belize readily adopt introduced technologies and alternate farming systems if they can be shown that implementing these technologies will improve their economic state or quality of life, i.e. reduced work loads, better health. The USAID TAMP project promotes agricultural systems that utilized agroforestry techniques. Since these techniques are compatible with traditional farming systems, they are being adopted by local farmers.

The rural population of Belize is composed of several ethnic groups and cultures. However, they have in common a commitment to the land, a high rate of literacy, and an eager and interested outlook which makes them highly trainable.

Agroforestry techniques appropriate to the soils, topography, and land systems in Belize are well known. Persons knowing how to apply these techniques are available in Belize. The major constraint to more widespread utilization is lack of substantial evidence that employing these techniques will be economically advantageous.

In the past land was the most available and cheapest resource. There was little incentive to intensify agriculture. However, that scenario is changing with more and more encroachment of marginal lands and the relatively large number of Central American immigrants. Both the indigenous farmers and the immigrants are being encouraged to reduce shifting agriculture in favor of properly managed permanent agriculture.

As with many other sectors in Belize, the technologies for alternative agriculture systems is available, but planning is still incomplete. During the life of this project, a comprehensive land-use plan and policy will be developed and adopted by GOB. With this plan to guide land-use, technologies can be applied where appropriate. This includes improved agro-forestry techniques.

F) Water Quality Monitoring, Watershed Management, and Hydrology

Before the establishment of the Department of the Environment (DOE), water quality monitoring was the responsibility of the Ministry of Health. Although Health still takes an active role in water quality control, the responsibility for ensuring that no environmental degradation occurs from development has been moved to DOE.

Strengthening DOE is a major component of this project. Technical assistance is included where necessary to aid DOE in realizing its objectives. Also, the project provides for at least four nationals to be sent abroad for advanced degrees in environmental planning and monitoring (including marine).

There is not, at present, a properly equipped water quality analysis facility. The project provides for a survey, assessment and consolidation of existing equipment and facilities. For a country the size of Belize, only one complete facility is necessary to serve the needs of GOB requirements.

Resource people with expertise in water quality monitoring and control are available in Belize. Many have worked for GOB, but have moved to the private sector because their expertise was underutilized under their GOB responsibilities. However, with a well-defined environmental policy, GOB will be able to attract those with technical expertise to working in the public sector.

Watershed management will be considered in the land-use planning and forest reserve management plans during the period of this project. Once again, it must be stressed that proper planning should be the basis for all future natural resource project design and implementation. The newly-established Department of Hydrology (DOH) has the expertise, personnel, and mechanisms to advise DOE and MNR on conditions and issues which will be included in land-use planning.

ANNEX ( )

NATURAL RESOURCE MANAGEMENT PROJECT

SOCIAL SOUNDNESS ANALYSIS

Prepared for:

USAID/Belize

Prepared by:

Diversified Business Consultancies Division, Belize Chamber of Commerce and Industry

November 1990

202

Acronyms

GOB	Government of Belize
TAMP/VITA	Toledo Agricultural Marketing Program/Volunteers in Technical Assistance
BABCO	Belize Agribusiness Company
NGO	Non-Governmental Organization
BTIA	Belize Tourism Industry Association
BSI	Belize Sugar Industries
MSC	Multiple Service Centers

C. Social Soundness

Sound economic use of natural resources must be "people oriented". This requires an approach that links community with local and national structures responsible for enhancing and protecting the resources of the country. The aim of any resource management project is to ensure that natural resources are exploited in ways that ensure their perpetual benefit to Belize.

This is also important from a socio-economic point of view. Belize is a relatively poor country, especially in the rural areas. People living in these areas need to make use of the sea, the land and the forest resources. Thus, any plan instituted for the management of these resources must ensure that the recommended measures do not inherently conflict with the utilization of the natural resources by the people. If it does, then the plan will probably not succeed.

This project must be "people sensitive" to the needs of those directly involved. Organizations that represent those directly involved in the utilization of the said resources (such as fishing cooperatives, timber producers associations, and agricultural cooperatives/associations) must be the ones that the project works <u>through</u> rather than only with. This will maximize both the benefits and the participation of those directly affected by the project. It will also minimize constraints (such as resentment and indifference) that may occur if these people are not directly included in the project and are only tokenly "consulted" as is often done in the Belizean situation. The help and aid of those directly involved in the utilization of the said resources through indigenous organizations that represent them is the most crucial aspect affecting the social soundness of the project.

The direct beneficiaries of this project will include:

1) The primary users of the marine, forest, and agricultural resources who have been involved in the planning and implementation of the various components of this project.

2) The private sector and NGOs involved in the actual implementation of the project.

3) The decision makers and related staff of government who are responsible for environmental and natural resource management in Belize.

Women will clearly benefit from this project. The interdependence of the family unit in the rural areas of Belize ensures that whatever economic benefits are accrued to the family will be evenly dispersed among family members. Besides that, women are also important users of the resources. They manage the dive shops, run many hotels and restaurants, help make furniture in the Mennonite villages, and produce fruit juices for the local market in villages in the north of the country. Women's roles in the rural areas tend

20f

Table of Contents

I. Executive Summary

II. Introduction - Background

III. Social Soundness Analysis

a) Participation and Community Organization

b) The Socio-Cultural Context

c) The likely beneficiaries of the project

d) The impact of the project on individuals, the respective communities it is implemented in, and the nation as a whole.

e) The pertinent issues that need to be addressed in this project.

f) The Socio-Cultural feasibility of the project

IV. Recommendations

V. Appendix: Survey data results

VI. Acknowledgements

VII. References

VIII. Scope of Work

205

to be much more flexible than that of men and this enables them to more readily accommodate new ideas and innovations.

Also, women are taking the lead in environmental and conservation issues, particularly at the local level, in Belize. Several of the NGOs involved with conservation in Belize are chaired by women. What is even more significant is that most of the village councils studied in this project were headed by women. In fact, 75% of those who attend regular meetings of these councils are women. This is significant because village councils are the ones that organize clean-up campaigns, the planting of trees, the proper disposal of garbage, as well as the body that introduce new ideas into the community.

This analysis concludes:

1) Most of the people interviewed and/or surveyed have positive attitudes towards conservation and agricultural diversification. This suggests the project will probably be well received among the general populace.

2) Most of the project's direct beneficiaries stated they could contribute to the project. This reinforces this analysis' belief that with proper dialogue there should be no lack of local personnel involvement as well as little negative feedback from the primary users of the project.

3) Government and NGOs are clearly interested in contributing to the project. They have indicated that a project of this nature is very much tailored to their development agenda.

Finally it is concluded that Belizeans are being "sensitized" to conservation/protection issues. All of this indicates that with proper up-front education and awareness-based activities, the "ownership" of this project will be firmly Belizean.

INTRODUCTION

Background

Belize is a multi-ethnic country of approximately 184,000 people, based on the 1990 "Quick Count" census. Population density is very low. Divided evenly between urban and rural areas with more than 30% of the population living in Belize City. While Belize City is predominantly English speaking Creoles (people of African descent), the rest of the country is more diverse with a majority of the rural population speaking Spanish as a first language. Nationally, the largest group are the Creoles (39.7% of total population in 1980 census), followed by Mestizos of mostly Mayan ancestry (33.1%), Garifuna (Afro-Indian, 7.6%), Yucatecan and Mopan Maya (6.8%), Mennonite (3.3%), Kekchi Maya (2.7%) and East Indians (2.1%). A substantial number (estimated between 5,000 and 10,000) of refugees from El Salvador and Guatemala have entered the country in the last five years, settling in both rural areas and cities. They have formed several villages, with their own identity, throughout the country. Also, many Guatemalans and Mexicans enter Belize on a seasonal basis as farm laborers.

Major socio-economic divisions within Belize are along rural/urban lines and among the various ethnic groups. These must be noted when engaging in any project that transcends groups or regions. However, there is a good deal of intermarriage and a slowly emerging national Belizean identity which cuts across ethnic divisions. Class has never emerged as a major division as Belizeans generally value equity and equal access to resources very highly.

Community Participation and Organization

Belize is politically organized on three levels: national, district, and community. Communities elect a council (town or village) and also participate in national elections for a representative for their political division (usually the rural areas of a district is divided into two divisions) who represent their interests directly to the national government. At the district level there are appointed officials who are usually the lower level public servants from each ministry who are responsible for services in the district.

The principal village structure for community participation is the Village Council. This council is comprised of elected members with a chairperson. In some areas of the country (particularly the Toledo District) the village has an appointed alcalde (mayor). The Mennonite communities have an informal Council of Elders. Other key and influential individuals in the rural areas include the school principal, the church leader, the malaria control voluntary collaborator and Peace Corps volunteer if present.

As partners in the project, most communities will be able to

develop or strengthen organizations on their own. Probably the most important and difficult interface will be between the village committee and the project representatives. Project representatives tend to be the urban professionals. They should, when developing workshops and training programs, be sensitized to community views and to their role as participants in the project. In the longer run the incentive for improved economic benefit through proper resource management will strengthen these local institutions such as village councils, and can have a spread effect which will enhance development in more areas throughout the country.

The Socio - Cultural Context

Belize is a multi-ethnic, multi-lingual, multi-religious society. It is a small country with an excellent bus system, a radio system that reaches all of the people, and various television stations that are capable of reaching more than half of the population. With the exception of the undocumented refugees, people can be reached - but the message must be tailored to cultural differences.

There are three general constraints that need to be addressed in this project before implementation. The first has to do with the social context. There seems to be a rural/urban syndrome in Belize that adversely affects policy implementation. Most decision makers are urban. Yet, most of their decisions are for implementation in the rural areas. For example, those who will effect most of the decisions in this project are located either in Belize City or Belmopan, whereas most of the decisions are going to be implemented in the villages and the cayes around the country. Analysis of the surveys done in this analysis show that most of the people in the rural areas where the project will be implemented are offended by this fact. They are not resentful of the project itself, but of the perception that they may not be a part of the decision making process.

The second concern is the political context. Most of the survey respondents do not hold politicians in high esteem. They do not seem to distinguish between politicians and government officials. Both have the same level of esteem. Most of the people living in the rural areas who were surveyed generally are very independent people with a long tradition of doing their own thing and ignoring many government directives. They probably have seen too many promises made and too many broken.

The third concern is perhaps the most important. It relates to the economic context of the areas being considered for the implementation of the project. With the exception of the cayes, most of the areas can be considered poor. This means that the resources utilized in these areas are not so much utilized to make a profit, but to survive. Most survey respondents mentioned that they use a resource such as wood for fuel - which can be considered basic to their day to day existence. Therefore most cannot 'not use' the resource. This is vital to the understanding of why most

may be resentful if they are told that they cannot use the resource as they wish.

On the plus side however, three general factors will work to the benefit of the project. Firstly, the rural communities, although ethnically different from one another, tend to be cohesive operational units. This suggests that decisions made at the community level usually are respected by most of the community. Most of the communities are tightly knitted socially and culturally and tend to act as a group. Therefore, if the leaders in the respective communities are "sold" on an idea, it is usually not hard to convince the other members of the community to be involved.

The second factor is that most of the members of these communities speak 'Creole' (the local dialect) and are literate. This means that it is not impossible for them to understand a new idea or, for that matter, a rather complex idea like conservation. When surveyed, most of them had a general concept as to what conservation is. More encouragingly, most thought it was something necessary in Belize.

The third factor is that the country itself is physically small and sparsely populated. The people are in contact with most of the other ethnic groups and there are no major divisions among classes. People tend to accept each other as Belizeans and tend to 'root' for one another as a whole. In other words, there is no one ethnic group that is demeaned or isolated by the other ethnic groups in Belize. This means that it is not impossible to draw all ethnic groups into a comprehensive and integrated project such as this one.

The Project Beneficiaries

In the broadest sense, it is suffice to say that all Belizeans will benefit from more efficient management and utilization of the country's natural resources. However, to get a more realistic picture, the areas which will more directly benefit from the project were assessed.

The direct beneficiaries of the marine resource activities will be the people of the cayes, the fishing villages on the mainland and Belize City. The cayes will benefit from this project in three ways. First of all, management of the marine resources will benefit the fishermen. Most of the fishermen surveyed by this analysis said that they realize the importance of creating marine reserves such as the one at Hol Chan and of not catching undersized marine products. Most would like to see laws that are presently on the books, enforced. The fishermen, who are directly involved in this activity, realize that they themselves can potentially benefit the most from such a project. They recognize that if such a project can put just a small dent in the illegal fishing by neighboring nationals such as the Guatemalans and the Hondurans, then all Belizean fishermen will benefit. This is incentive

enough! All surveyed stated that they would be willing to do their part in marine resource conservation and protection, as long as they are not the only ones doing it. Therefore a project that includes participation of the Cooperatives, which is the only legitimate representative body for the fishermen, can achieve very positive results.

Secondly, the hotel, restaurant, and dive-shop owners plus tour guides and others who depend on the tourist potential of the marine resources see the economic benefits of supporting such a project. Ninety percent of those surveyed saw the tourist potential in the creation of marine reserves such as Hol Chan can help Belize's reputation as a major eco-tourism center for the region. The other ten percent simply had not heard of Hol Chan. Most recognize that the destruction of the reef means the destruction of their trade. Most also said that the depletion of the marine products will harm their respective trades because tourists come to see the diversity of fishes, lobsters, and other marine life as well as to fish and eat these marine products. Therefore if they are gone, their business will be harmed.

Thirdly, the residents at these cayes are alarmed at the lack of conservation measures. Less fish, conch, and lobster, means less recreational activities and less resources for their sons and daughters to enjoy in the future. Therefore, these people, the community leaders, the wives, and the residents see the need for conservation measures and are willing to join the conservation fight.

Similarly, people in fishing villages are willing to put their worth into conservation matters. The village of Hopkins, for instance, fish mainly for grouper. When spoken to, most of the village leaders and the fishermen stated that there should be some conservation measures put in place for the protection of this species such as catching only a certain size and releasing those smaller than the stipulated size. The ones who will have to suffer the most in the short term by these measures see the need and are willing to catch other species of fish for a while until the grouper population is replenished. Therefore they deserve help.

People in Belize City also see the need for marine resource conservation. Again, they have said that if we continue to destroy our reef and if we let the lobster catch and the shrimp catch go the same way as conch, all Belizeans will lose and most will have to pay a much higher price for the product. Again the bottom line was one of economics. It's a very powerful argument, one that catches the attention of most Belizeans. The BTIA in Belize City expressed particular interest in this project.

After analysis of the survey results concerning the forestry components, the following statements can be made. Most agreed the forestry department is a very neglected department. It is also a department with a very high staff turnover rate. Many or most of the officers in that department have limited training in

conservation matters. However, what is positive is that the officers and administrators willingly admit to this deficiency and recognize the value and need for help in this area. This is therefore a priprity area with regards to this project, both in the enforcement aspect and in the educational aspect. Training for these officers and for new officers must be a priority if a sound conservation policy is to be enacted and sustained. One of the reasons why this department is so under-trained is in the past there was a tendency to supplement the personnel of the department with foreign trained people who stay for short periods. Local people need to be trained in forestry activities in-country and put in charge of projects of this nature to encourage sustainability.

The Belize Timber Producers Association, the sole legitimate representatives of the loggers in Belize, also recognizes the need for better forestry management programmes in Belize. This is particularly noteworthy because this organization represents people who have vested interests in exploiting forest resources. People interviewed from the association stated they have tried to maintain small nurseries for replanting but need help to do it on a larger scale. These are people who realize they can benefit from a better forestry management programme. They have even started one on their own called Sustained Yield Project. They recognize the benefits of such a project and are willing to help. This organization should be looked at as a project resource.

The villagers who do small time logging and sell to the small sawmills around the country also represent another target beneficiary. In fact, a few of these people even operate their own small sawmills. By targeting them, one will be catching two birds with one stone. Many of these villagers have stated that they would be willing to start replanting once the seedlings are provided. They have also recommended starting programmes in the village schools to talk about conservation, as well as distributing booklets and leaflets throughout the villages.

In the agricultural sector, there were approximately 11,500 rural households in Belize directly involved in farming as based on the 1980 census. Perhaps another 1,000 live in urban areas but own or manage a farm. The 1984 labor force survey (Ministry of Economic Development) lists a total population of 12,210 adults employed in farming, which includes 1,146 women and an unspecified number of farm laborers. This latter figure probably under-represents women who contribute labor to a family farm, and does not include children under 18 who also make major contributions throughout the country.

There are a substantial number of farmers, perhaps as many as 1,000 who have land, access to mechanized equipment, and sufficient family labor, to participate. The largest and best capitalized farmers are more likely in the project to move fastest in taking advantage of the crops developed under this project. Particular attention should be paid to perfecting better information flows to these less wealthy and less educated farmers on new technology

packages related to the "new" crops. Nevertheless, there are no detectable cultural or social obstacles to innovation in farming systems among these farmers.

Corozal and Orange Walk districts are culturally homogenous, being settled mostly by Maya/Mestizo descendants. Many are subsistence farmers with some cash producing enterprises like fishing, pig raising, working on sugar estates, logging, and chicle gathering. The major change in the economy of the area has been the rapid increase in production of sugar cane, from 4,503 tons in 1955 to 43,400 tons in 1966 to 114,278 tons in 1983 to 105,000 tons in 1984. A major impact of the decline in sugar prices was the closing of the Libertad sugar factory in 19__ which put over 1,000 people out of work.

However there have been some positive changes in the sugar industry in the past few years. The total tonnage for the 1990 crop season (up to August 1990), for instance, exceeded that of any comparable period by 18,100 long tons. Total earnings for that period were $17.5 million more than the comparable period last year. Nevertheless, the industry is still volatile since it still depends on quotas and preferential trade agreements.

Until 1972, the vast majority of cane was grown on the large plantation of the Belize Sugar Industry (BSI). At that time the GOB and BSI agreed to transfer production to small farmers, and established cane fields were sold to 220 farmers with eight years to pay with a system of quotas for delivery of cane to the factory. Over the next years many new quotas were issued, reaching a total of 4,955 licensed quota holders in 1984.

The advent of cane farming as a source of cash led to drastic changes in the cultural and social structure of the north. The changes began earlier in the Corozal District where the first modern factory was established. A number of studies of the area found some decrease in nutritional standards, less economic autonomy for women, an increase in social and economic inequality, and indications of strain in the fabric of community and village life. Political opportunities and village factionalism made community action very problematic. On the other hand, the family network proved very durable, and cane production became increasingly a family business as groups of related farmers pooled their field labor and their capital in order to invest in equipment and the related new technologies necessary for increased production. Other effects of the rise of cane as the major cash crop, was a rapid rise in disposable income and living standards, a rapid decline in food production in the area, and a rise in the price and value of land.

Since the time of the first distribution of quotas (licenses for cane delivery), a number of changes took place in the system making it extremely difficult to obtain the exact number and profiles of the present cane farming population. The net result of these changes today is that there is no longer a close relationship

212

between the statistics available from the Cane Farmer's Association (CFA) on the number of license holders and number of cane farmers, or the actual acreage and/or distribution of cane plantings. Some farmers grow cane, but have no license. Thus they sell cane at a lower price. This number could range from 500 to 1000. These producers have very small operations with cane as their major source of income. The total number of active cane farmers at present is between 4,250 and 4,750. However, this is not the total number of possible beneficiaries of the present project in the two districts. Because of the high haulage cost per ton of cane and the historical growth of the industry centers around the two factories, there are many villages in the two districts that have never participated fully in the cane boom. Analysis of the 1980 census shows that there are probably 3100 men population in the rural areas of the two districts who are not cane farmers. Many are probably day laborers, but others are the small subsistence farmers and the Mennonites - all of whom may be interested in participating in new cash crop opportunities. The number of farm beneficiaries in these two districts alone may be about 7,000 farmers.

Meanwhile in the South the TAMP/VITA project in the Toledo district provided some good crop diversification techniques appropriate to small farmers. These could be used as good working models for crop diversification activities elsewhere.

TAMP does very well interacting with small farmers. The project also seems to be doing very well working with these farmers in establishing and rehabilitating cash crops such as cacao. This effort will probably go on after the project is completed provided farmers continue to plant alternative cash crops such as cacao, citrus and annatto. To strengthen agricultural diversification efforts in Toledo, support may still be needed through technical assistance and extension service - which might be provided through the Multiple Service Centers. The immediate beneficiaries of the project were the farmers because the project directly involved them.

IMPACT

Belize has already begun to establish some meaningful credentials for itself as a country very much concerned in ecologically compatible development such as eco-tourism, eco-manufacturing and recreational activities. Therefore, many of the mechanisms already in place should undoubtedly increase the spread effects of a project as this one.

To achieve maximum spread effects within the project, two points should be considered. First, it should seek to involve as many of the local people in the target areas as possible. This ensures that a maximum number of the people directly involved in the utilization of the resource base will be "sensitized" to stated

213

project goals and objectives. It is reasonable to assume that there will be more users and much more use of the resource in the future. Therefore the users of the resources today. when "sensitized" to the goals and objectives of the project, can be the "base" through which goals and objectives can be implemented in the future. Then, the next legitimate steps of the development process can be undertaken.

The second consideration for assuring the spread effect is basically an extension on the first suggestion. In order for the project to achieve maximum impact and spread, it is imperative an increased number of users of the resources be involved in the decision making aspects of the project. Two reasons account for this:

1) Many foreign based projects frequently fall short of expectation in Belize because they seem to maintain contact with only a particular section of the Belizean hierarchy, such as the government and/or the urban NGOs. This project, in order to set a new standard both in innovation and success, needs to maintain maximum contact with those diractly influenced by the project. Again contact means including these people in the decision making process. The project's decision making process must involve the grassroots level so that it can become "their project". This is only natural - if a person feels "ownership" of the activity - they put more effort in it.

2) If the users of the project are part of the decision making process then it is seems logical that after the project is completed, there will probably be a group left behind that is willing to carry on. These people, in all likelihood, will continue to stay involved. It is a critical element when addressing long term maintenance and institutional issues governing projects. The NGOs in Belize City will probably move on to other projects as will the government. However it is conceivable those involved as users of the project will be around for the todays and tomorrows.

The activities proposed in this project are clearly replicable. In fact one of the objectives of the project is to develop viable models for replication. It is important to emphasize the research and development elements in the project. This is enhanced replication. Critically needed in all components is data on a broad range of subject areas for example, a forester by the name opf Mr. Martin Meadows, who worked with the Belize Prosuce Company Ltd. when they logged in the Duck Ridge Area, reported that he did not see the natural reforestation that he was accustomed to seeing in the past. In fact, there were very few young trees. The stortage in the so-called, primary species,was very glaring. therefore a complete inventory and follow-up exercisein needed in this area to determine the cause and extent of the problem.

214

Research and development such as this, in all aspects must be pursued competent data will be used and so that the work done will continue beyond the life of the project.

ISSUES

Two issues should be addressed because they influence the "success" of the project: (1) politics and the role of government and, (2) the role of environmental groups in Belize.

Politics and the role of Government:

The people interviewed in this analysis were asked whether or not they viewed politics as an important determinant related to the success or failure of the project. Most stated that they would prefer the project remain "free of politics". People interviewed were also asked whether or not they thought the government should oversee the project. Again, most answered that they would hope that whoever funds the project would not put in the hands of the government. They feel little positive will occur.

Two social implications have been alluded to in this report, but should be noted again. 1) Rural people of Belize can to be very independent. They are accustomed to doing things a certain way. They also tend to be closely knitted in terms of family bonds and their community. Much of their sphere of experiences and influences are often limited to their village or community. In must rural societies people are more apt to open up to outsider than urban. Be careful at any misinterpratation here. Generally they are not the kind of people who welcome outsiders with open arms. People who are accepted in the communities are usually those who have lived there for relatively long periods of time. Most do have an unfavorable view of politicians. They will listen, accept the little that they do get, but tend to accept the fact that with politicians, promises are made to be broken. They seem to rely or have more confidence in themselves than on urban people in Belize. The differences of individualism displayed in Belizean rural/urban communities is interesting and probably should be the basis of more studies on group dynamics in Belize.

2) The questionnaire consistently indicated rural dwellers felt there was an attitude of superiority displayed by those from the urban centers who were leading on directing of rural based projects. This contributes to the "perpetuation effect" of resentment by rural communities of all government officials. The findings of the questionnaire does indicate that there is a definite rural/urban socio-psychological displacement and that it must be taken into consideration in the conceptual framework of this project.

The second issue addressed relates to the role of Conservation/Environmental groups in Belize. This analysis asked people in its questionnaire to assess the role of the conservation

groups in Belize. It was that many of the respondents were familiar with the conservation people or agencies and even fewer had any contact with them. Concurrently many of those who had contact with the NGO's did not particularly express positive feelings about the organizations. Two reasons seem to stand out:

1) Many of the people surveyed are users of resources in question. Yet, for reasons not clearly understood, these same people had less contact with the environmental groups concerned with the conservation and/or wise use of those same resources.

2) Those that were in contact with the environmental groups expressed an "us against them" mentality. They seemed to feel that the environmental groups regard them as "the culprits" who should be told to do better and how to do it better, more on the order of a student - teacher relationship.

This study also contacted most of the environmental groups in Belize. The interviews could be sumarized by the following:

1) Most of the environmental groups seem to be more concerned with enforcement over education and research when asked to prioritize these three specific conservation areas; namely research, education and enforcement.

2) When asked about their activities involving education, all activities most did not claborate on including users as part of the education process. They tended to look at it more from professional on professional to "general" public.

3) When asked about the conservation knowledge of the users, most of the environmental groups indicated that they felt that the users had very little conservation knowledge (This analysis did not come to the same conclusion). They tended to view users as environmental culprits.

This analysis suggests that environmental groups in general do not spend enough time conversing with those who are directly involved in the utilization of the resources in question. Further, they have been somewhat remiss in trying to involve users in their projects, especially during the decision making process. Finally, they to their cause to look these people perhaps unintentionally as "adversaries" or "irritants".

Socio-Cultural Feasibility:

Based on the field assessments and the composition of the stated project components, judge the Natural Resource Management Project

216

is socio-culturally feasible and is implementable in the context of Belize.

1) Administrative Context

This study shows that with the proper assistance, the administrative personnel within the specified target populations will be able to undertake many of the activities proposed in the project. The reasons are:

a) most surveyed are aware of and concerned about conservation issues and no significant adverse or negative reactions were noted among the interviewed leadership.

b) most of these interviewed actively want help and assistance in conservation matters. They recognize the need for more basic information, more educational programs, and more enforcement procedures and ask that help in these areas be given to them. All they want is to be a part of the process from inception.

2) Organizational Context

Analysis shows that the target populations are fairly well organized at the local level and in a manner that should help the project to succeed. Reasons include:

a) the cohesiveness of the family unit is a positive factor in assuring the benefits from the project will be equitably distributed within the family.

b) most communities have active councils which are respected by local people. In fact, these community or village councils may possibly be the most potent political force in rural Belize. Most of the community leaders interviewed in this study said they greatly desire to be a part of the project.

c) most of the users of natural resource surveyed in this study belonged to some formal organization whist represent their interests. Interviews with people from these organizations have indicated that they are willing to help with any conservation project. Most feel the needs are urgent.

d) a significant number of the villages or communities surveyed do link with other nearby communities or towns. This means that the isolation factor is not so much a factor in this project as what some thought it might be. Another equally positive factor is that most of the people in these communities speak the local dialect (Creole)

regardless of their ethnic origin. This suggests information can be communicated throughout the project in a consistent manner.

3) Technological Context:

Although the users of the natural resources in question currently apply what some would suggest as "primitive technologies" in utilizing resources, the kinds of technological innovations being proposed do not appear to be a negative factor in regards to this project. There are several reasons:

a) Users of the resources are not averse to technological innovations. Most have heard of new and better ways of farming, logging or fishing and have expressed a willingness to explore and test these new methods.

b) Most users are adequately educated to take advantage of new technological innovations. The relatively high literacy rate in Belize and the fact that most of its people are trainable is a positive factor in ensuring that it will not be a long and drawn out process in introducing new technologies.

c) Since the population is small, most of the users will not be displaced by the introduction of new technology. Probably the opposite will happen since newer technologies often help the users to utilize the resources in a more efficient and less wasteful manner.

4) Economic Context

Economic well being is a factor affecting this project. As stated earlier, Belize is not a rich country where people can opt for laying off a resource in favor of another. People who are fishermen, farmers or loggers cannot just stop using their resource and switch to another. However, Belize is also fortunate that the resources in question are still in plentiful supply and if restricted for use only by Belizeans, there is adequate amount to supply the needs of most Belizeans. Therefore it is possible to institute conservation measures and still allow utilization of the resources. In fact, it is most advisable to do so.

a) If traditional users of the resource are not restricted from using the resource, it will be much more easier to enlist their participation in the project.

b) Conservation or proper resource management in this project should not be equated solely with preservation. The project goal should be implicit in that the efficient utilization of the resource is just as important as any "moratorium" on the use of the resource.

4) The Ideological Context

The ideological context is a positive factor towards the success of this project. Both the government and the people of Belize have favorable attitudes about conservation. In fact, this may be the most positive element of all with regards to this project. Two reasons account for this:

a) Belize's stress on ecologically sound development is making showcase in the region and is instilling pride in many Belizeans. It is something that many want to see encouraged and strengthened. Thus a project such as this one can be viewed with a more positive attitude.

b) The conservation measures currently in place have for the most part been successful. The reserves both on land and sea have, for a large part, been favorably received. It has helped the country develop its tourism base and has encouraged more interest and financial help in conservation from abroad. Thus a project with similar ideals will be well received by all relevant agencies in Belize provided there is more "hands on" participation by the local populace.

Due to the attitudes and literacy of most Belizeans, the project is deemed socio-culturally feasible. What is needed is to make sure the project is placed more in the hands of Belizeans. Local Belizeans, especially those directly involved in the utilization of the resource,need to be involved in the decision making aspects of the project.

RECOMMENDATIONS

This section lists in greater detail the directives recommended to achieve the specific contact objectives in the previous social soundness statements. These recommendations are based on the analysis conducted by this social soundness analysis only.

1) The socio-cultural context:

(a) The rural/urban syndrome where most decision making takes place in the towns and/or cities, but most of it effective in the rural areas. Resentment builds in the rural areas because of this. This analysis recommends that contact be made through the appropriate local entity like councils in the target areas and that at least one member of the selected organization, be utilized as project contact in that particular area.

(b) The second recommendation relates to economics. As stated, most people use the natural resource in question for subsistence purposes. It is recommended moratoriums not be proposed in the project. This can be disastrous to many of the poor. Analysis done by this study seems to indicate that it is not the average fisherman, farmer or logger who is the biggest conservation culprit. It is the big citrus growers, the illegal shrimp and fish boats from other countries and the large logging companies are the main vialotors. Enforcement must be directed towards then as well as the traditional pan people in the rural areas.

There were also three three aspects stated that made the project socio-culturally possible. The first one talked about the cohesiveness in decision making in the community. It is recommended by this analysis that this cohesiveness be utilized to its maximum. The project should call a meeting of the village leaders, the education leaders, the church leaders and the political leaders and enlist their aide. This must be incorporated as a first step in project design.

Although Belizeans are ethnically different, most speak and understand "Creole". Even the illegal aliens know this and try to learn Creole as fast as they can in an effort to assimilate. Therefore it is recommended that those trying to "sell" the project to target areas do so in "Creole" -because most people will be able to understand the project, which is one of the biggest factors that is being stressed by this social soundness analysis.

There is no real racial and/or ethnic separation in Belize. There are rumblings, however, of discontent against aliens, especially in the rural areas. Therefore it is recommended that no one group be singled out for special treatment by the project.

2) Beneficiaries:

Related to the Cayes and fishing villages, the following

recommendations are made. The project should incorporate the participation of the Belize National Fishermen Cooperative Association and the Belize Tourist Industry Association. The Belize National Fisherman Cooperative Association is the umbrella organization of all fishing Cooperatives in Belize. The Belize Tourist Industry Association represents most tourist operators in Belize. These two groups have the most impact on the marine resources of any group in Belize. It is imperative these two groups be included in the project cause. They have expressed interest and are willing to be a part of the project. A key contact for the Belize National Fisherman Cooperative Association is Mr. Bobby Usher of Northern Fishermen on North Front Street in Belize City. A contact for the Belize Tourist Industry Association is Maria Vega of the Belize Institute of Management. A possible way to utilize these two agencies is to promote conservation units within each of their respective organizations.

In forestry, the following recommendation is made: the Belize Timber Producers Association be included as a resource and that this association be given assistance in setting up a conservation unit. A contact person for this association is Mr. Carlos Romero of Romero Lumber Company on Fort Street, Belize City. This is the legitimate logger organization within Belize.

In Agriculture it is recommended that:

A) The MSC concept of the TAMP activity be used as working model for this project. The MSCs perform well for small farmers groups. This analysis suggests that working models of the MSCs are legitimate and proven vehicles for new diversification activities to other parts of the country.

B) BABCO be re-defined so that it can become a vital marketing force for the farmers in Cayo, Orange Walk and Corozal. It must also continue to do research and development and link to viable markets.

3) Spread Effects and Impact

For the project to have an effective spread effect, the following is recommended:

1) Incorporate local students into the research and development component - wherever possible. Incorporate local schools into the project. Primary school children, especially those in the rural areas, often provide the innovations within their homes. Many of the respondents to the survey stated that their children were the ones

221

who brought in the new ideas in the home. It is essential the project effectively use the local schools.

High.school and sixth form students should, wherever possible, be incorporated into the project. Conservation competitions, essays, debates etc. are interesting and effective ways of achieving multiplier effects of the project. Students at the university level could also be a the research process. It is cost effective and uses Belizean in a more effective manner.

The churches in the rural areas are also good instruments for spread effect. Churches in rural Belize are a very dominant force when it comes to the spread of ideas. The pulpit in these areas is used not only for the spread of religious ideas but also for the spread of social and political concerns. The project should encourage church leaders and their members. They are constructive vehicles to "spread the conservation/protection word."

To accelerate spread the project should assist organize and involve local users into producer associations, cooperatives and other such organizations. By pooling their resources, time and energy, more maximum results can be achieved. The Toledo Small Farmers Association is a good workable example.

In all of the above, special note should be made of the influence and role of women in these local institutions. they have demonstrated the ability to lead and maintain local group cohesiveness. They are also receptive innovators as well as agents of change.

4) Roles

Government:

The GOB role in this particular project should be oriened towards that of a regulating body. This is so because there is so much pressure on it already to do so many other things. Because of pressures and the current chronic lack of staff experienced by all the departments, GOB is not always the best agency to implement the project. It some cases it is better handled instead by a conservation based NGO's.

The role of women:

If you want an idea to catch on in the rural areas, involve the women. Women form 75% of the village councils, church groups and other local organizations in the rural areas. Women also play the major role in organizing village festivities and group sessions. Most of the teachers in the rural areas are women. Therefore, educational activities designed for village level, must fully incorporate women as

part of the local decision making process.

Although women may not be involved in the direct utilization of the resources as much as men do, they frequently play a major role in the secondary uses of these resources. For example, women use the papayas grown to make juices, they are heavily into the hotel business and they also use a lot of the wood logged to make furniture. Therefore the more secondary uses of the resources is encouraged, the more women will be involved.

Women have taken the lead in directing and actively supporting conservation organizations and/or movements at the local level. The Hol Chan reserve was the result of as much women's efforts as it was men. This is because women are generally more flexible than men are in their activities. They come into contact with more innovative ideas than their male counterparts do. Conservation and management efforts are apparently appealing to them and their special skills and receptiveness in this area should be utilized to the fullest.

The role of the Environmental NGOs:

They need to do a better job of changing some of the negative perceptions. As stated, most of the rural people interviewed by this analysis, see the NGOs as aloof and elitist. They are perceived as people from "the outside" who buy land or perform a service for the benefit of others and not for the locals - especially the local users.

The NGOs should incorporate more local users into their projects. Local users and their associations stated that the environmental associations often times do not involve them in their projects. When done do, it is frequently only as a token partner.

In sum, NGOs need to work harder at reducing or modifying some of these negative perceptions local people have about them. One way is to do a better job of informing them what is going on. Of course including more local people into their activities and offering more on-site training will be very contrustive. They must especially include the local users of the resource they are trying to conserve.

223

The following is a summation (in percentages) of the 128 surveys done in the six sector areas of Belize concerning the two components, Environmental Planning and Agricultural Diversification, of the Natural Resource Management Project.

SOCIAL SOUNDNESS ANALYSIS SURVEY RESULTS

1) Knowledge of environmental conservation.

Excellent	Good	Fair	Poor
25.2%	30.7%	36.9%	7.2%

Excellent - both theoretical and practical knowledge.
Good - more practical than theoretical knowledge.
Fair - practical knowledge only.
Poor - no practical or theoretical knowledge.

2) Level of utilisation of Natural Resources.

High	Medium	Low
72%	17%	11%

High - used as means of livelihood.
Medium - used as partial means of livelihood.
Low - little or no contact with natural resources.

3) Level of Conservation of Natural Resources.

High	Medium	Low	None
42%	50%	3%	5%

High - utilises practical means to protect resources on a daily basis.
Medium - practices some means of conservation some time.
Low - not really interested in conservation.
None - total lack of conservation.

4) Conservation measures suggested.

Education	Enforcement	Laws
36.7%	19.5%	18.8%
Research	Reforestation	
7.5%	17.5%	

5) Agency/Group suggested for environmental conservation implementation.

Local Private - Government	Foreign Private - Government	Other
43%	54.5%	2.5%

6) Previous environmental (Belize) projects known.

Locally Sponsored	Foreign Sponsored	Both	None
9.3%	16.8%	6.3%	67.6%

7) Beneficiaries of environmental conservation.

None	Local	National	International
2%	41%	51%	6%

8) Anticipated environmental conservation policy drawback.

None	Corruption		
	Local		Foreign
	Private	Government	
2%	16%	9%	5%

15. Previous Experience with Crop Diversification.
Locally Sponsored 0%
Foreign Sponsored 0%
Both 100%
None 0%

16. Factors that affected the results of past diversification efforts.
lack of Finance 32.0%
Lack of Market 40.0%
Lack of Training/Education 24.0%
Lack of Proper Pest Control 4.0%

17. The effect of past experience on present crop diversification efforts.
Positive 91.7% Negative 8.3%

18. Community Reaction to crop diversification.
Positive 98.8% Negative 4.7%

19. Cultural attitudes and its effect on crop diversification.
None 57.1% Complacency 4.8%
Corruption 0% Inter-ethnic problems 38.10%

Inter-intra Ethnic Problems - Blood Relationship
Ethnic Prejudices (Creole/Garifuna Belizean/Alien/Regugees).

DESCRIPTION/SPECIFICATIONS/STATEMENT OF WORK

A. Purpose

To conduct the Social Soundness Analysis which will be incorporated into the new Project Paper on Natural Resources Management and Protection (NRMP) for USAID/Belize.

B. Background

The 1991-95 Country Development Strategy Statement (CDSS) for Belize focuses USAID effort on two priority sectors - agriculture and tourism. The strategy is to help the Government of Belize (GOB) develop the capacity to rationally plan and manage its resources to effectively guide economic growth, while continuing to address key constraints to growth in the two priority sectors. The NRMP project is a major instrument of this strategy to enable Belize to increase and sustain economic activity in agriculture, forestry and fisheries, while protecting the country's natural forest and marine ecosystems.

A central feature of the NRMP project is development of natural resources management capabilities including land use and coastal zone management. The project intends to provide assistance in policy, regulations, protection and the economic use of the resources in crop diversification, forestry and fisheries. The project builds on several existing USAID agricultural efforts - particularly in new crops development and non-traditional exports. It recognizes that agricultural development must be actively linked to forest and marine environments.

Experience to date in addressing natural resource management and related environmental concerns shows the necessity of understanding the people and the communities involved in these processes. The development and implementation of any planned interventions without explicit concern for the people affected has little or no chance for success. Considerations such as gender based assessments of demographic and other socio-economic data, culture and community structure analyses and assessments of the inherent potentials and capabilities of the resident (target) populations must be fully addressed starting with the project design process.

1. Scope of Work

The Contractor shall produce the Social Soundness Analysis for the Project Paper in accordance with A.I.D. Handbook Specifically, the Contractor shall:

a. examine the current levels of the environmental awareness at all levels - from the politicians through the tourism operators and industry down to the hillside farmer and artisanal fisherman;

b. analyze and assess community relationships between different sectors such as farmers, fishermen, technical workers and private sector/government officials and make recommendations, as appropriate, to the specific roles that these participants can have in supporting stated project activities;

c. describe the formal and informal communication systems influencing decision making in the communities, taking into account gender differences within these systems;

d. collect, review and analyze existing data and studies relevant to project concerns on the various people in agriculture, fisheries, forest management and use of natural resources;

e. interview representatives of local non-Government Organizations, community organizations and cooperatives to obtain information on actual/potential roles of the clients in project activities and the anticipated effects of the project on these individuals or groups;

f. give specific attention to women's relationships with the environment in Belize -- include such matters as women's special problems to credit access, training, land ownership, family maintenance and their sensitivities to environmentally related issues; and

g. based on the above, make recommendations as to how the traget groups can be an active part of the project activities; and identify obstacles that may arise from intra-family, local and national-level socio-economic forces that may interfere with the implementation of project activities; include the kinds of support which can improve effectiveness of their resources such as training, technical assistance, and structured incentives.

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Oscar Rosado - Chief Forestry Officer

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This report is dedicated to the users of the natural resources of Belize.

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Disclaimer

The opinions expressed in this report are those of the author and are based on the field experiences of this consultant and the compiled results of interview forms which were completed.

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DRAFT 10 June 1991

ECONOMIC AND FINANCIAL ANNEX

NATURAL RESOURCES MANAGEMENT AND PROTECTION PROJECT

INTRODUCTION

This project has three major components: environmental planning and monitoring, sustainable agricultural production, and forest development. The analysis which follows includes a review of financial analysis issues, discussion of the economic traits of the project, and an analysis of each of the components.

The primary approach of the project is institution building in support of environmental protection and management activities. Some activities are follow-on to components in previous projects while others represent new activities for USAID and the government of Belize.

Since conventional benefit cost analysis would be inappropriate for this project, other techniques will be used. Cost-effectiveness, replacement cost or shadow project techniques as well as a review of recurrent cost and resource user incentive issues comprise the approach followed here. These are explicit or implicit alternatives suggested by USAID Handbook 3.

The relatively good environmental and natural resource situation in Belize provides an opportunity to address important issues before the costs become prohibitive. The "Financial/Economic Considerations" in the Project Identification Document noted several important points relevant to the approach to be taken in this economic and financial analysis.

- While Belize is not yet an environmental disaster area, there are clear signs that corrective or protective actions should be taken now, while the economic situation is good and the natural resource base is relatively intact or can be rehabilitated at a modest cost.

- The cost of building institutions and developing effective mechanisms to support sustainable development is cheaper now than when the base lies in shambles.

These points serve to place into perspective the with and without descriptions of the possible effects of this project. There are examples of situations and problems in Belize which, if unaddressed, will lead to the same erosion, deforestation, pollution and environmental destruction problems extant throughout Central America. Failure to begin addressing the problems will simply result in much more costly solutions in the future because protection and sustained management are easier with the resource base intact than after it is destroyed.

FINANCIAL ANALYSIS ISSUES

The purpose of financial analysis is to ensure that an activity can be paid for and to determine the profitability of a project from the standpoint of an individual or public or private entity for whose benefit a project is undertaken. Its principal purposes in the context of this project are: to judge whether outputs would be produced at the lowest practical cost and whether the unit costs of outputs is reasonable; whether resource users who will be the ultimate beneficiaries of project research, training and technical assistance inputs will be able to improve their situation by changing their behavior or adopting the recommended technologies; and how they will react to policy changes.

An additional important issue is the ability of the government to deal with recurrent costs. Recurrent costs are defined as the operating expenditures needed to carry out the project activity. The primary issue is the ability of the government, NGOs and individuals to maintain and carry forward the activities begun by the project after the termination of donor assistance. Often this issue has to be sidestepped because of on-going problems of government finance in developing countries. Clearly, resource mobilization will be a problem in a small country like Belize. USAID/Belize has proposed a Fiscal Policy, Planning and Management Project which will partially address these issues. Analysis here will note the direct and indirect effects of various components of the project on recurrent costs. This will include potential revenue generation activities and the potential for increased economic activity leading indirectly to an increase in government revenues.

There will be little or no direct financial benefits--revenue generation--under the project. Under such circumstances cost-effectiveness analysis is recommended by AID Handbook 3. In this case, there are no significant differences between an economic and financial cost-effectiveness analysis. An institution building and environmental education project which will involve a complex set of environmental and natural resource benefits could not readily be analyzed by the conventional benefit cost approach of economic analysis. Even should benefits be quantifiable and some shadow price estimated, that information would not have any relevance to the financial analysis since a revenue stream is needed to calculate individual or project internal rates of return. In order to avoid redundancy the cost-effectiveness analysis is performed in the economic analysis section of this annex.

Another aspect of financial analysis is the individual or group financial effects of involvement with the project. The ultimate success or failure of this project in terms of reducing natural resource and environmental problems or preventing problems from developing will depend upon the ability and willingness of natural resource users to change their behavior. Changing practices is often a short-term financial decision by people who have few choices. Therefore, an essential element within the project component implementation should be explicit examination of the incentive and cost structures faced by resource users.

A preliminary determination of some of those behavioral change possibilities will be made in this analysis where appropriate.

ECONOMIC ANALYSIS

This project is designed to address sustainable resource issues through institution building, development of alternative technological packages and environmental education and management. Conventional benefit cost analysis is not applied to these types of projects since there are no outputs that are easily given an economic value. Illustrative material is often used to show that the activity has the potential to affect the problems being addressed by the project. These activities share similar economic and social characteristics which influence how society deals with their provision and the analytic problems they present to the benefit cost methodology. These characteristics are discussed briefly in turn below.

Planning, education and environmental services are often provided by governments because they have two characteristics. Within limits, some resources can be shared by two or more compatible users without subtracting utility from any one user. In economic terms, the marginal cost of an additional user is zero or close to zero. In terms of access to users, clean water, abundant wildlife and other factors contributing to the quality of life have, in effect, a marginal cost of zero. This is the case up to a threshold where the absorptive capacity or a replacement rate is exceeded. A central issue associated with this characteristic is how the costs of provision are shared. The Hol Chan Marine Reserve is an example of this issue.

The ease of access or, conversely, the difficulty of excluding others from access or exposure to the good affects resource use and provision decisions. When exclusion costs are high, the access or exposure to the resource will be difficult to police or, in some cases, avoid. When many people are interdependent over the same resource which has both marginal costs of zero and high exclusion costs the "free rider" problem exists. In this case, each resource user knows that if resource management is improved, no one can be excluded, even if they as individuals did not contribute to the improved situation. Pure market institutions are thus unlikely to provide these goods. This is the reason governments provide these services and why there are few market analogies to find proxy prices for the good. For this project the goods can be considered not only an improvement in the management of natural resources but the long-term institutional capacity to address environmental problems.

These characteristics come into play with open access resources. Open access resources, like marine fisheries and some publicly owned forests, among others, in Belize, will be over-exploited because there is no effective control of the use of the resource. The incentives are instead to use the resource before others get there first. The problem is one of establishing a property regime

activities of the project will improve the situation. The economist can estimate the value of such effects but needs the physical information, provided by physical specialists, in order to do so. This information is often not available and measurement of benefits, therefore, is not possible. Some of this type of research is included in the project design

Despite the methodological and informational issues outlined above, the exercise of describing the potential effects with and without the project (using the replacement cost or shadow project approach), describing elements of the project design which have the potential for cost reductions or revenue enhancement, as well as examining relevant economic traits will help to focus on the potential economic consequences of the project. In addition, this exercise should allow for the process of monitoring and evaluation to better focus on measurement of the physical and economic outputs of the project.

COMPONENT ANALYSES

The analysis of each component will use a common approach. The elements include the following:

- a brief description of the component including elements, activities and the form of the support;
- some background on the economic and environmental issues;
- a description of the final outputs or benefits of the proposed component;
- a summary analysis from a with and without project perspective;
- an analysis of the cost effectiveness or least cost issues of the component;
- review of recurrent cost issues as well as likely changes in incentives for resource users;
- a concluding analysis using the replacement cost or shadow project approach;
- recommendations for monitoring and evaluation in project implementation.

These elements will be addressed in each component analysis but the order will vary slightly from component to component.

A simple and intuitive analysis of the benefits needed to cover the direct, discounted costs of the project and components will be used to give a sense of the magnitude of benefits needed in current terms. This will be combined with the replacement-cost or shadow

project options for various of the project activities. The shadow project approach is used when environmental services are difficult to value. It is in effect the economic cost or option of providing substitute environmental services.

ENVIRONMENTAL MONITORING AND PLANNING COMPONENT

The elements of this component include environmental quality control, water quality and monitoring(including watershed management), information networking and communication, marine resource planning, and special studies and analysis. These activities will in part contribute to institutional strengthening of the Department of the Environment in the Ministry of Tourism and Environment. Activities will include development of environmental impact assessment capability, the integration of watershed management and monitoring into the land use planning process, developing a national policy for environmental quality control, increasing public awareness on environmental issues, assessing the national lands leasing policy and updating the Belize Country Environmental Profile. Support for these activities will be in the form of technical assistance, training, short courses, seminars, policy analysis,etc.

Several examples of the economic and environmental interdependencies will flesh some of the substantive issues to be addressed. Two key sectors of the economy depend on good management of the marine resources of Belize. A large part of the tourism sector is directed toward marine activities and are also responsible for some of the management problems of those resources. These issues will be discussed first. The second discussion will briefly review the importance and role of the fisheries sector.

Tourism has been growing rapidly with an increase of 55 % from 1980 to 1987 and an estimated 7 % per year since then. In 1987 tourism contributed $m47.3 to GDP. One estimate indicated an average expenditure per day of $157(Boo, 1990). Tourism has contributed to the balance of payments by increasing foreign exchange earnings. In addition, however, tourism is an important source of employment. An estimated 9,000 people were employed in the sector in 1987(Boo, 1990). Increased expenditure for infrastructure are often needed for such activities. The most notable effect of tourism is on the support resources for hotels and development. Changes in land use can negatively impact other interdependent resources. Mangroves, for example provide the habitat base for many fish species. Water and sewerage needs are also often ignored as rural communities change to address the demands of the tourist industry.

An example: San Pedro. Ambergris Caye

The area of most concern in terms of tourism effects on marine resources and the environment is San Pedro on Ambergris Caye. There are a number of interrelated issues: effects on land use and ownership; use of the Hol Chan Marine Reserve; water supply;

pollution; dredging and; effects on the fishing industries and fishing. These issues will be sketched in terms of their effects and interdependencies with the natural resource base.

San Pedro has undergone a change from a fishing village to a tourist center without changing the way people have dealt with the resource base. Water supply has become a critical problem and pollution of the water supply continues from septic tanks. San Pedro's population of approximately 4,000 has exceeded the carrying capacity of the fresh water under the island. The supply has also been severely polluted. The remedies for the problem are to barge in water from Belize City and to build a desalinization plant. Both are expensive. Other islands are considering steps like building airstrips which will encourage development and should be forewarned about the effects of such growth and past treatment of sewerage on the water supply. Groundwater pollution takes a long time to reverse and is not an option in this case. The pollution which enters into the reef system can and likely has led to increased algae and nutrient levels to the detriment of the reef. People in San Pedro are concerned that tourism will decline rapidly as a result of both pollution problems and reef decline problems.

Land use decisions have also led to the destruction of mangroves in the area. Dredging for land fill similarly disrupts the coastal ecology. While specific effects are not documented in this particular case, there are many examples where the wildlife and fish species which depend on these environments have declined as a result of such activities. The expansion of land for tourist activities as well as other housing needs will have to consider these ecological conditions. Indeed, the government has recently expropriated 22,000 acres on the north end of Ambergris Caye and will do a detailed plan, including preservation, before allowing development to take place.

The open access resources of the area have been partially addressed by the creation of the Hol Chan Marine Reserve. This activity has been funded by the World Wildlife Fund for the next five years. Hol Chan draws approximately 30,000 tourists per year. Some crowding has occurred. For example, there have been as many as 350 divers in the reserve at one time while the expressed preferential maximum number indicated by divers is much lower at around 27. No significant damage to the reserve has been indicated but there is believed to be some illegal use at night. The Reserve has begun to charge and entry fee of B$3 and the goal of the Hol Chan management is to become self sufficient from park generated revenues. However, some issues about whether these funds will go into government general revenues remain.

Fisheries are an important sector of the economy after agriculture and tourism. It is an important component to foreign exchange earnings. The commercial saltwater fishery takes place mostly inside the barrier reef. The most valuable species is spiny lobster. Other of importance include conch, shrimp and scalefish.

The sport fishery is a growing segment of the industry. (MUSIA, 1988, p. 28) " Lobster tails account for about two-thirds of the value of exports. While the exports of conch rose by over a fifth in 1988, the volume of exports of crustaceans has declined notably from 1983-85 to 1986-87 while domestic consumption has been increasing. It appears that excessive exploitation of both lobster and conch has been taking place. In the case of lobster this reflected by the decreasing average size catch per unit of fishing effort. The depletion of these has been taking place despite the existence of an annual quota and a ban on fishing during part of the year. In the shrimp industry, the number of trawlers is excessive." (World Bank, 1989, p. 14)

The CAC Amendment concluded that fisheries are:

* not properly planned and managed as a resource,

* not well coordinated in broader economic and land planning, (e.g., agricultural pesticides and erosion due to agricultural practices upstream which effect water quality and reef health; and uncontrolled tourism development which has allowed sewage and other wastes to pollute waters, even though the industry is dependent upon the reef for its own vitality)'

* inadequately supervised (lack of personnel and lack of training for existing personnel), and

* not well understood by the fishermen and the general public in terms of their contributions and sound management for a long-term economic base.

This project should contribute to the improved management of the coastal resources of Belize. This will lead to sustained use of fisheries and a continued contribution of this sector to the economy. There are many examples of the absolute destruction of fisheries in other countries. Since this is an open access resource it will be a necessity for the government to gain effective control of the resource in order to be able to rationally manage its use. Without the project the trends that have already been noted will likely continue or get worse. Fishermen have expressed the need for better compliance enforcement since they understand the current incentive system favors resource depletion. The economic gains made by Belize attributable to fisheries cannot be maintained without such management. The costs of management and opportunity costs associated with short-term reductions in individual and overall catches will be balanced by benefits from stable and continuous (allowing for natural fluctuations) resource use within its carrying capacity. Other elements of this component will address coastal zone management and the effects of point and non-point pollution on the marine environment

Tourism will also benefit from improved management in terms of the ability to provide the natural characteristics which attract

tourists and control over tourist related environmental problems. Since tourism is the second most important generator of foreign exchange, the interdependence between a sustained resource regime and long-term economic growth is critical. The externalities arising from tourist activities will be reduced and the problems of tourism killing tourism in other countries should be reduced. Significant constraints have already been reached. Without the project and similar efforts the progress which has been achieved by such activities as the Hol Chan Marine Reserve or the Halfmoon Caye Reserve could easily be lost.

From an economic point of view the most important potential outcome of these activities is the change in the demand for environmental goods among Belizeans. This will affect, among other things, the level of resources that the government will be willing to dedicate to environmental and natural resource programs. A social consensus has affected both behavior and resource use in developed countries as a result of the increased awareness of the interdependencies between human activities and wildlands. Such awareness can also result in increased support for both government and private individual and group efforts to provide these types of resources. Belize has an admirable beginning with the activities of the Belize Audubon Society, the Programme for Belize, among others.

In addition to the effects on tourism and fisheries (Agriculture is discussed in another section though the activities of this section will also affect agriculture.), this component will establish an environmental legal and regulatory regime affecting all elements of the economy. The Department of the Environment has at the moment the responsibility of reviewing applications for development concessions in terms of the possible effects and ameliorating actions associated with the proposed activity. It lacks the capacity to perform this function. It is also necessary to have overhaul environmental protection legislation, not just review of activities asking for development concessions.

From a cost-effectiveness perspective many of the activities of the project will draw from regional efforts, especially the USAID RENARM project. Recurrent costs of these component activities (which are predominantly public goods) can be captured by the long-term economic development of the country which is based on sustained resource management.

It should be noted that consideration of resource user incentives should be an important element of not only the policy analysis activities but all of the legislative and regulatory design activities. Failure to consider actual resource user behavior often leads to unanticipated and unwanted side-effects that obviate the purpose of the project and increase the over-all cost of the process.

Conclusion

The total anticipated direct costs of the NRMP project is

US$8.750million. The Environmental Monitoring and Planning component is US$1.195million and represents 17% of the total project costs. The primary benefits expected from this component include maintenance of a quality environment, maintenance of biodiversity, economic growth based sustained resource management, control of environmental externalities and protection of soil, water and marine resources. Without the project the rate of decline of resource stocks and environmental quality will worsen and reach an unsustainable level. The shadow project would include restoration of water sources and quality, if possible, dealing with often long-term pollution effects, including health and replacing beneficial effects of such resources as mangroves (e.g., flood control) with man-made structures. These will be much more costly than preserving resources in the first place. Belizeans concerned with the environment realize the opportunity they have to avoid problems, but they also realize that time is running short. The environmental awareness activities within this project as well as RENARM are critical to developing both the understanding and demand for environmental services.

Finally, while quantification and valuation of environmental and natural resource services may be difficult, they are in many cases not impossible. It will be crucially important to future analysis of environmental actions in Belize to further develop accurate information and apply and refine methodologies to both quantify outputs and estimate their value. Parts of the design of this component address this issue. Monitoring and evaluation of NRMP will need to include the potential contributions of the project to better informed decision making. There are both near and long term benefits to the actions to be taken here. An ex-post analysis should be better able to make those estimates than his ex-ante analysis.

SUSTAINABLE AGRICULTURAL PRODUCTION

There are two central sub-components to agricultural diversification: 1)sustainable agricultural production and 2) integrated pest management. The sustainable agricultural production sub-component will carry forward and expand work of the TAMP project. Activities include continued work with the Multiple Service Centers (MSC) and the Improved Milpa Integrated Cropping System (IMICS). Some of these activities will be compatible with and complementary to development of biosphere reserves addressed elsewhere in the project. The integrated pest management sub-component will establish a permanent and professional integrated pest management capacity to address existing and new crop issues. This activity will also examine the off-site effects of pesticide use on various ecological zones. Support will include technical assistance and institutional staffing, operating expenses and capital expenditures, among others.

Sustainable Agricultural Production Subcomponent

The project will continue work begun in the TAMP project in cacao

production. Cacao will also be encouraged through the IMICS activities and the Multi-purpose Service Centers. The efforts will directly address sustainable agricultural production. The design of the initial; and follow-on project will be to provide incentives and technological packages for farming activities as an alternative to slash-and-burn practices. The following quotes suggest returns to commercial cacao production and not directly its role in IMICS.

> Although cacao plantations are a long term investment, returns to both capital and labor can be attractive under good management. Estimates of 800 pounds per acre at the 1984 hershey guaranteed price of US$0.90 per pound would give a net return of US$468. per acre over operating costs. If prices drop to US$0.50 per pound, the lowest in the past 5 years, net income would then drop to US$248. per acre.

> Experience to date indicates a direct cost of almost US$1,500. to establish an acre of cacao through the fourth year when the new trees begin to bear fruit. Yearly operational costs of approximately US$600. per acre should be expected to be incurred thereafter. Using sensitivity analysis, the break even equilibrium point five years after planting appears to be a yield of 800 pounds per acre at a price of US$0.70 per pound. Actual yields are expected to be between 800 and 1,000 pounds per acre, and prices over the past five years have ranged between US$0.50 and US$1.00 per pound. If prices hold above US$0.70 per pound and yields over 800 pounds per acre can be achieved, cacao production appears to be a viable opportunity. (MUSIA, 1988, p.24)

Gilroy Graham has also contributed the following analysis of cacao production under the project.

> As a direct result from assistance under the TAMP project, cacao production in the Toledo District has doubled over the past two years from 400 acres to 813 acres presently. Sales of cacao beans have also increased considerably from 6,400 pounds in 1986, to an estimated 35,000 pounds for 1990. A recent survey has also indicated that over the past two years, the new acreage of cacao that has been planted, consist mainly of the hybrid varieties, indicating that less of the local varieties are being used. It also shows that there has been increased sales to Hummingbird Hershey and a reduction of sales to Guatemala, in spoilage, and in the retention of beans for home consumption, as was the situation three years ago.

> Based on the existing acreage of cacao estimated at 813, if proper production and processing techniques, along with outlets/buying centres to provide the necessary inputs and purchase cacao beans, are continued to be provided, the potential exists to produce an estimated 700,000 pounds of good quality dried cacao beans per year by the year 2002. Without this assistance, production from this acreage could be as low as 200,000 pounds per year over the same period. This

analysis therefore assumes that with the assistance that will be provided under this project, 700,000 pounds of dried cacao beans is attainable by the twelfth year. While under this project IMICS will continue to be promoted, this analysis does not include the benefits derived from such a system because of the difficulty in quantifying it. (Graham, 1990, personal communication)

The foregoing illustrative production cost analyses indicate significant potential for some crops.

The benefits of the sustainable agricultural production subcomponent will include increases in employment, income and foreign exchange on a sustained resource use basis. Diversification of Belize's agricultural export portfolio will reduce macroeconomic fluctuations caused by the relative importance of sugar in the portfolio. Without the project outputs, market fluctuations will continue to be a problem.

The cost-effectiveness issues the project will tie into on-going research activities at CATIE, other regional institutions, as well as ROCAP's RENARM efforts. Care will have to be taken on the distributional or equity effects of these activities. Since the project carries forward activities begun in the earlier CAC project the potential exists for the relatively smaller marginal costs resulting in greater marginal benefits. It is useful, however, to reiterate that such results cannot be necessarily assumed if the conditions for sustained use R&D are not met.
Finally, recurrent costs in one sense can be recovered through increased government revenues from economic activities fomented by the project.

Integrated Pest Management Subcomponent

Pests are responsible for substantial economic losses, reducing yields and increasing production costs. Economic losses due to increasing production costs and the inability to control some pests have often led producers to abandon fields and crops. The use and primary reliance on pesticides is increasing. This practice disrupts the environment, resulting in secondary pest outbreaks and greater pest problems for the producer, which in turn often leads to more pesticide use, the pesticide treadmill. High levels of pesticide residues have also been responsible for economic losses to agricultural exporters from the Central American region because their shipments have been rejected at the U.S. border. Pesticides also contribute to foreign exchange problems, since most of it is imported.

The project will provide technical assistance, training and education for R&D efforts incorporating Integrated Pest Management techniques. Benefits expected from the project activities include a reduction in economic loses from pests and improved health and off-site environmental conditions. Without the project there will be a continued misuse of pesticides on non-traditional crops with

potentially severe health and environmental consequences as well as economic consequences for international trade. The shadow project may well be the banning of pesticides and the resultant loss of crops. Alternatively one could consider the treatment costs for the pesticide induced health problems. Replacing some environmental services negatively affected by off-site pesticide damage, mangrove swamps for example, would be prohibitive.

This sub-component will also draw from regional institutions such as CATIE, EAP and RENARM which have on-going pest management research activities. This should increase the cost effectiveness of the project IPM activities. Recurrent costs will be provided by the increased or sustained production and the government revenues derived from same.

Conclusion

This component represents US$2.225million or 25% of the direct costs of the project. The benefits needed to cover these costs will arise from increased employment, income and foreign exchange as well as improved and sustained resources use, improved health and reduced losses from pests. Replacement costs can be viewed in a number of ways. First, continued slash-and-burn activities will lead to a diminished resource base affecting tourism, agriculture, fisheries and protected areas. Failure to address the needs of sustained agricultural production will lead to a barren environment unable to sustain the population and cost of replacement the country could not afford. Second, importation of the goods presently produced or resulting from the natural resource base to feed, house, etc. would also be prohibitive since current economic activity is resource dependent and not likely to be replaced by other non-resource dependent activities.

FOREST MANAGEMENT AND PROTECTION

The two sub-components are 1)forest conservation and 2)wood utilization and market development in support of forest management. Major activities include planning and management of protected areas, establishment of a biosphere reserve and improved community involvement. Support will be provided to both government and NGOs in the form of training, technical assistance and institutional support. The wood utilization and market development in support of forest management sub-component will support activities at the Department of Forestry's Wood Workshop. Presuming the clarification of the mandate and focus of the Wood Workshop's mission, activities will include testing and market development for species of so-called secondary hardwoods which are presently not utilized. Discussion of these components will be separate until the concluding, replacement-cost analysis.

Forest Conservation

This sub-component will strengthen the Department of Forestry and

participating NGOs in the management of protected areas. The potential benefits from these activities can affect many sectors of the economy. Wildlands can be vital to successful and sustainable economic development in Belize. Benefits include the creation and protection of soil, the stabilization of water flow patterns, the amelioration of both local and global climate, the breakdown of pollutants, the recycling of wastes, and the provision of nurseries for economically important fisheries and barriers against weather damage. In Belize, wildlands form the basis for the tourist industry in terms of marine areas and land based natural areas as well as archaeological sites. Wildlands also protect soils on agriculturally marginal lands until economically viable and ecologically sustainable cropping or silvacultural techniques can be introduced. Wildlands can and have provided important services for humans though that value may be difficult to determine because of, among other things, uncertainty. Their loss, however, is in most cases irreversible and irreplaceable.

Many or most of the wildlands that are vital for preserving biological diversity are important in protecting the environmental services necessary to sustain economic development and human well-being. Some, although not all, of these environmental services can be provided by other land use systems. Most notably, the water retention, soil protection, and climate stabilization afforded by natural forests can also be provided by plantation forests, although to a lesser degree. But even if plantations can adequately protect watersheds, they do not preserve biological diversity. If economic activities that utilize renewable natural resources, such as agriculture, forestry, livestock production, and fishing, are carried out in a sustainable manner, the productive potential of the resources remains undiminished. It will then not be necessary to convert wildlands simply because formerly productive land or aquatic areas have been exhausted.

Preservation of resources which support biodiversity can either represent costs to the individuals who depend on those resources for nearer term services and/ or are externalities from their forbearance. To the extent that resource exploitation is governed by the perceived self-interest of various individuals or groups, behavior affecting maintenance of biological diversity can best be changed by providing new approaches to conservation which alter people's perceptions of what behavior is in their self-interest (NcNeely, 1988, p.6).

Current conditions in Belize do not result in effective management of protected areas. For example, a recent USAID analysis concluded that:

> The Forestry Department has the administrative responsibility for forest reserves, national parks and other protected areas, and for wildlife management. But, the Department has only five professional foresters to manage a national forest estate of 13,000 km2. It has no professional wildlife biologists. The Department's vehicles are old and of insufficient number

for the guards to carry out their duties, and the operational budgets are inadequate to cover the costs of gasoline, repairs or other needed equipment. Other GOB agencies responsible for environment and natural resources management, such as the Fisheries Department, face similar constraints in fulfilling their duties.(USAID, Policy Agenda and Strategy, 1989)

Protected areas present an opportunity as add-ons to marine tourism activities. Indeed tourism development might be considered a potential source of significant economic growth. Where natural or archaeological areas draw or could draw tourist developments the local residents might find it in their interests to preserve the resource for their own financial gain. For example, local crafts are being sold beside the entrance to some of the reserves. In other areas, lodging is provided outside of the park by the private sector. These incentives as well as an increase in the enforcement of park and reserve requirements by the government will be needed to preserve these resources.

While present problems are not necessarily severe, they are troublesome. Slash-and-burn agriculture is occurring in the Altun Ha region. Logging is becoming a problem for both Lamanai and near Caracol. These sites are an important component to the Ruta Maya project in Belize. Nature reserves are similarly affected. One reserve (Cockscomb Basin) was recently expanded to prevent further intrusion by commercial citrus operations. Addressing these problems can further tourism trends noted in the Tropical Forest Action Plan and quoted below.

> The number of natural history tour groups in Belize is increasing, and tourism experts feel that, given the environmental assets of Belize, the nature tour business can expand greatly. Scouts for tour companies are looking for additional sites to visit in Belize. There is also an incipient industry of adventure tourism, including rafting, caving and backpacking, that depends on the natural setting. The established reserves are attracting many visitors, especially Crooked Tree, Cockscomb, and the Community Baboon Sanctuary. Expanded facilities are needed at some reserves. The influx of visitors can benefit the reserves financially, but could also damage them, if not managed correctly. (ODA, 1989, p. 90)

Thus the outputs of the project can directly help continued growth in tourism. Other potential benefits can be derived from the multiple use management of proposed biosphere reserves. It is clear that long term successful management of both reserves and forests will be less costly if local communities gain economically from or understand the value of protected areas management. Buffer zone issues are recognized as crucial to successful projects and experience in other countries. While immediate protection will be needed for areas in urgent need of such, long-term protection will only be cost-effective if near-by communities are supportive of the protected status. The proposal within this component to develop a

comprehensive system of protected areas should also allow for the reservation of appropriate areas while also allowing for the sustained use of other areas for agriculture and tourism.

As in other project activities, the public awareness activities will increase demand for these kinds of environmental goods a encourage the government to support these activities after the conclusion of the project. Other activities within the project directly address recurrent cost issues by examining fund raising strategies, the role and level of user fees, and the potential role of endowments for the NGO efforts in protected areas. To repeat, recurrent costs of protection can be reduced by helping local communities understand and benefit from protected areas. Without considering the incentives faced by potential resource users and addressing those needs, the costs will significant to prevent the resource from being an open one.

From a cost-effective point of view these activities will achieve lower cost because of the design intent to build on work and expertise with ROCAP's RENARM Project Conservation Data Center Activities, complementarities with other donor work, especially the various projects evolving from the Tropical Forestry Action Plan, and the approach of identifying and protection areas in urgent need of protection, thereby increasing the relative benefits for the given cost since replacement cost would be exorbitant otherwise.

Wood Utilization and Market Development

The "wood utilization and market development in support of forest management" will support the Forest Department Wood Workshop in testing the suitability and marketing of presently unused secondary hardwoods. The concept is to improve the management of forest operations in terms of increased utilization of forests and greater value added in Belize. Some background on the Wood Workshop from the Tropical Forest Action Plan is presented below:

> This government owned wood working plant at Belmopan has been in existence 17 years. Until a year or so ago it was only a small installation with a wood fired kiln of 2,00 board feet (4.7m3) capacity, and several wood working machines for small scale door and furniture making. Now a new dry kiln has been built - also fired by waste wood - which will dry 6,000 board feet (14.2m3) of one inch (25.4 mm) lumber in a 7 day period.
>
> In addition to the dry kiln, the United Kingdom has recently provided an elaborate group of wood working machines that will make siding, flooring, doors, and furniture. It is planned to bring pine cants from Mountain Pine Ridge, produce 1 inch (25.4mm) lumber for kilning with a 60" (1.5m) Stenner band resaw, and process 220,000board feet (520m3) of siding and flooring through the plant annually.(ODA, 1989, p. 75)

Further quoting from the Tropical Forestry Action Plan (1989, p. 87):

> The Department Workshop was initially established in 1971 in a modest way to use considerable volumes of small-sized Gmelina thinnings from the Melinda plantations to replace a variety of imported wood manufactures and to demonstrate the utilization of little known secondary hardwoods. The workshop encountered a variety of operational problems. Recently with the assistance of the United Kingdom, the plan has been substantially enlarged and equipped and its staff is supported by an expatriate specialist. It has the capacity for an annual output of 220,000 board feet (519m3) of special lumber products, as well as doors and furniture. The workshop has been producing mill work and furniture for the Forest Department, for other government organizations and also against orders from the private sector.

The above quote points to the management of the Workshop by the Forest Department as government performing essentially private sector activities. The public sector research and development activities represented in this component will face problems in implementation should the existing structure continue. Indeed, a request for testing of wood suitability made by a private firm was rejected by the Workshop even though payment for the service was offered. The suggested restructuring of the management will need to be a condition for implementation.This should not be in the form of a joint venture with a private firm since the results of research would not likely be shared with other firms.

The concept of developing markets for more wood products which could potentially lead to better management of that resource is valid, though other issues would also have to be addressed. The potential outputs would be improved returns to forestry, increased foreign exchange and less extensive forest activities at the margin. Without the project species with economic potential will be unutilized and larger areas of forest will be harvested to gain the same economic returns than would be the case with the project. If management changes can be instituted, there is the potential that returns from profit making activities of the Workshop can be used to subsidize the costs of the component research and development activities. Since at least one timber firm is currently using eighteen different species of hardwoods, there is evidence the demand for the intermediate R&D activities.

Conclusion

The forest conservation sub-component approach is far less costly than the rehabilitation of marginal lands that have been degraded by inappropriate clearing or subsequent misuse. The replacement-cost for wildlands can be quite high if, indeed, replacement is possible or feasible. Corrective measures may require expenditures for reforestation, check dams, levees, dredging operations, fish hatcheries, water purification equipment, and the like, and scarce development resources are diverted from productive to remedial or production preserving activities. Failure to adopt appropriate wildland management measures in the present thus greatly increases

the capital costs of economic development in the future. (Ledec and Goodland, 1988)

Similarly, reforestation activities could be reduced by the more intensive forest management assumed in the Wood Workshop sub-component.

This component is budgeted at US$1.632million. This is 19% of the total NRMP Project direct costs. Benefits to cover these costs will primarily arise from improved environmental protection and management. Some of them have potential measurable dimensions in increased tourism, improved rural economic conditions and increased timber products. Without these project components deforestation will continue to affect protected areas and potential income from timber management will be low. The shadow project, as mentioned, will be reforestation which has been shown to be much more costly than developing sustainable management of existing forests or, from the forest conservation point of departure, the irreversible loss of unique natural habitats and the economic activities which depend on them.

SUMMARY CONCLUSIONS AND RECOMMENDATIONS

The Natural Resources Management and Protection Project has three primary components: environmental planning and monitoring, agricultural diversification, and forest management and protection. Most of the activities within the project focus on institution building, training and education, research and development, planning and policy analysis. These activities by-and-large are public goods which requires something other than pure market actions in order to be provided. This is, therefore, often the realm of government involvement in the provision of environmental and natural resource services. These services are usually difficult to evaluate using benefit cost analysis. This is especially the case where institution building is the primary activity since the line of causality from inputs to final outputs is ex ante purely speculative.

The analysis performed for this project paper draws from explicitly and implicitly suggested alternative to benefit cost analysis in USAID's Handbook 3. Both present and future demand is addressed in the replacement cost and shadow project approach to conventional with and without analysis. They have provided the fundamental logic supporting the suggested activities. The logic is simply that it is cheaper to preserve a resource or a high level of environmental quality than it is to replace it. Belize is particularly dependent on the sustained use and quality of its resource base. Mining of the resources for short-term gains will lead to long-term economic disaster.

Cost-effectiveness has pointed to the complementarities with regional programs like RENARM and CATIE. Project design efforts did not specifically examine an alternate scenario and cost structure but instead tried to connect project activities to

regional institutions were possible. Many examples appear throughout the project. In addition, several components are building on earlier project components or government of Belize projects. While these components (BABCO and the Wood Workshop) have unresolved organizational issues, opportunities exist to transform their purposes into environmentally supportive activities.

Granting several cautions mentioned in the text, the NRMP Project will address critical institution building activities which, if ignored, will result in greater and likely prohibitive costs in the future.

Natural Resources Management & Protection
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