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UNCLASSIFIED

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

NICARAGUA

PROJECT PAPER

NATURAL RESOURCES MANAGEMENT

AID/LAC/P-850

PROJECT NUMBER: 524-0314

UNCLASSIFIED

PROJECT DATA SHEET

1. TRANSACTION CO.

A = Add
C = Change
D = Delete

Amendment Number

CODE

3

COUNTRY ENTITY

Nicaragua

3. PROJECT NUMBER

524-0314

4. BUREAU/OFFICE

LAC

524

5. PROJECT TITLE (maximum 40 characters)

NATURAL RESOURCES MANAGEMENT

6. PROJECT ASSISTANCE COMPLETION DATE (PACD)

MM DD YY
09 30 96

7. ESTIMATED DATE OF OBLIGATION

(Under 51" below, enter 1, 2, 3, or 4)

A. Initial FY 91

B. Quarter 4

C. Final FY 92

8. COSTS / \$000 OR EQUIVALENT \$1 =

A. FUNDING SOURCE	FIRST FY 91			LIFE OF PROJECT		
	B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total
AD Appropriated Total						
Grant - ESF	5,240	2,760	8,000	5,240	3,760	9,000
Loan						
Other						
U.S.						
Host Country					2,600	2,600
Other Donors					1,236	1,236
TOTALS	5,240	2,760	8,000	5,240	7,596	12,836

9. SCHEDULE OF AID FUNDING / \$000

A. APPROPRIATION/PURPOSE	B. PRIMARY TECH CODE	C. PRIMARY TECH CODE		D. OBLIGATIONS TO DATE		E. AMOUNT APPROVED THIS ACTION		F. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1) ESF	9000					8,000		9,000	
(2)									
(3)									
(4)									
TOTALS						8,000		9,000	

10. SECONDARY TECHNICAL CODES (maximum 5 codes of 3 positions each)

067 | 095 | 096 | 097 | 098

11. SECONDARY PURPOSE CODE

283

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

A. Code BR | BL | LAB | PUDU

B. Amount

13. PROJECT PURPOSE (maximum 420 characters)

To improve management of renewable natural resources, to protect biological diversity in selected sites, and support sound, environmentally safe pest management practices in Nicaragua.

14. SCHEDULED EVALUATIONS

Interim MM YY | MM YY | Final MM YY
09 91 3 | 10 91 5 | 01 91 8

15. SOURCE/ORIGIN OF GOODS AND SERVICES

000 91 Local Other (Specify)

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

17. APPROVED BY

Signature: *Jane Ballantyne*
Title: USAID/Nicaragua Mission Director

Date Signed: 08 23 91

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

MM DD YY

U

PROJECT AUTHORIZATION

Name of Country: Nicaragua
Name of Project: Natural Resources Management
Number of Project: 524-0314

1. Pursuant to Part II, Chapter 4, Section 531 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Natural Resources Management Project for Nicaragua, involving planned obligations of not to exceed Nine Million United States Dollars (US\$9,000,000) in grant funds from Section 531 account (the "Grant") over a five-year period from the 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 Project is five years from the date of initial obligation.

2. The Project has been designed to improve the management of renewable natural resources, to protect biological diversity in selected sites, and support sound, environmentally safe pest management practices in Nicaragua. To do this, the Project will finance: a package of technical assistance, training, commodities, and related operational support to build-up the institutional capacity of the Government of Nicaragua Natural Resources and Environmental Institute (IRENA); environmental awareness activities; pilot programs in three of Nicaragua's ecosystems; and a pest control and management program to promote the sound, safe use of pesticides. Overall coordination of the Project will be carried out by IRENA.

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 conditions, together with such other terms and conditions as A.I.D. may deem appropriate:

a. Source and Origin of Goods and Services

Commodities financed by A.I.D. under the Grant shall have their source and origin in the United States, in Nicaragua, or in any other Central American Common Market Country, except as A.I.D. may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services shall have Nicaragua, countries which are members of the Central American Common Market Country, or the United States (A.I.D. Geographic Code 000) 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. Motor vehicles financed by A.I.D. under the Project shall, except

as A.I.D. may otherwise agree in writing, have their origin in the United States.

b. Conditions Precedent to Disbursement

(1) Prior to the first disbursement under the Grant or to the issuance by A.I.D. of documentation pursuant to which disbursements will be made, the Grantee shall, except as A.I.D. may otherwise agree in writing and except as noted under paragraph (2) and (3) below, furnish to A.I.D., in form and substance satisfactory to A.I.D.:

(i) A legal opinion of the Attorney General of Nicaragua, or other counsel acceptable to A.I.D., stating that this Agreement has been duly authorized, or ratified by, and executed on behalf of the Grantee, and that it constitutes a valid and legally binding obligation of the Grantee in accordance with all of its terms; and

(ii) A statement of the name(s) of the person(s) holding or acting in the office of the Grantee specified in Section 8.2 of the Agreement and of any additional representatives, together with a specimen signature of each person specified in such statement.

(2) Prior to the first disbursement under the Grant or to the issuance by A.I.D. of documentation pursuant to which disbursements will be made to IRENA, IRENA shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., information to demonstrate that it has in place the accounting, procurement, and administrative systems, and related internal controls to be able to manage effectively and properly account for any funds which A.I.D. may provide to IRENA under the Project.

(3) The disbursement of any funds under the Project for the procurement and/or use of pesticides under the Project, including technical assistance in pesticide management, or for any project activity which may have an adverse impact on the environment, is prohibited until USAID/Nicaragua approves such action based on the findings of the two Environmental Assessments carried out on the Project, when approved by the LA Bureau Environmental Officer, pursuant to A.I.D. Environmental Procedures, 22, CFR 216. Project implementation plans will be modified, as necessary, to incorporate mitigative measures developed under the EAs. These provisions are limited to Project areas which may adversely affect the environment and do not prohibit the initiation and implementation of Project activities,

such as technical assistance and training, that will not have potential significant impacts on the environment.

Date: August 23, 1991

Janet C. Ballantyne
Janet C. Ballantyne
Director
USAID/Nicaragua

Drafted: PDIS: AMB:8/8/91

Clearance:

PDIS: JCloutier (JCL)

Date: 8/13/91

PEPS: RBurke (draft)

Date: 8/14/91

LA: MVelazquez (draft)

Date: 8/17/91

ARDO: BRudert (BR)

Date: 8/13/91

CO: JCorley (JC)

Date: 8/19/91

OFIN: RLayton (RL)

Date: 8/23/91

DD: KSchofield (KS)

Date: 8/23/91

REF: NATURAL RESOURCES MANAGEMENT Project

PROJECT: No. 524-0314

This PP-like document complies with current Agency Guidance on methods of financing and has provided for adequate audit coverage in accordance with the Payment Verification Policy Implementation Guidance.

A handwritten signature in black ink, appearing to read 'R. Layton', written over a horizontal line.

Richard W. Layton

CONTROLLER

USAID/NICARAGUA.

NATURAL RESOURCES MANAGEMENT PROJECT
(524-0314)

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Acronyms and Abbreviations

CATIE	Centro Agronómico Tropical de Investigación y Enseñanza
CCC	Caribbean Conservation Corporation
CDC	Conservation Data Center (TNC)
CI	Conservation International
CIAV/OEA	Comisión Internacional de Asentamiento y Verificación/OAS
CIRA	Centro de Investigaciones de Recursos Acuáticos
CITES	Convention on International Trade of Endangered Species of Fuana and Flora
CONAL	Corporación Nacional del Algodón
CONAMOR	Comisión Nacional del Medio Ambiente y Ordenamiento Territorial
CORFOP	Corporación Forestal del Pueblo
CORNAP	Corporaciones Nacionales del Sector Público
DANIDA	Danish International Development Agency
DGPF	Dirección General de Planificación Física (INETER)
ECODE	Estrategia de Conservación para el Desarrollo (National Conservation for Development Strategy)
FORESTA	Forest Resources for a Stable Environment (project)
FRM II	Forest Resource Management Project: Part II
INRA	Instituto Nicaragüense de Reforma Agraria
IPM	Integrated Pest Management
IRENA	Instituto Nicaragüense de Recursos Naturales y del Ambiente
IUCN	International Union for Conservation of Nature and Natural Resources
MCR	Miskito Cays Reserve
MED	Ministerio de Educación
MEDE	Ministerio de Economía y Desarrollo
MAG	Ministerio de Desarrollo Agropecuario y Reforma Agraria
MINSA	Ministerio de Salud
MINVAH	Ministerio de Vivienda y Asentamientos Humanos
MIS	Management Information System
NGO	Non-Governmental Organization
NORAD	Norweign Agency for International Development
NRM	Natural Resources Management Project
PACA	Programa Ambiental para Centro América (CARE-TNC-CI Consortium)
PAFT	Plan de Acción Forestal Tropical
PAFT-CA	Plan de Acción Forestal Tropical para Centroamérica (regional)
PAF-OT	Plan de Acción Forestal y de Ordenamiento Territorial
PAS	Private Agricultural Services Project
PCEM	Programa de Control de Erosión de Managua
PCEO	Programa de Control de Erosión del Occidente
PFCAM	Programa Forestal Campesino
RAAN	Región Autónoma del Atlántico Norte
RAAS	Región Autónoma del Atlántico Sur
RENARM	Regional Natural Resources Management Project (596-0150)
ROCAP	Regional Office for Central American Programs (AID)
SAREC	Swedish Academy for Research
SF	Servicio Forestal (IRENA)

Si-a-Paz Sistema Internacional de Areas Protegidas por la Paz
SIDA Swedish International Development Agency
SIRENA Sistema de Información de Recursos Naturales
SPN Servicio de Parques Nacionales (IRENA)
TFAP Tropical Forest Action Plan (see also PAFT and PAF-OT)
TNC The Nature Conservancy
UCA Universidad Centroamericana
UNA Universidad Nacional Agraria
UNAN Universidad Nacional Autónoma de Nicaragua (León and
Managua)
UNEP United Nations Environment Programme
UNO Unión Nacional Opositora
WCI Wildlife Conservation International
WWF World Wildlife Fund (see also WWF-US)
WWF-US World Wildlife Fund - United States

I. SUMMARY and RECOMMENDATION

A. The Problem

Nicaragua is the largest country in Central America and one of the least densely populated, yet the population is expanding rapidly, fueled by a high internal growth rate and the return of Nicaraguans from other countries. Decades of political mismanagement and upheaval have destroyed much of the country's physical infrastructure, strangled access to capital and product markets, and drained qualified expertise in most technical and administrative areas. While large areas of tropical forests, coastal wetlands, and marine waters are relatively undisturbed, this natural resources base, upon which the productive resiliency of the economy ultimately depends, reflects the effects of these human problems.

An excellent opportunity exists now to build and strengthen the public and private institutions that deal with natural resources management and environmental protection. Exports from the agriculture, fisheries, and forestry sectors have traditionally been the foreign exchange earners. As programs get underway to revitalize the economy and generate foreign exchange, pressure will increase on the natural resource base. If these sectors are revived with no changes, the resource base of the country will be rashly exploited and depleted rather than managed sustainably.

There are critical constraints to sustainable use of Nicaragua's natural resources, the solution of which requires external assistance: extremely weak institutional capability, absence of a coherent policy framework to guide responsive actions, lack of know-how to develop and implement an effective strategy to deal with the environmental problems in the short, medium and long-term; ignorance on the part of the population in general about the implications of consistent environmental damage, and lack of funds to finance the wide array of actions and inputs required to address the problem comprehensively and effectively.

This A.I.D.-sponsored project will complement GON efforts to carry out an effective response to the problem by addressing key constraints through an integrated package of technical and financial assistance, training, education campaigns, commodities and specific demonstration activities in selected geographic areas of the country.

B. Project Goal and Purpose

The goal of the Natural Resources Management (NRM) Project, therefore, is to contribute to the development of environmentally sustainable, broad based economic growth in Nicaragua.

The purpose of the project is to improve the management of

renewable natural resources, to protect biological diversity in selected sites, and support sound, environmentally safe pest management practices in Nicaragua.

C. Project Components

The Project will have five closely inter-related and mutually supportive components, which flow from comprehensive institutional, technical, financial, economic and social analyses included as annexes to this Project Paper. These are:

1. Institutional Development and Strengthening, under which the Project will provide technical assistance, training and related support to improve the administrative, management, technical, and accounting capability of the Nicaraguan Institute for Natural Resources and Environment (IRENA) and selected private sector institutions engaged in natural resources conservation practices.

2. Policy Development, Dialogue and Implementation, under which the Project will finance studies, seminars, observation trips and the development and exchange of information to promote, design and implement policies conducive to long-term sound management conservation and environmental protection practices. Policy dialogue will focus mainly on the priority issues of deforestation, watershed management, land use, protected areas, and the uncontrolled use of pesticides.

3. Environmental Education, under which the Project will develop a National Environmental Education Strategy in conjunction with IRENA and other government and non-government entities. The strategy will be tested and refined through workshops and the implementation of selected strategy components, including a multi-media public campaign, teaching materials, and school programs.

4. Protected Areas and Buffer Zones, under which the Project will finance the actual implementation of natural resource management and environmental protection activities in three protected areas and their buffer zones. These areas are: (a) the Miskito Cays Reserve in the North Atlantic Coast and the marine environment including the offshore islands, a biologically rich and diverse area with special importance for sea turtles, shrimp, lobster, and native and migratory birds; (b) the Bosawas Reserve on the northern border with Honduras, which is the largest intact remnant tropical forest north of the Amazon; and (c) the Chococente Wildlife Refuge, which is an important tropical dry forest remnant facing a Pacific Ocean beach used as a nesting area by sea turtles.

These areas were selected on the basis of three main criteria: (a) depth of biodiversity - richness and uniqueness of

species and geographical balance; (b) urgency of containing degradation of the area; and (c) likelihood of sustaining project activities, based on expected community involvement, after termination of A.I.D. assistance. Other areas may also meet these criteria, however the availability of resources required limiting it to the above three.

5. Plant Protection and Integrated Pest Management (IPM), under which this Project, in concert with the Private Agricultural Services (PAS) Project, will address several problems related to plant protection and pest management: pesticide residues above tolerable limits on agricultural products, accidental poisoning of pest control workers, environmental contamination by pesticides, and the high cost of the pesticides needed to protect crops and control disease vectors with methods used in Nicaragua.

D. Implementation Arrangements

IRENA will be the focal GON agency involved in the overall coordination of the project. Implementation mechanisms include an institutional contract with US firm to be selected competitively; non-governmental organizations, including the Central American Environmental Program (PACA) and the Caribbean Conservancy Corporation (CCC), which submitted unsolicited proposals to carry out activities in the protected and buffer zones areas; and a buy-in arrangement through the Regional Natural Resources Management Project (RENARM) under the IPM component. IRENA will contract also some local specialists, with US technical assistance.

A detailed discussion of each component and the related implementation arrangements is contained in Parts IV and V of this Paper.

E. Financing

An estimated A.I.D. life-of-project (LOP) funding of \$9.0 million, including \$8.0 million in Economic Support Funds (ESF) available under the FY 1990 Dire Supplemental Legislation, is proposed to finance Project implementation activities during a five-year period. Roughly, this funding is planned to be used as

follows (figures in \$000):

1. Technical Assistance	\$2,571
2. Training	1,431
3. Commodities	1,568
4. Local Personnel	1,162
5. Other Costs (local travel, supplies, seminars, special studies, operating expenses, etc.)	1,968
7. Evaluations and Audits	300
Total	<u>\$9,000</u> =====

Per Tables VI-1A and IB of the Financial Plan, the GON estimates its contribution to approximately \$2.6 million during a four-year period. This amount represents the part of IRENA's budget for counterpart personnel, office space and other logistic support directly related to the project. US NGOs contributions, under the Protected Areas component, will total approximately \$1.2 million, which reflects a ratio of NGO:AID contribution of approximately 1:3.

F. Project Approval Factors

1. AID/W Guidance. Per State 107013 of 3 April 1991, AID/W approved the PID and provided guidance for the preparation of the Project Paper. The guidance and key concerns expressed in the AID/W cable, and the way this PP addresses them follows:

a. Concerning the Protected Areas Component, AID/W requested that the Mission not consider a policy-based disbursement strategy and not use the PVO Co-Financing Project as a funding mechanism for activities under this project. In response, the Project does not include a policy-based disbursement strategy under the Protected Areas Component, and this activity has been included as a distinct project component.

b. The role of IRENA and its mandate. AID/W expressed concern that IRENA's capability may be overextended by assigning too many activities, such as the integrated pest management activities. Following discussions with IRENA's officials, its role and mandate have been clarified, as discussed in Part IV, V and in the institutional analysis section of this Paper. The Project includes the required technical assistance and related support to assist IRENA in carrying out its assigned role and mandate effectively.

c. Wildlands and protected areas. AID/W expressed concern about communication and coordination between IRENA and the NGOs. Part V of this PP discusses how this concern will be addressed - through an inter-agency coordinating mechanism in which NGOs will participate.

d. Environmental Education. AID/W suggested the involvement of the private sector in the implementation of this component. The design team concluded that this is a valid suggestion and the implementation arrangements now include a significant role for the private sector. This role includes private sector participation in policy dialogue, environmental education activities, and the selection of local private voluntary organizations in the implementation and replication of natural resources and environmental protection activities in the Chococente refuge and other areas.

2. Project Analyses. The Project design team which prepared the Project Paper has concluded that the Project has sufficient sound financial, economic, institutional, technical and social bases to be successful. This conclusion is based on the various Project Analyses carried out by both outside consultants and USAID/Nicaragua officers who participated in the design. The design assumes that if the institutional development and strengthening activities are carried out as planned and the GON continues its strong support of environmental conservation activities, the main implementing institution - IRENA - will be able to sustain project activities after termination of A.I.D. assistance.

3. Environmental Determination. The Project itself has been designed as a natural resource and environmental protection activity. As such, the design team determined that the first four Project components will not have an adverse effect on the environment. Also, per Annex 3, the AID/LAC Bureau Environmental Officer requested the Mission to carry out an Environmental Assessment (EA) focusing on the Protected Areas component, particularly the wildlands and biodiversity activities. This assessment has been completed and it will guide implementation of such activities. The fifth component, Integrated Pest Management, also seeks to control environmental degradation due to uncontrolled use of pesticides. To the extent that there is a need to finance the use of pesticides, such financing would be based on the results of an EA, which also has been completed.

G. Recommendation

USAID/Nicaragua has determined that the project is technically, economically, socially and administratively feasible. It addresses a critical problem affecting the long-term development of Nicaragua and furthers the important USG objective of supporting actions to preserve the environment and conserve natural resources. Thus, approval of A.I.D. funding totalling \$9.0 million in ESF is recommended.

II. BACKGROUND AND PROBLEM STATEMENT

A. Background

Nicaragua has invested little in resource conservation. Between 1960 and 1980, Nicaragua experienced the highest deforestation rate in Central America as forest cover was reduced by one-third. Returning refugees are now accelerating the felling of trees and clearing of forests. Assets will be wasted when potentially valuable trees are burned rather than used as timber. The productivity of important watersheds is deteriorating because of erosion and pollution.

Because of financial and political instability, Nicaraguans have placed a premium on short-term financial gain and have discounted long-term economic value. Policy makers have not given priority to conservation and therefore resources are being mined rather than managed.

On the brighter side, Nicaragua possesses a valuable resource in its biological and ecological endowment. Biodiversity is a renewable resource important to Nicaragua, particularly in the long run. It provides the potential for new products and processes to broaden the nation's economic base. The biological diversity in humid forests and coastal zones has significant international value as well. Long-term conservation of biodiversity will require consolidation of the Nicaraguan protected area system and involvement of local communities and resource users in management of the resources and benefits.

Almost none of the necessary conditions for improved resource management exist in Nicaragua. If prices and terms of trade are favorable, the economy may have short-term recovery based on export of a narrow range of commodities while renewable resources are mined for internal subsistence. However, without assistance in natural resource management from donor agencies such as USAID, long-term, broad-based economic growth is unlikely.

In sum, management of natural resources in Nicaragua suffered severely from the decade of political upheaval that destroyed much of the country's physical infrastructure, strangled access to capital and product markets, and drained all fields of technical and administrative expertise. Inappropriate resource pricing, nationalization of forests and fisheries, and other policies of the former government eroded incentives that supported sustainable resource-use practices. The new government is now challenged to develop policies and programs which will motivate the Nicaraguan people to sustain the productivity of the country's natural resources to provide the basis for long-term economic and social development.

B. The Problem

Unfortunately, capabilities for policy analysis and program implementation are severely limited by the weak state of IRENA, the institution responsible for natural resource information, policy, and management. IRENA's existing management and financial controls are poorly structured and inadequate to regulate natural resource use and to collect needed revenues. A manifestation of the lack of effective policies and control over natural resources is the worsening condition of the country's major watersheds. For instance, siltation and runoff of agrochemicals and domestic and industrial contaminants are causing the biological death of Lake Managua.

Key forest and marine environments are threatened, as potentially valuable forests are converted into wastelands and coastal fisheries are degraded by destructive fishing and gathering practices. Between 1960 and 1980 Nicaragua experienced the highest rate of deforestation in Central America: forest cover was reduced about one third -- nearly two million hectares. If deforestation were to continue at those rates, Nicaragua would be without productive forests before the year 2020.

The 250,000 refugees who migrated to Costa Rica and Honduras during the last decade are returning, and resettlement programs are turning to the remaining forested areas for repatriation. Coastal fishing zones will not sustain uncontrolled harvests by outsiders as well as locals, and foreign fishing vessels are currently depleting resources in Nicaraguan waters without regard to the rights of local people.

The socio-economic pressures on people living in the forest and coastal zones make it difficult for them to resist using unsustainable fishing, logging, and agricultural practices in these environments, even though they mean widespread deforestation, waste of forest, fisheries and wildlife resources, and degradation of land productivity. The consequences are especially destructive of long-term economic potential in the areas of greatest biological diversity in the Atlantic and central regions - the designated protected areas in coastal zones and rain forests - and in the few designated protected natural areas of the Pacific region.

C. Constraints to Sound Environmental Practices

By creating IRENA, the GON has taken a major step to deal with the problems of environmental degradation and the unchecked use of the country's natural resources. However, IRENA faces major inter-linked constraints as it attempts to carry out its

mandate. These constraints, which the Project will address, are as follows:

1. Institutional Weaknesses

Nicaraguan institutions in general are weak, both in the public and private sectors. The key public institution - IRENA - which under Nicaraguan law is mandated to manage protected areas, promote environmental awareness, and ensure environmental quality, faces an array of financial, personnel, operational and administrative problems that must be addressed urgently so it can perform its functions effectively.

Briefly, IRENA does not have adequate procedures for accounting and financial control, it is housed in dilapidated quarters with run-down and inadequate equipment; its large, redundant and generally untrained, unqualified staff performs poorly and is plagued by low morale.

In addition, IRENA is chronically underfunded. It can rely on receiving about \$3 million annually from the Nicaraguan Government, but it needs much more than this level to carry out its basic functions. IRENA has the authority to collect fees to augment its revenues but it has limited capacity for fee collection.

2. Absence of a Rational Policy Framework and Strategy

Nicaragua lacks a comprehensive, rational policy framework, legal basis, and strategy to carry out the wide array of actions needed to protect and conserve the environment and natural resources. This is compounded by the lack of democratic traditions for decades which have inhibited the development of the processes and mechanisms necessary for policy dialogue, development and implementation. Recently, however, such processes are emerging. The current exercise to produce a national conservation strategy is one example, but even this effort is hindered by the lack of qualified personnel.

Particularly, the GON and Nicaraguans in general, need to deal urgently with key issues related to: deforestation, watershed management, pesticides, biodiversity conservation, land use, infrastructure development, land tenure and property rights, and land taxation. In the past, each of these problem areas has been neglected mainly because of inadequate policies and their inherent difficulties in implementing them. In addition, the GON needs to take account of all the policies which may affect the environment and develop ways and provide the means to reconcile conflicting policies and make them complementary and self-supportive.

3. Lack of Awareness About Sound Environmental and Conservation Practices

Generally, as in other developing countries, the Nicaraguan population is unaware of the importance of sound natural resources conservation and protection practices to the long-term, rational development of the country and the welfare of its population. As a result, public involvement in such practices and their support for appropriate policies is generally absent or at best minimal. In addition to the absence of sound policies and strategy and institutional weaknesses, the key factors for this situation include: the lack of relevant education programs in schools, the lack of didactic materials, the lack of participation of the mass communication media in educational campaigns, and the lack of trained staff in public and private institutions to take the lead in designing and carrying out effective educational and public awareness programs.

4. Population and Political Pressures to Exploit Resources in Key Geographic Areas Vital to the Preservation of Environmental Balance and Ecosystems of the Country

Significant resource degradation is taking place in Nicaragua as a result of spontaneous and uncontrolled exploitation. Thus, valuable resources such as timber, gums, resins, fruits, nuts, and marine and terrestrial fauna, are being damaged and squandered at a rapid rate. The GON needs to harmonize rural development and biodiversity protection goals in order to foster environmentally sustainable natural resource use in support of broad-based economic growth. However, the approaches and techniques to do this have not been fully developed and tested and they need to be designed and tested in representative areas so they can serve as models for replication throughout the country.

Currently, IRENA does not have the management, financial, and technical capability to undertake these types of activities. Similarly, the ability of local non-governmental organizations (NGOs) to undertake such crucial activities is extremely limited. For this reason, external resources are needed to develop the public and private sector capability to deal with the problem in a sustained manner.

5. Erratic, Hazardous Use of Pesticides

The use of pesticides is causing significant pollution in Nicaragua. Agricultural yields in Nicaragua are severely constrained by weeds and pests and crop producers tend to use pesticides heavily and erratically. Methods for protecting the crop plants involve heavy pesticides under conditions which

sometimes endanger farm workers. Often, the level of pesticide residues is so high that protected crops are sometimes unacceptable in importing countries. Similarly, the Ministry of Health, to protect citizens from vectors of malaria, yellow fever, and other diseases, uses large quantities of insecticides. Workers applying pesticides to stop spread of disease are in danger of poisoning, and environmental contamination can occur.

Nicaragua lacks the Know-how to collect, analyze, and base decisions on information regarding pest populations, crop conditions, costs and benefits, and optimum timing and targeting of pesticide applications. Nicaraguans need to be trained on how to test for pesticide residues on foodstuffs and other products, to monitor workers' exposure to pesticides, and to deal with accidental contamination.

Effective technologies have been developed in the past decade for reducing the costs and risks associated with pest control. However, despite their availability elsewhere, most of these technologies have not been transferred to Nicaragua because of the political turmoil, commercial decline of the past decade, and overall lack of knowledge about these technologies.

III. PROJECT RATIONALE and STRATEGY

A. Rationale

Innovative practices for sustainable extraction of forest and coastal zone products involving less deforestation and the preservation of biological diversity are possible, but they will require a concentrated organizational and technical assistance effort. After a decade of turmoil and deterioration, neither government nor private sector institutions are strong enough to manage natural resources or to provide technologies and extension services that could empower local people to manage natural resources for sustained production.

Similarly, because of the lack of a local capability, a sustained external assistance effort is required to deal with the problems associated with the indiscriminate use of pesticides and unsafe plant protection methods.

The recently announced A.I.D. initiative on the environment sets forth an agenda for the Agency to guide future natural resource and environmental interventions, and notes the growing prominence that natural resource management plays in supporting economic growth and sustainable use of the resource base. The initiative identified two areas that are global in nature, and a third that is region specific: (1) sound environmental and economic policies; (2) institutional development; and (3) priority problem areas. For Latin America and the Caribbean (LAC), the priority areas are: sustainable agricultural production; tropical forests and biodiversity; watershed management; and coastal zone management. The Nicaraguan situation, as summarized above, and this global initiative provide a powerful rationale for the project.

B. Project Strategy

The project envisions a package of technical assistance, training, commodities, educational activities, limited financial support, and pilot activities in three protected areas to address the problems and constraints described in Part II of this Paper. Consistent with the scope of the constraints, the Project contains five inter-related and mutually supportive components. The first component- **Institutional Development and Strengthening** - will strengthen the capability of IRENA to plan, develop, carry out, and/or coordinate a wide range of activities to deal with the gamut of natural resources and conservation problems and constraints described previously. The second component - **Policy Development, Dialogue and Implementation** - will deal with the policy and legal constraints which impede sustained efforts to sound management of natural resources. The third component - **Environmental Education** -will help IRENA and other organizations to promote environmental values that support

natural resource conservation and sustainable economic development. The fourth component - Protected Areas and Buffer Zones - will enable local NGO's and communities, cooperating with IRENA and other government agencies, to manage, use, and conserve natural resources in and around designated protected areas with important biological diversity. The fifth component - Plant Protection and Integrated Pest Management - will enhance protection of agricultural crops while reducing health, environment, and financial risks associated with pesticide use.

As described in Part V of this paper, implementation arrangements will be tailored to the scope and traits of each component. Such arrangements include: (a) an institutional contract to help IRENA in the overall implementation and coordination of the project as well as in carrying out a range of institutional strengthening activities, such as training of staff personnel, advisory services on policy development and implementation, etc.; (b) a consortium of US pvos (PACA) which submitted unsolicited proposals to carry out activities in three protected and buffer zones; (c) local and third country contracts to tap relevant, cost-effective resources available in the region; and (d) a buy-in arrangement through RENARM - the Regional Environmental and Natural Resources Project - under the IPM component.

C. Relationship to the A.I.D. strategy

The Project is a key USAID/Nicaragua activity to attain the fourth objective contained in the recently approved Country Development Strategy Statement (CDSS) for the period FY 1991-1996. The essence of this objective is to promote sustainable resource use by addressing critical natural resource and environmental policy questions through policy dialogue and by strengthening the capacity of the primary Nicaraguan natural resource management/environmental protection agency. The ultimate goal is to help Nicaragua manage its resources in a sustainable way so they can form the basis for long-term growth.

The U.S. Congress has strongly recognized the need to support the environment and natural resource sector. IRENA was specifically mentioned in the Report of the House Committee on Appropriations accompanying the Foreign Operations, Export Financing, and Related Programs Appropriations Bill for FY 91.

The AID Regional Office for Central American Programs (ROCAP) is developing a specific regional environmental strategy for the 1990's. The draft strategy highlights, *inter alia*: (1) economic and environmental policies of sustainable development, (2) institutional strengthening for government agencies and NGO's, (3) public participation and empowerment in natural resource issues, and (4) human resource development and training.

The Project embodies these strategy elements in its mix of components.

AID/Nicaragua has several programs underway with direct and indirect implications for NRM. The Commodities Support Project is procuring equipment for the IRENA offices and providing guidance on the procurement aspects of the NRM Project. The NRM plant protection and integrated pest management component is shared with the Private Agricultural Services Project.

D. GON and Other Donor Programs

1. GON Programs. The new Nicaraguan Government has expressed its resolve to re-orient the management of the country's natural resources as a central component of its platform. President Chamorro was an outspoken proponent of improved management of natural resources during the Central American summit held in Guatemala in June 1990. She has promoted IRENA to a Cabinet-level position with the same status as a Ministry and nearly doubled the agency's funding in 1990.

Presently, the GON is developing its natural resources management strategy. Currently, the best expression of the GON's emerging strategy is presented in its "Proposal for the Use of Environmental Funds from the Agency for International Development for Nicaragua." The preliminary objectives of the strategy include:

- Establish a land use planning and management system to ensure sustainable use of the natural resource base;
- Promote the rational and sustainable use of renewable natural resources;
- Control and manage watersheds to avoid soil degradation and loss, and prevent downstream contamination of water sources;
- Create a system of natural reserves and parks to ensure the protection of threatened habitats, maintenance of biodiversity, and support for such diversity.
- Control and prevent environmental contamination; and
- Mount an effective environmental education campaign.

2. Other Donor Programs

The Government of Sweden, through SIDA, has been a major supporter of the natural resources sector in Nicaragua, with most

of its support aimed toward aspects of forestry production, in addition to initial support in developing a natural resources strategy. This support is expected to continue, but perhaps at reduced levels. The shift in GON policy to favor private ownership over state corporations will certainly affect SIDA support to the state forestry corporation CORFOP. There are indications that SIDA will be expanding its support in the conservation area. A recent draft of the SIDA natural resources country plan includes support to the SIAPAZ project and funding for a director and one vehicle for the Bosawás Reserve. SIDA is also responsible for the development of the National Conservation for Development Strategy (ECODE) and the Tropical Forest Action Plan - National Land Use Plan (PAF-OT).

In smaller efforts, SAREC (Sweden), NORAD (Norway), and Oxfam (Belgium) have worked in SIAPAZ. GTZ, Bread for the World, Greenpeace, Friends of the Earth, and lesser known European NGO's have provided assistance to at least two conservation NGO's in Nicaragua: ABEN and MAN. CATIE and IUCN have projects in Nicaragua and can offer technical and training assistance to NRM.

Oxfam (U.S.) and the National Science Foundation have supported research in the lowland forests of the Atlantic coast and monitoring of recovery efforts of rain forest flattened by Hurricane Joan in 1988. The University of Maine trains Nicaraguan students and has a forest inventory and management program for the RAAN and RAAS areas on the Atlantic Coast. Other US universities with natural resource activities in Nicaragua include: University of Maryland, Ohio University, University of Wisconsin, Michigan State University, and the University of Miami. The South Florida Water Management District has seconded a staff person as Environmental Advisor to the President and will coordinate with IRENA on the policy and watershed management components of NRM.

IV. PROJECT DESCRIPTION

A. Goal. To contribute to environmentally sustainable, broad based economic growth in Nicaragua.

B. Purpose. To improve management of renewable natural resources, to protect biological diversity in selected sites, and support sound, environmentally safe pest management practices in Nicaragua.

C. Project Outputs. Attainment of the project purpose assumes the following outputs as a result of inputs to be financed by A.I.D. and the GON under the project.

1. Institutional Development and Strengthening

-- IRENA's management, financial and technical capability strengthened. IRENA will be able to prepare projects for funding by the international donor community and will be able to administer and use such funds effectively.

-- At least 200 IRENA personnel trained in accounting, administrative and related operational systems.

-- Reduction of IRENA staff in the central office by at least 100 employees and a corresponding increase in field office staff.

-- IRENA's central staff to include a fully qualified controller with a graduate degree in accounting, a fully qualified natural resources planner with a graduate degree, a certified accountant, and five professionally trained natural resource managers.

-- Financial stability in IRENA to sustain its operations with a recurring appropriation from the GON central budget of approximately US\$ 3.0 million plus its own internally generated revenues.

2. Policy Development, Dialogue and Implementation

-- National inventory of natural resource policies completed.

-- New forestry law and regulations promulgated and applied toward better forest management.

-- Plannometric base maps with transparent overlays depicting Nicaragua's diverse ecosystems and land use patterns.

-- Public infrastructure plan completed; plan in use to influence basic decisions on rural infrastructure.

-- Proposal for national watershed management project completed, presented to international development agencies.

-- New regulations on pesticides drafted.

-- IRENA protected areas plan completed.

3. Environmental Education

-- Trained environmental educators in IRENA and collaborating institutions, and an equipped environmental education department established.

-- National Strategy for Environmental Education and related action plans developed.

-- Didactic materials, slides, photographs, audio and video-tapes, newspaper articles, public service announcements, etc., that convey environmental messages developed.

-- School visitation program designed.

4. Protected Areas and Buffer Zones.

-- Effective conservation and management programs in and near protected areas will be developed and implemented in collaboration with local communities and NGO's; Outputs related to each of the protected areas are expected as follows:

A. Miskito Region

-- A plan developed to protect natural resources in the Miskito region. This plan will include effective resource surveillance and control measures.

-- Arrangements formalized among IRENA, MIKUPIA, and local communities to provide the basis for effective cooperation in conservation and management activities.

-- A team of at least three persons trained by IRENA and the NGO(s) to work in the replication of successful natural resources/environmental protection activities in other areas in the Miskito Reserve and the Atlantic coast.

B. Bosawás Region

-- A patrolling, enforcement, and community relations plan developed to protect effectively the forests and natural resources of the Bosawas Reserve.

-- Indigenous Sumu communities within the Reserve

incorporated into the design and management of the Reserve and participating in the benefits of sustainable resource exploitation programs.

-- A team of at least three persons trained and at least one community organization strengthened by IRENA and the NGO(s) to develop programs and promote and teach sound natural resources/environmental protection practices in the Bosawás region.

C. Chococente Wildlife Refuge

-- A plan developed to protect the Refuge and its resources, especially sea turtles and their egg-laying.

-- Three communities in the Chococente area organize to participate in buffer zone activities that stabilize land use and increase farming intensity and sustainable use.

5. Plant Protection and Integrated Pest Management (IPM)

-- An extension program developed to teach farmers sound IPM techniques.

-- Research carried out to determine ways to improve plant protection and to reduce accidental damage caused by pesticides.

-- A training program developed to teach users and handlers of pesticides about the techniques for safety and cost-effective applications of pesticides.

-- A pesticide registration plan developed to provide needed information for control and improvement of the health and environmental impacts of pesticides in Nicaragua.

-- A testing service established to measure pesticide residues in agricultural products.

-- An information dissemination program developed to provide up-to-date information to researchers, technical outreach staff, suppliers, and producers on pest management, pest control products and methods, and diagnosis and treatment of accidental poisoning and contamination.

D. End-of-Project Status (EOPS). By the end of the project, the following EOPS are expected:

1. Institutional Development and Strengthening. IRENA's management, financial and technical capability will have been

strengthened to the point where it will: (a) be able to prepare projects for funding by the international donor community, and (b) be able to administer and use such funds effectively, and (c) be financially stable with an adequate budget to sustain its operations, entailing a recurring appropriation from the central GON budget plus its own internally generated revenues.

2. **Policy Development, Dialogue and Implementation.** The Government of Nicaragua will have developed appropriate natural resources and environmental protection policies guiding the sound use of natural resources and will have an enhanced capacity established in IRENA to implement those policies.

3. **Environmental Education.** A National Strategy for Environmental Education will have been adopted and IRENA will have a trained cadre of environmental educators who are properly equipped to carry out the strategy and related environmental education and awareness activities.

4. **Protected Areas and Buffer Zones.** A rational plan to protect fragile areas and preserve Nicaragua's ecosystems will be in use by IRENA as a basic tool for setting priorities and making decisions. Protection of natural resources and/or ecosystems in the Miskito Cays, Bosawas and Chococente regions with effective resource surveillance and control measures will be in place.

5. **Plant Protection and Integrated Pest Management (IPM).** The agricultural sector, and particularly producers of non-traditional export crops, will have greater access to alternatives to pesticides and better knowledge and technology for monitoring potential pesticide problems.

E. Assumptions. Attainment of the goal, purpose and EOPS assumes that:

-- Adequate political will and the required authority vested on IRENA to implement economically rational natural resources policies (even where effects of policies where these are contrary to special interests). Government policies will foster local organization's taking responsibility for control of natural resource use.

-- GON police and courts will enforce restrictions on use of natural resources.

-- IRENA leadership has adequate political backing to reduce staffing levels and implement effective decentralization of functions and decisions.

-- Funding for developing resource management plans is made available by government or other donor-assisted projects.

-- Organizations involved in plant protection and pesticide use willing to invest in methods to reduce negative effects of pesticide use.

-- Unforeseen political or logistical problems will not prevent the inputs from arriving and being applied as planned.

F. Description of Project Components

Together, the aforesaid five components should achieve the project's purpose. Each component responds to a distinct aspect of the current situation in Nicaragua and the specific constraints that impede the sound management of the country's natural resources and the protection of the diverse ecosystems. A description of each component follows:

1. Institutional Development and Strengthening

This component will address one of the key constraints - institutional weaknesses - impeding effective actions to deal with the environmental degradation problems in Nicaragua. To do this, the project will focus on strengthening IRENA, the public agency in Nicaragua charged with managing the country's renewable natural resources and protecting the environment.

Currently, IRENA does not have adequate procedures for personnel, accounting and financial controls, and its operational procedures are erratic at best. The organization is housed in dilapidated quarters with run-down equipment. IRENA has a large staff but morale and performance are low. The staff does not have the equipment or training to perform well. Hardly any staff member has full professional credentials. Too many personnel are concentrated in Managua and too few are in the field.

IRENA also lacks the resources it needs to hire, train and equip qualified staff. Its current budget totals approximately \$3 million annually from the central GON budget, which is inadequate to finance the required institutional improvement effort. IRENA has the authority to collect fees to augment its revenues but it has limited capacity for fee collection. It is expected that the technical assistance to be provided under the project will help IRENA in building up its capacity to collect such fees as a supplement to the central budget allocation in order to become an effective sustainable organization. However, collection of fees for permits, licenses and other uses of the forests, fisheries, and other resources will be consistent with good management of the resources.

Thus, the basic objective of the institutional strengthening component is to upgrade IRENA's administrative, management, and

accounting, and technical capabilities so that it can carry out its mandate effectively and in a sustainable manner. Such sustainability will entail an improved capability to collect fees for activities related to the rational exploitation of natural resources, and a capability to develop and manage activities which can be assisted by international organizations.

To meet the basic objective of this component, the Project will seek to improve staff moral and staff motivation through training and appropriate personnel management techniques. It will improve internal management and control in IRENA sufficiently that the agency will be able to increase fee collection by 50% -- from roughly \$500,000 per year, to roughly \$750,000 per year. The Project will also develop technical and managerial capacity in IRENA that will enable it to carry out the other components of the NRM Project, and to fulfill its statutory responsibilities.

IRENA's administrative, management, and accounting capability will be brought up to standards through intense advice and training provided by a U.S. consulting firm, as discussed under implementation arrangements. The project will also finance the purchase of accounting, office, and other management hardware and software to help IRENA develop the required information systems, accounting and personnel procedures and other operational mechanisms necessary for effective operations.

Accordingly, the project will finance:

a. **Technical assistance.** The principal technical assistance mechanism will be a contract with a U.S. firm, which will provide:

-- One long-term advisor for three years who will be the principal advisor on environmental and policy matters to IRENA. He will be expected to be the day-to-day counterpart to the General Director of IRENA and will be available to advise the Minister, when required. This advisor will also coordinate the provision of a wide range of specialists to be provided on a staging basis, as needed during project implementation. In addition, this person will play a key role in the selection and contracting by IRENA of local specialists (listed under 2. below) needed for the overall, long range operations of IRENA and its field offices. Tentatively, the specialists, will include:

-- Specialists to help IRENA in developing and implementing new operational systems and procedures: The areas of assistance

and the types of specialists include:

- ** Accounting: A Controller for 30 person/months. (SIDA is already financing the initial 6 months of a controller); and an Accountant for 36 person/months.
- ** Budgeting: A Budget Advisor for 36 person/months.
- ** Administrative/Property management Systems: A Systems Advisor for 36 person/months.
- ** Personnel: A Personnel Advisor for 36 person/months.

Currently, it is unknown whether or not qualified individuals are available locally to fill any of the above positions. The U.S. firm, in concert with IRENA, will explore their availability in Nicaragua, prior to exploring contracts with external advisors. The compensation paid to locally-hired Nicaraguan specialists will be based on IRENA's usual salary scale and will be consistent with A.I.D. regulations and procedures on salaries. These regulations prohibit the use of A.I.D. funds to pay salary supplements.

Although the project will finance the initial contracts of the long-term specialists, these specialists are expected to be funded under IRENA's central operational budget upon termination of the project. Otherwise, by the end of the project, these specialists would have trained enough regular IRENA employees to assure the establishment of their respective capabilities after they complete their contracts.

-- In addition to the above specialists whose efforts will focus on the institutional strengthening of IRENA, the project will finance the services of short-term specialists in the areas of environmental legislation, regulations, policy formulation, environmental education, etc. to carry out the advisory activities related to all project components. The specific expertise and duration of each advisory task will be determined by the long-term advisor and IRENA's management. Tentatively, the project provides for up to 30 person/months for such technical assistance.

The matrix below indicates how institutional strengthening of IRENA will increase the agency's ability to deal with

Nicaragua's major natural resource problems.

<u>Project Action</u>	<u>Effect on Major Resource Problem</u>
Strengthen central financial and administrative systems	Deforestation: improved capability to plan, budget, and monitor forest management.
	Biodiversity conservation: better system for setting priorities and allocating staff and financial resources.
	Pesticides: greater capability to oversee pesticide regulation.
	Watersheds: better ability to set policy and coordinate with local authorities.
Strengthen field office finance and administration	Deforestation: improved ability to collect fees; provide equipment to field staff; pay staff salaries in field operations.
	Pesticides: greater capability to equip field staff; facilitate field monitoring.
	Watersheds: better ability to transfer resources to field operations.
Increase field operations capacity	Deforestation: improved ability to enforce forest management plans.
	Biodiversity conservation: better system for attaining field level conservation; boosting morale of field personnel; maintaining an official presence in the field recognized by the public.
	Pesticides: greater capability to apply pesticide regulation and monitor pesticide use in the field in cooperation with MAG and MINSA.
	Watersheds: better ability to change land use practices and institute conservation measures in the field.

b. **Training.** It is expected that during the first three years of the project, the long-term technical advisors will train more than 200 IRENA staff members in the new accounting, budgeting, personnel, and administrative systems. This training will be offered on-the-job at IRENA. During its second, third, and fourth years, the project will provide 60 short courses and

seminars. The short courses will train approximately 120 IRENA personnel, whereas the seminars will be offered to broader audiences. Intensive management training at specialized U.S. institutions will also be considered during project implementation.

The project will also fund professional degrees for up to eight candidates, as determined by needs analysis, in natural resource management and public administration during its second, third and fourth years. The exact areas of study the candidates will pursue will be determined during the first year of project implementation. The project will consider obtaining the professional degree training from regional institutions in Mexico and Central America.

c. **Commodities.** The project will finance the purchase of accounting, office, and management hardware and software and their installation in IRENA's renovated office facilities in Managua within the first year of Project implementation. This hardware and software will include computers, printers, copiers, facsimile machines, accounting software, and office furniture. Other commodities will include 45 two-way radios with base station, office furniture, 30 trailbikes and two four-wheel drive vehicles for field offices. Additional information on the commodities to be financed under the Project is contained in Part VI - Cost Estimate and Financial Plan.

2. Policy Development, Dialogue and Implementation

This component will address shortcomings in the existing policy framework for natural resources management in Nicaragua, and particularly the policy constraints discussed in Part II of this paper.

The project will provide technical assistance, training and related commodities to and through the focal GON agency -IRENA - to help plan, design and carry out a series of inter-related actions to deal with Nicaragua's policy constraints in the natural resources and environment conservation area. These actions include:

-- The establishment of appropriate fora or the strengthening of existing ones for inter-agency consultation on environmental policies. This is necessary for resolving policy conflicts between agencies. A starting point will be a review by the technical assistance contractor and IRENA of the existing inter-agency policy dialogue and review mechanism which includes CONAMOR, the National Commission on Environment and Land Use, and IRENA. Upon completion of this review, a decision will be made as to continue with the existing mechanism now under the

leadership of CONAMOR, or to create one which is more responsive to the aims of the project.

-- The development of policy papers on the key topics of deforestation, watershed management, pesticides, and protected areas, land use, land tenure and property rights, land taxation, etc. The process of producing these papers would also entail a study of existing policies and how these policies foster or hinder Nicaragua's natural resources and environment. These papers will be used as the basis for many of the fora mentioned above.

-- The adoption of a national system to determine and designate land use capability in accordance with the ecological characteristics of the land. Application of the system will result in a set of maps and land use regulations that apply the classification throughout the country. This will enable the government to prepare a national plan for maintaining and upgrading existing infrastructure and constructing new infrastructure based on the long-term productive capacity of the lands served by the infrastructure.

-- Drafting of a new forestry law and related regulations. It is expected that the proposed law and regulations would redefine the roles of the government and the private sector with regard to forest ownership and forest management. They would establish a schedule of stumpage prices and user fees and, possibly, a set of economic incentives for private landowners to engage in forest management and reforestation.

-- The preparation of a proposal for a national project in watershed management for presentation for funding to other donors that may be interested in assisting Nicaragua in the natural resources area. This proposal would include an activity to further the adoption of the pesticide standards and regulations which the FAO has proposed to the government of Nicaragua but which have not yet been made official. The Soil Conservation Service of the U.S, Department of Agriculture under a PASA arrangement is one option for this activity.

-- The preparation by IRENA, with project financed technical assistance, of a plan for the national system of protected areas. This plan would clarify the type of management each type of unit -- e.g. national park, wildlife reserve, historic site -- should receive. The plan will determine whether existing units should be expanded and whether new units should be designated. The plan will also project the level of management each area can realistically expect to receive across a time horizon of the next ten years. This projection will show the costs of management, anticipated revenues from user fees, and shortfall between income and costs of management. Thus, the plan will serve as one instrument for IRENA to use in setting internal

priorities and seeking supplemental financing.

-- A workshop to discuss the National Strategy for Environmental Education, planned to be developed under the Environmental Education component discussed below.

The central results of the policy dialogue on deforestation, watershed management, pesticides, and protected areas should be completed within three years after starting the dialogue process. Thereafter, the policy dialogue process would concentrate on monitoring implementation of the policies it has produced.

a. **Technical Assistance.** To assist in carrying out the above actions, the project will provide extensive technical assistance and short-term training as well as equipment. Equipment will consist of computer hardware and software that will enable IRENA to automate the mechanical aspects of the policy process: draft and redraft proposed policies, store policy documents, index policies, etc. The types of technical assistance to IRENA to support the policy process is expected to be as follows (shown in person-months):

<u>Policy Output</u>	<u>Technical Assistance</u>	<u>Est. (pms)</u>
General Develop.	Natural resources policy specialist	6
	Natural resources planner	3
	Environmental lawyer	3
Land Use	Land use capability analyst	6
	Land use cartographer	2
	Remote sensing, preparation of maps	1
Infrastructure	Environmental impact analyst	2
	Infrastructure planner	2
Deforestation	Forest policy specialist	4
Watersheds	Watershed project design team	4
Pesticides	Pesticide regulation specialist	3
Protected Areas	Protected areas planner	6
Inventory	Policy analysis team	6
Other-contingent	Land tenure specialist	7

It is expected that international specialists will provide roughly two-thirds of the short-term technical assistance

with the remainder provided by Nicaraguan professionals. The duration of each short-term assignment will be modified as necessary based on Project implementation experience.

b. **Training.** The project will provide training through short courses and seminars under this component. One to two-week courses, will instruct groups of roughly 15 professionals from IRENA in technical subjects related to natural resource policy. One- or two-day seminars will inform general audiences of approximately 50 people on issues in natural resource policy. The contractor awarded implementation of the project will be responsible for carrying out the short courses and seminars.

The following table details proposed training under the Policy component:

<u>Policy Output</u>	<u>Training to be Provided</u>
Land Use	2 short courses in land use capability analysis, remote sensing, etc. 1 seminar on land use capability
Infrastructure	1 short course in environmental impact analysis for infrastructure projects
Land Tenure	2 short courses in land tenure and property rights 2 seminars on land tenure and property rights
Land Taxation	1 short course in land taxation methods
Deforestation	1 short course in forestry legislation and regulation 2 seminars on forest policy
Pesticides	1 short course in pesticide regulation 3 seminars on environmental and public health aspects of pesticides
Protected Areas	1 short course in protected areas planning Watershed management, hydrology, soil conservation

Policy dialogue carried out under the project is expected to lead to adoption of a national program to determine and designate land use capability in accordance with the ecological characteristics of the land. Application of this system will result in a set of maps and land use regulations that apply the classification throughout the country. This will enable the government to prepare a national plan for maintaining and upgrading existing infrastructure and constructing new

infrastructure based on the long-term productive capacity of the lands served by the infrastructure.

The project will produce proposals to simplify and streamline current processes for land titling and registry of rural properties. It will also propose revisions to existing laws and judicial procedures to guarantee property rights and to enforce contracts. Further, the project will recommend changes in land taxation practices so that tax rates reflect land use capability and actual land use. The recommendations will also cover mechanisms for making tax collection more effective.

To confront deforestation, the project will formulate a proposed new forestry law and regulations. The proposed law and regulations will redefine government and private sector roles with regard to forest ownership and management. They would establish a schedule of stumpage prices and user fees and, possibly, a set of economic incentives for private landowners to engage in forest management and reforestation.

The project will prepare the design for a major watershed management project with the intention of seeking funding through international development assistance. The project will also urge the adoption of the pesticide standards and regulations that FAO has proposed to the Government of Nicaragua but which have not yet been made official.

Through the project, IRENA will update the national wildland system plan (SINASIP) that classifies the type of management each unit (e.g., national park, wildlife refuge, historic site) should receive. The plan will determine whether existing units should be expanded and whether new units should be designated. The plan will also project the level of management each area can realistically expect to receive during the next 10 years. This projection will show the costs of management, anticipated revenues from user fees, and shortfall between income and costs of management. Thus, the plan will serve as one instrument for IRENA to use in setting internal priorities and seeking supplemental financing.

Each action under the policy dialogue component will specify institutional responsibility for carrying out the action. The actions will also include estimates of financing requirements to put them into effect and will identify funding sources. These could include sources such as user fees and private investment in addition to funds from the general public treasury and from international assistance. Policy dialogue actions will also set priorities and institute a continuous process for evaluating progress and considering future actions. Thus, with regard to the project output of revised forestry legislation, for example, policy dialogue will lead to: a proposed new forestry law, proposed new forestry regulations, clear allocation of

institutional responsibility for implementing the law and regulations, and appropriation of funds to enable implementation.

The central results of the policy dialogue on deforestation, watershed management, pesticides, and protected areas should be completed within three years after starting the dialogue process. Thereafter, the policy dialogue process should concentrate on monitoring the implementation of the policies it has produced.

3. Environmental Education.

The long-term objective of environmental education is to empower and motivate people to act in a responsible way with respect to the environment. Human survival requires exploitation of natural resources, but long-term survival depends on understanding the environment and learning to manage human use of it better. Public awareness of the need for careful management of the resource base must be generated before that consciousness can be translated into effective conservation action.

Thus, the aim of this Component is to raise public awareness of the importance of natural resources to human welfare in order to generate broad support for policies and regulations that conserve natural resources and protect the environment. Attainment of this aim will entail first the development of a National Strategy for Environmental Education, which will provide the framework for other inter-related efforts, including: (1) training in environmental education concepts and techniques, (2) development of didactic materials, (3) development and implementation of a mass media campaign, and (4) pilot testing of a school visitation program.

The training activities will focus on the education department staff of IRENA and collaborating institutions (e.g., Ministry of Education). One workshop will deal with environmental education concepts and techniques, while a separate workshop will focus on developing environmental programs for mass media.

The workshop on didactic materials for environmental education will train participants in the techniques needed to develop successful learning materials for formal, non-formal, and in-formal audiences. The emphasis will be on complementing existing textbooks with environmental education techniques and materials.

The mass media program will develop and test materials to discover effective ways to reach the Nicaraguan public with environmental messages. Although envisioned as a pilot program, many of the materials will have a useful life beyond the end of the project.

The school visitation program will test and compare approaches to involving school children with the environment. For example, is it more effective to bring environmental awareness and actions into the classroom or to take the school children to visit the environment? The related research program will help decide which approach leads to more effective and lasting changes in environmental attitudes and behavior.

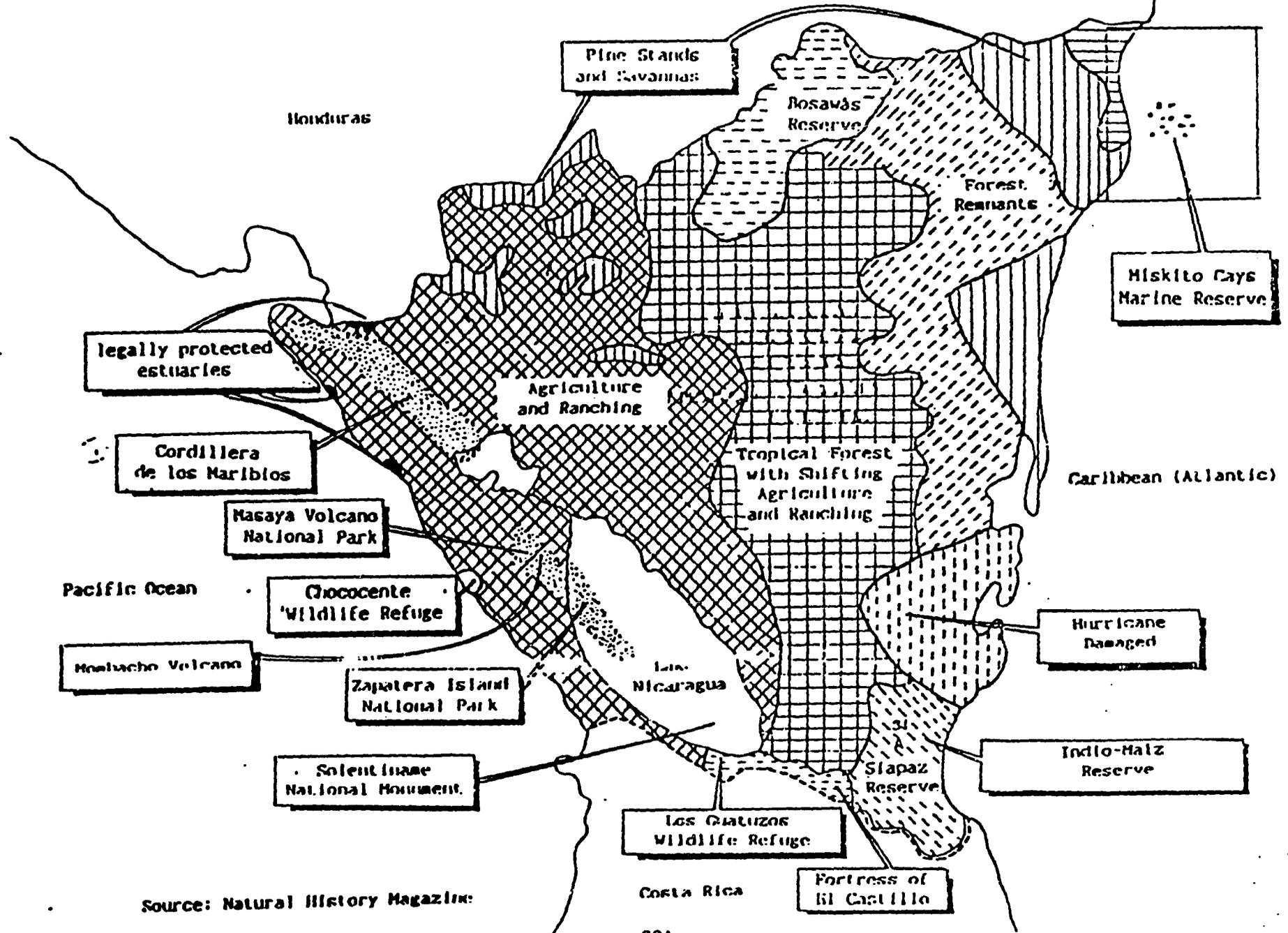
4. Protected Areas and Buffer Zones (See map page 29a)

The long-term objective of fostering environmentally sustainable natural resource use is to support broad-based economic growth. But when resource exploitation is spontaneous and uncontrolled, potentially valuable resources such as timber, gums, resins, fruits, nuts, and marine and terrestrial fauna are often squandered.

To bring biodiversity protection and rural development into harmony, the project selected key sites to develop and implement techniques for integrating protected areas and their buffer zones. Buffer zones are the areas adjacent to parks and reserves that serve as a transition between the natural environment inside the reserve and the human-altered landscape outside. Incorporating buffer zones into broader protected area development plans helps stabilize marginal activities in the buffer zones and reduces destructive human pressures on the protected areas' resources. Yet each situation is unique. Effective buffer zone management requires finding the specific combination of incentives and deterrents that will persuade individuals and communities to recognize the protected areas as legitimate neighbors. Activities for the sites cannot be prescribed in advance but will be selected and designed in cooperation with buffer zone communities to ensure ample participant input. The earliest efforts in the subcomponent sites will be needs assessments and participatory project designs, at which time specific activities and interventions will be chosen.

The project cannot expect to undertake activities in all of the 40 or more proposed and existing units of the Nicaraguan protected area system. Both the funding and the institutional capacity to implement are limited. Therefore selection criteria were developed to guide the choice of sites: (1) biodiversity, (2) urgency or threat, and (3) sustainability, with the hope of also identifying opportunities for developing and testing innovative techniques. The biodiversity criterion was evaluated on the basis of species richness and species uniqueness, and included attention to geographical balance. The urgency criterion looked at immediacy of resource destruction and threat of loss. The sustainability question assessed the ability of IRENA or the local organizations to continue the activities after

and Proposed Areas



Source: Natural History Magazine

the end of the project.

The sites selected were: Bosawás Reserve, Miskito Cays Reserve, and Chacocente Wildlife Refuge. (Details on these sites and the Nicaraguan National Park System can be found in annex E: Technical Analysis.)

IRENA will not have the management or financial capability to undertake these types of activities until later in the project, after the institutional strengthening component has begun. Yet the levels of resource threat and deterioration create significant urgency. Local NGOs are similarly limited in their capacities to undertake large programs of activities. As a result, this subcomponent will make substantial use of the experience and management capability of U.S.-based NGOs for the Bosawás and Miskito Cays areas. The NGOs contribute the additional advantage of having made a long-term commitment to these protected areas, an important consideration for continuing the development of local NGOs. The Chacocente activities will be implemented directly by IRENA.

1. Miskito Cays Reserve

The Miskito Cays Reserve is a proposed protected area for the marine and coastal region in northeast Nicaragua. The area is biologically rich, comprising lowland forests, coastal lagoons, mangrove forests, shallow waters of the continental shelf, sea-grass beds, coral reefs, and coralline islands. The proposed protected area could include 800,000 ha of marine (80 percent) and terrestrial and coastal environments (20 percent). The aquatic ecosystems are especially important, supporting major harvests of shrimp, lobster, turtle, and fish. The rich resource base has attracted many exploiters, and today over-harvesting is threatening the livelihood and way of life of the indigenous Miskito people and the biodiversity and long-term productivity of the resource base.

An indigenous Miskito NGO, MIKUPIA, has led the conservation and development efforts in this area. By focusing support and strengthening on this NGO, the subcomponent will develop a mechanism for implementing activities during the project and create a local institution capable of carrying on activities after it ends.

AID/LAC has approved a competitively awarded grant to the Caribbean Conservation Corporation (CCC) for the first year of a biodiversity conservation project focusing on the Miskito Cays. The NRM project will help fund continuation of the project through the fourth year. The detailed description of this subcomponent is therefore contained in the CCC proposal to AID and the Cooperative Agreement between AID and CCC. A brief description is included here.

This subcomponent would re-establish Miskito control over traditional natural resources through the creation and management of the Miskito Cays Reserve and related sustainable development of the rich biological resources of the area.

The purposes of this subcomponent are to protect productive coastal and marine ecosystems, conserve biological diversity, and improve Miskito social and economic conditions. The specific objectives are to establish a Miskito Cays Reserve, protect the natural resources of the reserve and the buffer zone, involve local communities in the development and management of the overall area, identify and promote sustainable resource uses, and strengthen MIKUPIA to carry on the programs after the initial project ends.

The Miskito Cays Reserve subcomponent includes four primary activity areas: needs assessment, NGO development, reserve management, and buffer zone management. The activities will be integrated to make maximum use of synergistic relationships, economies of scale, and limited resources.

The needs assessments will use participatory techniques to involve local communities in identifying specific needs and designing programs to address those needs. Because local participation is a key component of successful resource management, activities cannot be prescribed in the project paper a priori but will be determined by CCC and MIKUPIA in consultation with the Miskito communities. The needs assessments will be supported with inventories and other preliminary results from applied research into the status, dynamics, and productivity of the resource base.

NGO development activities will focus on strengthening MIKUPIA as an institution capable of designing and implementing conservation and development programs.

Reserve management will focus on protecting the natural resources. Activities will involve training for reserve and NGO staff, equipment and infrastructure, protection and enforcement, research and monitoring, and education.

Buffer zone management will focus on environmentally sustainable development programs. Activities may involve women's clubs, environmental education with materials in the Miskito language, resource management for sustained yield, alternative harvesting technologies, resource tenure and usufruct studies, community outreach, and feasibility studies (shrimp, fish processing, ecotourism, etc.). The specific activities will be determined during the needs assessments and community meetings.

Responsibility for implementing the activities of this subcomponent will rest with CCC in direct cooperation with

MIKUPIA and IRENA. MIKUPIA and IRENA will provide appropriate personnel to participate in training events. Equipment, materials, and infrastructure from this subcomponent that remain at the end of the project will transfer to MIKUPIA or IRENA.

2. Bosawás Reserve

The Bosawás Reserve is a site of roughly 710,000 ha of rain forest in the northern part of the Central Highlands. The proposed area encompasses Cerro Saslaya National Park (11,800 ha), but would increase the area under management by nearly 60 times. This would create the largest terrestrial protected area in Nicaragua and in Central America. The area is largely unstudied, but the few reports indicate that habitat abounds for jaguar, harpy eagle, and other spectacular Central American fauna. In migratory birds alone, the area is thought to shelter more than 100 species during the northern winter.

Previously protected by its geographical remoteness and broken topography, the Bosawás today is a forest under threat. The ever-present demand for new agricultural lands, held in check by the military conflict of the past decade, has been increasing in recent months. Calculations by Swedish forestry advisors indicate that the 1990-1991 dry season exceeded all previous records for deforestation: 200,000 ha--much of it in the Bosawás region. Ironically the settlers are not really interested in the forest; it is considered an obstacle that must be cleared and burned to prepare the land beneath for crops.

A window of opportunity exists to create a framework for sustainable exploitation of the buffer zone to guide the re-settlement efforts already underway. Most of the former fighters who are being re-settled in the Bosawás area have little or no experience with agriculture in these ecosystems. Helping them to learn and adopt appropriate techniques can play a pivotal role in reducing their impact on the forest resources and can contribute to earlier improvement in the welfare of their families.

Concerned over the deforestation threat, the destruction of natural resources, and the decline in rural well-being, the Programa Ambiental para Centro América (PACA--a consortium of U.S.-based NGOs), submitted an unsolicited proposal to AID/Nicaragua to develop a field-based conservation and development program for Bosawás. Working in close cooperation with IRENA, local organizations, and buffer zone communities, the proposal would link protection work in the reserve with development work and environmental education in the buffer zone. AID provided PACA with written comments and indicated a willingness to receive a revised proposal. If the revised proposal is accepted by AID, it would be funded through this project. The accepted proposal would constitute a detailed

description of this subcomponent. A brief description is included here.

This subcomponent would stabilize expansion of the agricultural frontier in the Bosawás region through establishment of the Bosawás Reserve and development of environmentally and economically sustainable activities for the buffer zone and reserve.

The purpose is to protect productive tropical forest environments, conserve biological diversity, and improve the social and economic conditions in the Bosawás region. The specific objectives are to establish a Bosawás Reserve, protect the natural resources of the reserve and buffer zone, halt deforestation, involve local communities in the development and management of the overall area, identify and promote environmentally sound alternatives to resource destruction, and strengthen local NGOs or other organizations to carry on the program after the initial project ends.

The Bosawás Reserve subcomponent includes four primary activity areas: needs assessment, NGO development, reserve management, and buffer zone management. The activities will be integrated to make maximum use of synergistic relationships, economies of scale, and limited resources.

The needs assessment will involve local communities in identifying their roles and responsibilities vis-à-vis the environment and in defining their socioeconomic aspirations. This step will determine the precise buffer zone activities for the project. The community assessment work will be preceded by resource inventory and survey work to provide an informed basis for community decisions. Training and other techniques to encourage participation will be integral parts.

NGO development will focus on identifying one or more community organizations (or helping to create new ones) that can build a constituency for and implement conservation and development activities.

Reserve management efforts will focus on protecting the natural resources of the Bosawás. Activities will include field surveys and inventories, determination of boundaries, marking of trails and borders, hiring and training staff, procurement of materials and equipment, construction of protection and administration infrastructure, monitoring, and education.

The buffer zone portion will promote environmentally sustainable programs. Activities will include agroforestry, women's clubs, agricultural extension work, applied research in farming methods, integrated pest management, pesticide safety and first aid, and feasibility studies of timber and non-timber

extraction strategies for the native forest. The precise buffer zone activities will be determined early in the project during the needs assessments. Examples of specific activities would be: pest management courses for farmers cooperatives, installation of a portable sawmill to provide an alternative to burning trees as part of land clearing, or bee culture.

Responsibility for implementing the Bosawás subcomponent will rest with the PACA consortium, particularly CARE and The Nature Conservancy, in close cooperation with IRENA. Infrastructure, equipment, and materials from this subcomponent that remain at the end of the project will transfer to IRENA or the NGO(s) cooperating in the activities.

3. Chococente Wildlife Refuge

The arrival of female sea turtles from thousands of miles away to lay their eggs in the sand on the beaches of Chococente is a magnificent spectacle. Established to protect the remnant dry forest and shelter the nesting turtles, Chococente Wildlife Refuge is a unique site in Nicaragua. Two species of sea turtles nest on the beaches. The forests within the refuge form what is probably the largest block of dry forest remaining anywhere on Nicaragua's Pacific slopes.

The ruggedness of the coastal landscape has helped to protect these resources until relatively recently, but continued growth (in the human population and therefore in the demand for agricultural land) is increasing the pressure on Chococente's resources. Hunting, fuelwood harvesting, clearing for agricultural use, gill-net fishing, wildfire, and grazing are ever-present threats. Collecting and selling turtle eggs is a traditional source of income, but increases in harvesting intensity are threatening the survival of the turtles themselves.

IRENA has been stretched to the limit to provide even a minimum presence in the refuge. At times, the remoteness of the location and the need for staff in other areas meant that no presence was maintained. This makes resource over-exploitation likely and reduces the opportunity to develop programs in cooperation with neighboring communities.

The purpose of this subcomponent is to improve the management of the Río Escalante - Chococente Wildlife Refuge (Chococente) to protect biodiversity and encourage the sustainable use of the renewable natural resources of the region. A secondary purpose is to improve the socioeconomic status of the human populations in and around the Chococente Refuge through promotion of practices and methods for agriculture, agroforestry, and resource harvest that recognize the carrying capacity and sustained yield limits of the resources. The specific objectives

are to: ensure protection of the resources and ecosystems of the refuge, develop effective protection for the sea turtles (especially the females and nests), promote sustainable resource use among local communities, and improve the integration of refuge and buffer zone.

The Chococente subcomponent will include three primary activity areas: infrastructure and equipment, community outreach, and training.

The infrastructure activities will include needed maintenance and improvements for the ranger cabin and biological station, installation of pump and pipe to bring fresh water to the compound, purchase of a 4-wheel drive vehicle for patrol and outreach work, purchase of a motorcycle for ranger patrols, marking and signing of borders, installation of radio equipment, and feasibility studies for using wind and solar energy.

The community outreach activities will focus on the local communities and their relationship to the resources in the refuge. IRENA staff and consultants will conduct key studies of resource use, agricultural techniques, soils, the local rural economy, and particularly turtle egg exploitation.

The training activities will prepare the staff for increased levels of responsibility, particularly in enforcement and extension. Rangers will receive training in wildlife laws, enforcement, field work, communications, and public relations. Technicians will study field techniques, public relations, extension and environmental education techniques, and park management. Supervisory and research staff will receive park management, finance and administration, environmental education, and public relations training.

Responsibility for the Chococente subcomponent will rest with IRENA and the Department of Wildlands, located within the Directorate of Wildlands, Wetlands, and Coastal Zones. IRENA will provide staff from the central office and from the refuge. The activities will use the infrastructure of the refuge. Short-term technical assistance will be contracted directly by IRENA from local consultants and researchers, particularly for the rural sociology and socioeconomic studies.

5. Plant Protection and Integrated Pest Management

Agricultural yields in Nicaragua are severely constrained by weeds and pests. Methods for protecting crops often involve heavy (and costly) use of pesticides, under conditions that sometimes endanger farm workers. The crops may have pesticide residues so high that they would be rejected by importing countries. Thus in applying pesticides to their crops, producers

take both health and financial risks. Similarly, the Ministry of Health, to protect citizens from vectors of malaria, yellow fever, and other diseases, uses large quantities of insecticides. Workers applying insecticides to stop spread of disease are in danger of poisoning, and environmental contamination can occur. Thus, it is highly desirable to use the minimum quantities of pesticides possible to achieve plant protection and disease control goals.

Technologies have been developed in the past decade for reducing the costs and risks associated with pest control. Unfortunately, most of these innovations were not transferred to Nicaragua because of the embargo, political turmoil, and commercial decline of the past decade. New hardware, chemicals, plant culture methods, and biological pest control methods are now available in other tropical countries. Most importantly, ways have been developed to collect, analyze, and base decisions on information regarding pest populations, crop conditions, costs and benefits, and optimum timing and targeting of pesticide applications. Techniques to test for pesticide residues on foodstuffs and other products, to monitor workers' exposure to pesticides, and to deal with accidental contamination have all been improved substantially beyond the practices common in Nicaragua. Many of the innovations result in reduced expenditure for pesticides to achieve the same levels of protection. Thus, agricultural producers can be expected to adopt the new techniques willingly and to bear a substantial share of the cost of technology transfer.

The NRM and PAS project activities in plant protection and pest management should enhance the effectiveness of farmers' plant protection investments, reduce the level of pesticide residues on agricultural products, increase safety of pest control workers, and enable producers of export crops to monitor pesticide residues so as to foresee any problems with acceptability of their products.

The project will support development of a pest control technical assistance unit within the GON Ministry of Agriculture (MAG) to provide technical services to farmers. The specially trained extensionists in this unit will help farmers to select pesticides, decide the best time to apply them, develop networks to coordinate pest control with neighbors, use precise application techniques, and adopt a broad variety of IPM methods. The extensionists will exchange information frequently with the research unit and will provide information to and disseminate information from the information unit.

Funds for applied and basic research will be provided to MAG/CENAPROVE and MAG/CNA. Supported research may include pesticide evaluation, pest population resistance, pest and pathogen identification, pest and pathogen population sampling

and monitoring, non-chemical plant protection methods, and demonstration/extension approaches.

The project will support numerous in-service training events for pest control decision makers and workers as well as principals and employees of related technical services. Expert instructors will be arranged through EAP, CATIE, CARE, EXITOS (formerly PROEXAG), agricultural chemicals suppliers, UNAM, and similar institutions. Personnel of MAG/CENAPROVE will be trained in pest and pathogen identification. Personnel of MAG/CNA will be trained in pest and pathogen sampling procedures and impact appraisal. Training in extension methods will be provided to staff of the Pest Control Technical Assistance Unit to be supported in MAG/DER. Training in pesticide poisoning diagnosis and treatment can be given to technical personnel of the GON Ministry of Health (MINSA). Researchers and extensionists will be trained in IPM research and implementation principles and methods. Pesticide Technical Assistance Unit personnel will be trained in methods for safe and cost-effective pesticide handling and use, and they will extend the training to farmers and dealers. MAG will be supported to establish regular short courses on pesticide use for applicators seeking certification. MAG/DSV staff will be trained in organization, maintenance, and analysis of data bases for pesticide registry and the pest and plant protection information service to be established. As part of the Environmental Education component, a series of mass media programs will be planned and carried out, advising on the dangers of pesticides and their proper use.

The ability of MAG/DSV to register pesticides will be strengthened by providing a computer service and training. A pesticide and pest information service will be established and equipped at MAG/CENAPROVE to facilitate the flow of information on registered pesticides and provide up-to-date information for the research and technical assistance units.

Equipment and materials will be provided to MINSA to improve diagnosis and treatment of pesticide poisoning, and to facilitate medical monitoring of people who regularly work with pesticides, such as the pesticide applicators in MINSA's vector control programs. Finally, equipment and training may be provided to facilitate start-up of a private service to monitor pesticide residues on exportable crops. It is expected that exporters will support such a service and that it will arrange with an overseas laboratory for analyses.

The above activities will be carried out through a buy-in arrangement under the A.I.D.-sponsored Regional Natural Resources Management Project (RENARM), managed by ROCAP in Guatemala.

G. Role of Women

At this stage, it is impossible to predict the availability of women to participate in the implementation of the project. However, a conscious effort will be made to assure that IRENA, assisted by U.S. experts, look for qualified women to assist in project implementation. It is expected, for example that most of environmental education activities in public schools will be carried out by women.

The role of women in the protected areas component, would depend on the socio-cultural situation in each area. A brief description of their situation in each area follows:

a. Miskito Cays. As one will note from the list of Mikupia's board of directors, there are no women present, in spite of the fact that women play an important traditional role in Miskito society. As was mentioned above, Miskito marital relations are matrilineal, where newly married couples move in with the bride's family instead of the groom's, a fact that establishes the predominance of the woman's family over that of the man. The anthropological literature indicates that matrilineal residence is found where the principal providers of caloric intake are women, usually because the gardens they tend are of greater importance to the local diet than the fishing or hunting expeditions of men, and such would seem to be the case among the Miskito.

How can the lack of women in Mikupia be explained? It appears likely that the origin of Mikupia among exiled young men in Costa Rica and among the guerrilla members of the Resistance, nearly always male, caused the group to re-form in Nicaragua as Mikupia by calling on those same young males involved in the early conversations. It is not that women have been systematically excluded from politically organizations, since one of the principal Miskito leaders of MISURASATA was a woman, Hazel Lau.

Mikupia should be asked to rectify this situation by naming an equal number of women to its Board of Directors. These are the women who remained in the Miskito communities during the civil war and who suffered the attacks by the Sandinista army on the communities themselves, and they will provide valuable input to the organization in general and to this project in particular.

Specifically, women should be the focus of the community development effort, since they are traditionally the principal providers of non-marine elements of the Miskito diet. Needs assessment by the project must focus on the kinds of activities which women themselves identify as potentially productive and which complement their traditional activities.

b. Bosawás. PACA's unsolicited proposal to AID/Nicaragua focuses on the gathering of gender desegregated baseline data in preparing to work in the field and in gender-sensitive approaches to the collection of these data. The key issues considered in the PACA approach are:

-- Women's roles in farming where men leave the farm to seek income in other (often urban) activities, or as men abandon women with a small parcel of land to which the women have no legal rights for their support and that of their children;

-- The role of crop production and other productive activities in the household subsistence and cash economy;

-- Farm and non-farm employment opportunities for men and women;

-- Cultural perceptions of women's roles and activities;

-- The access of women, in the absence of a husband, to credit, cash, land, and extension assistance;

-- Small-scale marketing and income-generating activities;

-- Interdependence and time-discretion of sex and age-specific tasks carried out by women and men;

-- Activities, resources, incentives, and preferences of different household members.

PACA will be expected to pursue a strategy which allows it to use the data collected to formulate activities which benefit women. One obvious strategy is to form women's groups, clubs, and associations to provide a forum for continued discussion of these issues and to function as a conduit for programs which involve women in productive activities.

c. Chococente. The NGO which will participate in the implementation of this activity will be selected once the project is well underway. The agreement with the selected NGO will assure full consideration of women in the implementation of the activity.

H. Project Benefits and Beneficiaries

1. Benefits. Because of the absence of reliable data, it is difficult to quantify the economic benefits that would result from this project. However, there is no doubt that Nicaragua needs to manage its resources rationally to assure its long-term economic sustainability and the well being of its people.

Nicaragua possesses a valuable resource in its biological and ecological endowment. Its biodiversity is a vital renewable resource, particularly in the long run. It provides the potential for new products and processes to broaden the nation's economic base. The biological diversity in humid forests and coastal zones has significant international value as well. The long-term economic outlook of Nicaragua is therefore dependent on its ability to use its natural resources in a manner that produces optimal income in a sustained manner. The project would further this aim.

Specifically, some significant benefits are immediately apparent if the project is carried out as envisioned. Health care costs are expected to decrease and the expected productive life of farm workers would increase as a result of a reduction in pesticide use and improved handling practices. There is also a clear, if not quantifiable health benefit, from reduced pesticide use in the environment. Consumers of pesticide contaminated products incur higher health care costs and live shorter lives. Reductions in soil and water pesticide contamination reduces water treatment costs and improves the health of those using or in contact with contaminated soil and water.

Nicaragua could also improve its balance of payments situation as a result of increased agricultural exports. This would be an effect of an improved farmers' capability to conserve the productive capability of the soil and to meet international product standards on pesticides contents as a result of the activities carried out under the IPM component.

2. Beneficiaries. The project is expected to benefit the whole Nicaraguan population as a result of the sound management of the country's natural resources and the controlled, environmentally safe use of pesticides. Direct benefits would accrue to the target populations in the protected areas, as follows:

a. Miskito Cays. The target population beneficiary group of this project includes the entire Miskito population living along the Atlantic coast beaches and lagoons, a population estimated at about 15,000 people, who acquire a part of their diet and income from marine resources: fishing, diving for lobster, and turtle hunting. An estimated 3,000 men are engaged in marine resource harvesting at least part-time. They will benefit by increased availability of marine resources as marine resource piracy is brought under control and wholesale harvesting by non-national fishing boats is halted. The Miskito fishermen and their families will eventually benefit from the establishment of a fishermen's cooperative to jointly market their products and from the creation of a fish processing plant to freeze and otherwise process their products for eventual export to internal

and external markets.

Also benefitting the entire population, but directed in this case specifically at women, are the buffer zone activities in the Miskito communities to increase incomes and improve diets by initiating productive activities within the Miskito communities. An estimated 3,000 women will benefit from improvements in domestic garden production and in small farm animal production. These benefits will include both improved diet during the periods of migrant labor when males leave the community for six months at a time, but also the possibility of cash income through sales of garden products, eggs, chickens, and fruit to the larger towns like Puerto Cabezas, which currently send to Managua for these goods.

One of the indirect beneficiaries is Mikupia itself and, through Mikupia, the entire Miskito population, which needs organizations which consist of Miskitos, are directed by Miskitos, and which look out for Miskito interests. In spite of a past in which the Miskitos had a "king" and maintained a more complex social organization, the traditional Miskito society in recent years has been very localized. Each community has resolved its own affairs but has not had a vehicle for participation in the wider society of the North Atlantic Coast, much less Nicaragua as a whole. Mikupia will provide the Miskitos with one such organization in a centrally important area of local society and economy.

Another indirect beneficiary is the country as a whole, through the control of resource piracy. If concessions are granted to outside fishing boats, monitored and controlled by the Miskitos in Mikupia, the resulting revenues will help to finance the regional (RAAN) and/or central governments, always strapped for funds. If the resources are harvested and processed by the Miskitos themselves, the earnings in hard currency and export taxes again benefit the regional and/or central governments.

b. **Bosawas.** The bulk of the direct beneficiaries in this area will be those involved in the buffer zone activities. There are an estimated 6,000-8,000 project beneficiaries in the Bocay representing 1,500-2,000 small farmers and their families. The INRA resettlement plan is based on resettling 2,000 demobilized Contras, while the actual number of Contras as of June 10, 1991, was 1,480 who with their families total just over 6,000 people. From these figures, it appears that the average family size among the demobilized Contras is just four persons, less than the expected average of five for small farmers in Central America. If PACA works in the Siuna area with the cooperatives, the number of beneficiaries can be estimated at 4,500, based on the 900 farmer members of the cooperatives plus an average family of five.

The Sumus and others living inside the Bosawas reserve can be considered indirect beneficiaries of the buffer zone activities. While they will not participate themselves in the buffer zone activities, the role these activities play in keeping new colonization from destroying their resource base ultimately benefits them. It is estimated that 3,000 Sumus live inside the Bosawas reserve, and while no figures exist for non-Sumus in the area exist, Juan Arauz estimates that no more than perhaps another 3,000 Mestizos and Miskitos are resident in the rest of the area.

Other indirect beneficiaries include the predominantly Miskito population resident on the Coco River, the boundary between Nicaragua and Honduras. The protection of the Bosawas forest will have an effect in both controlling and maintaining the river itself through protection of one of its principal source areas and in maintaining the riverine biodiversity, which is an important resource for the Miskito riverine culture and diet.

c. **Chococente.** The direct beneficiaries will be the approximately 3,000 people living in, and in the immediate vicinity of, the Chococente Refuge. The project should follow the lead of earlier plans by IRENA and limit the exploitation of turtle eggs to members of the families resident in Chococente and in the buffer zone to assure that they will truly benefit from the project's activities.

I. Project Sustainability

Currently, IRENA is almost totally dependent on GON allocations from its central budget. Given the medium-term economic situation for Nicaragua as described above, there is very little potential for increased GON appropriations to IRENA in the foreseeable future. This suggests that IRENA will have to generate a significant portion of its own revenues.

Thus, to meet the natural resources management objectives of the GON and IRENA it will be necessary for IRENA to attain a higher level of financial self sufficiency before the end of the century. The institutional strengthening component of this project places a high priority on converting IRENA into a more financially self-supporting institution by 1996. Without attaining this status, it is highly unlikely that other project components will be sustained after 1996 without continuous infusions of external grants and loans.

Moving IRENA towards financial self-sufficiency by 1996 will require major efforts in the following areas:

- Improvements in internal financial control.

- Improvements in administrative performance.
- Finding new sources of revenue.
- Improvements in operational efficiency.

At the end of this project the institutional strengthening component will have produced a step increase in the annual internally generated revenue stream from three sources. These increased revenue streams will begin in 1996 at the end of the NRM institutional strengthening activities and will continue for five to fifteen years. While the improvements put in place during the institutional strengthening component of this project will begin to degrade immediately at the end of 1996, the improved quality of staff resulting from the intensive training program should sustain the revenue flows until staff turnover and individual entrepreneurship offsets the revenue benefits gained.

The projected project investment that will contribute directly to increased IRENA revenues in the future is estimated to be \$1.9 million and includes all equipment and supplies to support field personnel, and portions of the technical assistance and training funds.

Interviews with central IRENA administration as well as regional supervisors suggest that under the best of conditions current revenues could be doubled through better "policing" of current fee generating uses (improved collections). This improved policing is an anticipated result of skills training, the addition of vehicles and communications equipment. In addition, improved internal financial control could reduce internal "leakages" of as much as 50% (improved retention).

Finally, increased incentives and operational procedures are expected to yield new revenue generating activities amounting to as much as \$50,000 per year (new collections). For example, a rehabilitated technical information service could sell services to other government agencies and the private natural resource extraction sector. Also fees could be charged for eco-tourism and for pasturing animals. There is also an opportunity to gradually increase current fees as long as this results in increased revenues.

V. PROJECT IMPLEMENTATION

A. Implementation Arrangements

IRENA will be the focal GON agency involved in the overall coordination of the project. The Ministry of Agriculture, however, will be the primary GON agency involved in the implementation of the IPM component, as the planned activities are aimed mostly at farmers who can be reached by agricultural extensionists. The main implementation mechanisms include:

- (1) an institutional contract with an 8(a) or other US firm to be selected competitively;
- (2) three NGOs, including the Programa Ambiental para Centro America (PACA) and the Caribbean Conservation Corporation (CCC), which submitted unsolicited proposals to carry out activities in the Bosawas and Miskito Cays areas respectively, and a third NGO to be selected by IRENA to work in the Chococente area;
- (3) a Procurement Service Agent presently under contract with USAID/Nicaragua to purchase the commodities to provided to IRENA; and
- (4) a buy-in arrangement through RENARM under the IPM component.

IRENA will also contract a number of local specialists as part of the institutional strengthening effort. The contracts with these specialists will be consistent with IRENA's usual compensation scales for local employees and consistent with A.I.D. policies and regulations regarding salary supplements.

1. Implementation Mechanisms

Project funds will be obligated through a Handbook 3 Project Agreement with the GON, with an initial obligation of \$8.0 million in ESF. The complementary implementing mechanisms will include:

a. **An Institutional Contract With a U.S. Firm.** This firm would be selected competitively on the basis of a request for proposals (RFP) to be issued by USAID/Nicaragua. Alternatively, USAID/Nicaragua will explore the availability of a qualified 8(a) firm to provide the bulk of technical assistance, training, and related advisory services to IRENA and participating local organizations.

This contract, whether with an 8(a) or a competitively selected U.S. firm, will include funds for a long-term advisor, and short-term experts as detailed in the Financial Plan under the

Institutional Strengthening, Policy, and Environmental Education components. It would also include funds for training activities and subcontracts, as authorized by the USAID Project Manager.

b. Cooperative Agreements (CAs), Per Handbook 13.

These CAs will be used to implement the Protected Areas, Buffer Zones project component. In close coordination with IRENA, USAID/Nicaragua will sign CAs with US-based NGO's for the Bosawas and Miskito Cays sub-components. The Chococente subcomponent is scheduled for implementation after the second year of the project, by which time IRENA is expected to have the capability to negotiate and enter into an agreement with a local or a mix local/U.S. NGO to carry it out. Also, during the course of project implementation, the U.S. NGOs and IRENA may select local NGOs to participate in activities to be carried out under these sub-components. CAs with such NGOs (PACA and CCC) will be issued also. Two U.S. NGOs have submitted unsolicited proposals for the activities to be carried out in the Bosawas and Miskito Cays areas, which will be used as the basis for negotiation of two of the CAs. By taking advantage of un-solicited proposals from US-based and AID-registered NGO's, the implementation of the Project in the priority biodiversity sites can begin with a minimum of administrative delay. The US-based NGO's bring considerable experience to these sub-components.

c. Buy-in Under the Regional Environmental and Natural Resources Project (RENARM). USAID/Nicaragua will transfer funds to this regional project to finance the activities discussed under Part IV of this paper.

d. Use of the Existing Contract with Procurement Service Agent (PSA). This PSA will help IRENA and the Mission in developing detailed specifications for project commodities under the first three components of the Project, soon after the signing of the Project Agreement. This arrangement would allow the early arrival of the commodities and would result in a lower cost than including the related funding in the contract with the selected technical assistance firm, while relieving the Mission of a heavy procurement burden.

e. Local Contracts by IRENA. IRENA will hire the five local long-term and other short-term specialists as specified in the budget. However, IRENA may not have yet in place the capability and controls expected by the Mission for the effective management of A.I.D. funds provided under the Project for this purpose. For this reason, the Mission is planning to provide short-term assistance with a qualified firm to help IRENA establish initial appropriate financial systems and controls to use and account effectively for such funds.

In addition, shortly after the signing of the Project Agreement and prior to the initiation of the Project components

as described in previous sections, USAID/Nicaragua will contract the services of a qualified management/accounting firm to provide short-term assistance to IRENA in establishing initial financial, contracting, and procurement systems and controls. This initial short-term assistance is expected to provide IRENA a headstart in its institutional development efforts so it can absorb more effectively the assistance to be provided under the Project.

B. Methods of Implementation and Financing

Tables V-1 and V-2 show the expected methods of implementation and financing to be used in the Project. The amounts represent the best estimate available at the time of project design. Such amounts will be adjusted as necessary based on the actual figures negotiated with the various suppliers of goods and services. The table also shows the preferred methods of financing the various project inputs.

Regarding host country contracts by IRENA, the Mission will require an assessment of its financial controls and contracting capability prior to the disbursement to IRENA of Project funds.

Concurrent audits will be performed, as required under the Dire Supplemental Act. Such audits will be the responsibility of the Regional Inspector General in Tegucigalpa, who will be assisted by the USAID/Nicaragua Controller. Funds have been provided under a separate line item of the budget for this purpose. Any grants to non-U.S. non-governmental grantees will include sufficient funds for audits of related activities, as required by mandatory provisions to such grants.

C. Participating Institutions and Relationships

1. IRENA. IRENA, which is the GON agency charged with the responsibility to monitor, regulate, and manage the country's environment and natural resources, will be the focal point for the overall coordination and implementation of project activities. As such, it will be the official GON counterpart to the USAID/Nicaragua direct hire Project Manager.

IRENA will be the direct recipient and participant in the Institutional Strengthening, Policy Development, Dialogue and Implementation, and Environmental Education components of the project. In addition, IRENA will coordinate and supervise the development and management of the selected parks and reserves under the Protected Areas and Buffer Zone component, and will implement, with U.S. technical assistance and a local NGO, the Chococente sub-component.

IRENA will also play the pivotal role in the coordination of

NGO activities, both US and local, as well as in the involvement of other Nicaraguan public sector institutions in natural resources conservation and protection activities. In the case of the Ministry of Agriculture's Plant Protection and Soil Conservation Services, the US Direct Hire Project Manager will also deal directly with these agencies. As a mechanism, IRENA will take the lead in planning and organizing an Advisory Committee (AC), which will be chaired by IRENA (which also act as the Secretariat) and include representatives from CONAMOR, local private organizations, the participating US-based NGO's, USAID/Nicaragua and other donors.

2. **The Advisory Committee (AC).** The key role of the AC will be to ensure the flow and exchange of information between and among Project participants, to promote policy dialogue on environmental issues, and to assure donors' activities and assistance programs are complementary and in accord with the overall policy framework of the GON. The AC will be chaired by IRENA, which will also act as secretariat.

3. **Non-Governmental Organizations (NGOs).** Upon award of the HB13 Cooperative Agreements, a Memorandum of Understanding (MOU) defining the Project activities, operating plan, institutional relationships, and reporting requirements will be signed by participating NGO's and IRENA. To facilitate timely initiation of activities, a separate MOU can be prepared for each protected area, signed by the institutions participating in that sub-component.

The US-based NGO's selected to implement the two Protected Area and Buffer Zones sub-components will be responsible for carrying out the activities described in their respective Cooperative Agreements/Scopes of Work. These NGO's will work closely with local NGO's and other local organizations and with the GON institutions and the private sector. The NGO's will hire respective Component Managers (CM) for continuous, in-country, day-to-day management of component activities, liaison with GON institutions and other counterparts, and for supervision of all fieldwork under these components.

The US-based NGO's will be required to work together with the GON, local NGO's, and AID under the regulations governing Cooperative Agreement grants. Funds will be disbursed directly to the US-based NGO's and implementation of the Protected Areas and Buffer Zone components will be carried out directly by the NGO's in close collaboration with local counterparts and in coordination with the activities of the other components.

In order to further increase Project leverage and increase the probability of sustainable Project benefits, the selected US-based NGO's will be required to work within local institutions and organizations (especially NGO's) and assist their development

and maturation as institutions for long-term effectiveness in Project activity areas. These local NGOs will be selected during project implementation by US NGOs in close cooperation with IRENA and the US institutional firm.

4. **USAID/Nicaragua.** USAID/Nicaragua will provide overall management and direction of project activities, in close cooperation with the AC. The USDH Environment and Natural Resources Officer in the Office of Agriculture and Rural Development (ARDO) will be the Mission official directly responsible for AID management of the Project. This person will be the principal USAID contact with all institutions and individuals involved in this project. The Project Officer will continuously monitor Project implementation and will coordinate closely with other related projects of the Mission and of ROCAP.

The Mission will establish a Project Implementation Committee, chaired by the Project Manager, with representatives from the following Mission offices: Controller, Project Development and Implementation Support, Program, Economic and Private Sector Office, and Contracts. Technical support will also be available from ROCAP's Regional Environmental Officer and Regional IPM Coordinator.

In sum, it is expected that the Project Agreement, the Advisory Committee, and the MOU(s) will ensure the required level of understanding of the roles and responsibilities of the participating institutions and will promote effective coordination and management of Project activities. However, adjustments to these institutional relationships and implementation arrangements may be necessary based on implementation experience. Such adjustments will be made, as necessary through Project Implementation Letters (PILs).

D. Implementation Plan

As discussed above, project activities will be carried out by GON institutions directly and by US-based NGO's in collaboration with GON institutions, community organizations and local NGO's. GON activities will be governed by the Project Agreement signed by GON and AID. NGO activities will be governed by the respective Cooperative Agreements. Table 1 lists the major actions that will be undertaken from the starting point of the signing of the agreement. Each action includes the approximate time required for completion without a specific date for completion, given present uncertainties about the date of the signing of the agreement and GON compliance with conditions precedent (See pages 48A and 48B).

Project Year/Quarter

Project Component / Activity	Project Year/Quarter			
	1st	2nd	3rd	4th
	-1	1234	1234	1234
Overall Project Management				
AID approves NRM project	-			
Project Agreement signed	-			
Cooperative Agreement(s) signed	-			
Annual audits		-	-	-
Mid-Project Evaluation		-		
End-of-Project Evaluation				-
Environmental Education				
Annual work plans		-	-	-
Personnel support				
TA - Environmental Educ. trainer		-	-	-
TA - Media Specialist		-	-	-
Commodities procurement		-	-	-
Renovate office		-	-	-
Concepts & Techniques training		-	-	-
Strategy workshop		-	-	-
Evaluation workshop				-
Computer training		-	-	-
Training of trainers		-	-	-
School visit study		-	-	-
Media study		-	-	-
Didactic materials preparation		-	-	-
Annual reports		-	-	-
Final report				-
Institutional Strengthening				
Strengthening IRENA				
Technical assistance, short term				
Accounting systems specialist	-			
Budget specialist	-			
Systems specialist	-			
Personnel specialist	-			
Administrative specialist	-			
Install admin/finance/mgmt systems	-			
Technical Assistance, long term				
Controller				
Accountant				
Budgeting specialist				
Systems specialist				
Implement admin/finance/mgmt				
Audit systems				
Procure commodities	-			
Rehabilitate offices	-			
Training				
On-site training program		-	-	-
In-country seminars		-	-	-
Degree training abroad		-	-	-
Policy development				
Technical assistance				
International experts	-			
Local-hire experts	-			
Commodities procurement				
Training				
Short courses		-	-	-
Seminars		-	-	-
Policy inventory				
Policy formulation				
Land use capability				
Land titling/registry		-	-	-
Land taxation				
Forestry law/regulations				
Protected areas plan				
Public infrastructure plan				
Pesticide regulation				

E. Information, Evaluation and Monitoring Plan

1. **Information Plan.** (Per AID Evaluation Handbook, Sections 1 and 3.2). Several types of data will be needed for the proper management of the project. Initial data collection has been done by the AID Mission and consultants working on the project identification document and project paper. Other data needed will be collected during the course of Project implementation. Sources include periodic reports prepared by the implementing organizations, consultants reports, and special data gathering efforts, as required to assure proper project monitoring and evaluations.

One set of data needed is a survey of potential project affiliates (NGOs) at the local level. This would involve date of affiliation or establishment, legal status, names and positions of board and staff, classes of membership, mailing and street address, current projects, pending proposals, and strategic plans.

Quarterly reports from all implementing organizations (GON and NGOs) will provide data on financial and managerial aspects. While impact data are not collected on a quarterly basis, at a minimum the organizations should include details of the impacts of activities with the annual report for each year.

Regarding the Policy component, additional information will be needed about all the policies which affect Nicaragua's natural resources and environmental situation. This will be required to reconcile conflicting ones and assure a rational, sound policy framework for the implementation of appropriate actions. Project-financed short term experts, in concert with IRENA, will collect the necessary information to fill any gaps in information and supplement the data already collected by the consultants who participated in the design of the Project.

For the environmental education and buffer zone/protected areas components, the activities begin with a needs assessment or field assessment. This information will be used to design specific activities and programs. These data should be analyzed by the participating institution and archived by the AID project officer. These reports will provide an important baseline assessment for mid-project and end-of-project evaluations.

The protected areas, environmental education, and pest management components include research and analysis as component activities. These reports should also be archived by the project officer for use by the evaluation teams.

End-of-project status of certain activities will be assessed as part of the protected areas and environmental education components. These will form the basis for further critique at

the end-of-project evaluation.

2. Monitoring, Reporting, and Evaluations. Monitoring and evaluating will be continuing activities throughout the life of the Project. The process should be decision-driven rather than purely knowledge or compliance-driven. The overall purposes are: (1) to measure progress toward achievement of outputs and impacts, (2) to propose corrective actions, (3) to facilitate positive interactions among the various project components, and (4) to build the monitoring and evaluation capabilities of participating institutions.

The implementing organizations will be required to design and propose, with U.S. technical assistance if necessary, their own evaluation criteria and key indicators as part of their annual work plans. This will provide a basis for the monitoring and evaluation system and procedures by using agreed-upon indicators appropriate for each stage and component of the project. Efforts will be made to integrate the monitoring and evaluation process with the overall management information needs of the participating institutions.

Monitoring and evaluation specialists will be contracted during the initial stages of the project to design a monitoring and evaluation system in collaboration with the participating institutions. External evaluators will be contracted as facilitators/trainers to structure the mid-point and final evaluations.

3. Specific Monitoring and Evaluation Actions. Over the four years of the project, the following actions will occur:

(a) Grantees design and propose monitoring and evaluation criteria and key indicators as part of formal agreements with AID, with technical assistance from monitoring and evaluation contractor.

(b) Grantees submit annual work plans plus quarterly progress reports and annual reports.

(c) Periodic external audits are conducted to determine compliance with AID rules and procedures.

(d) Studies specified in individual components are conducted and results included in monitoring and evaluation reports.

(e) A mid-project evaluation is conducted at the end of Year 2.

(f) The final evaluation is conducted just before the PACD.

Monitoring and reporting will be done at several different levels of the Project. Grantee and contractor performance will be monitored directly by the USAID Project Officer. Monitoring will be based on observation of performance and quarterly reports.

The U.S.-based NGOs will be required to submit quarterly reports to AID on the progress of implementation activities, and will submit to AID annual work plans in advance for approval. IRENA will provide quarterly reports to AID on progress toward implementation, increasing in detail once the environmental education and Chococente activities begin. Quarterly reports will be based on quantifiable targets of performance on both finance-accounting and activity aspects.

IRENA and NGOs will also submit annual reports. In the case of local NGOs supported through the U.S.-based NGOs, the local NGOs will submit periodic reports showing progress toward implementation, and particularly progress toward fund-raising goals.

Under the Institutional Strengthening component, the Project will monitor whether IRENA has been strengthened by focusing on two types of indicators. One type of indicator entails counting activities (revenues collected, training events, deliveries of equipment, hiring of staff, etc.). The more subjective type of indicator will measure institutional capability and evaluate effectiveness. The most significant indicator of success in this component will be the degree to which IRENA captures adequate human and financial resources to continue essential activities.

Under the Policy component, the evaluation will measure the extent to which the gamut of existing policies have been reconciled or new ones developed to assure a sound policy framework to provide the basis for environmental protection and the sustainable use of Nicaragua's natural resources and the preservation of its ecosystems.

The Protected Areas and Buffer Zones component will provide baseline studies for all the sites participating in the Project. While these studies cannot be repeated annually, they will be repeated at the end of the project. Particular attention will be placed on the relative change or stabilization in the resource base, using remotely-sensed data where appropriate to cover the large areas involved. (Chococente represents less of a logistical challenge because the area is smaller.) Particular attention will be given to evaluating women's participation in the component activities and the impacts of the activities on women and children. In addition, assessments will be made of administrative effectiveness, using the mechanical approaches mentioned above in the discussion of monitoring for institutional strengthening.

The environmental education component includes its own studies of the effectiveness of the activities in generating changes in attitudes and behavior. In addition, it will use the same types of indicators (e.g., numbers of participants and their evaluations of training events) mentioned above

The plant protection and integrated pest management component will assemble data on pesticide quality control, pesticide residues, pesticide poisonings. These will be collected from producers, laboratories, MAG, and MINSA. Another source will be test results from shipments to the United States. These data will provide an ability to monitor the impact of this component periodically throughout the life of the project.

Formal project evaluations, contracted directly by AID, are scheduled at the end of the second and just before the PACD. An in-house review will be conducted by AID staff at the end of the first year. For the Environmental Education component and Chococente subcomponent, the mid-project evaluation at the end of Year 2 will involve only training, planning, and equipping efforts undertaken. Other project components will have more complete results to evaluate and will be subject to greater scrutiny of outputs and impacts. The end-of-project evaluation will focus on delivery of outputs under the project, impact of the project, spread effects (e.g., policy reviews in other institutions, programs in other protected areas or buffer zones), and achievement of the project purpose. The table below illustrates the schedule and cost for monitoring, evaluation and auditing activities.

Monitoring and Evaluation Schedule

<u>Activity</u>	<u>Schedule</u>	<u>Estimated Cost</u>
Monthly Reports (first 6 months)	Monthly	NC
Quarterly Reports	Quarterly	NC
Evaluation System Design	Once	\$36,000
Annual Reports	Annually	NC
External Audits: 4 @ 20,000	Periodic	80,000
In-House Review	End of Year 1	NC
Mid-Project Evaluation	End of Year 2	82,000
End-of-Project Evaluation	End of Year 4	<u>130,000</u>
Total		\$300,000

VI. COST ESTIMATE and FINANCIAL PLAN

The overall cost of this project is estimated at approximately \$12.83 million during a five-year period. This total includes an A.I.D. contribution of \$9.0 million, a matching contribution by participating US NGOs of approximately \$1.23 million (a matching contribution of nearly 30 percent of the corresponding A.I.D. funding) under the Protected Areas Buffer Zones component, and the IRENA operational budget directly related to the implementation of the project of approximately \$2.6 million. Please note that under ESF funding guidelines, the host country is not required to contribute the minimum of 25 percent of the life of project cost.

Participating local organizations are expected to provide significant contributions in-kind, but since these organizations will be selected at a later date during the course of project implementation, their actual contributions cannot be estimated before project authorization. Once selected, IRENA will be expected to collect information on their contribution. This information will be part of the data collection system and will be reflected in project evaluations.

Other donors are also providing or planning to provide assistance to the GON in areas related to the purpose of this project. For instance, the Swedish International Development Agency (SIDA) is considering a \$26 million forestry sector project which may be implemented during the period 1992-1994. This project is expected to contribute to improved forest practices on the Atlantic slope and to strengthen the forestry management capability of IRENA. Although complementary to the NRM project, the SIDA project is a separate activity and this contribution has not been included in the overall cost of the NRM project.

A. The A.I.D. Contribution

The A.I.D. contribution of \$9.0 million, consists of \$8.0 in ESF available under the FY 1990 Dire Supplemental Legislation, plus \$1.0 million in ESF planned for FY 1992.

A.I.D. funds will finance technical assistance, training, policy analysis, equipment purchases, materials and supplies, consultants, administrative support, evaluations, audits, and NGO support, as detailed in tables VI-1 through VI-7. These funds will be disbursed for the various project elements as shown in Tables V-1 and V-2 (Methods of Implementation and Financing).

There are seven financial tables, all of which include an inflation factor of eight percent. These tables relate directly to each of the components discussed in Section IV of this paper.

Tables VI-1A and B show illustrative disbursements for all project components by major disbursement category spread over a four-year period, in addition to the estimated mix of foreign exchange and local currency requirements. Personnel costs in the form of staff, consultants, and travel are expected to represent the largest percentage of the A.I.D. budget.

The budget includes up to \$55,000 to finance short-term assistance and software packages to give IRENA a headstart in improving its accounting, personnel, and other management control systems so that it can be better prepared to absorb the assistance to be provided under this project, and to account properly for any funds which AID may provide directly to IRENA.

Commodities will include mainly equipment necessary to improve the performance of IRENA and the protection of the Miskito Cays, Bosawás, and Chococente areas. Table VI-7 shows an illustrative costing of the major Project outputs by component. Similarly, the rest of the budget items flow directly from the proposed activities under each component.

The reader should note the illustrative and estimated nature of the costing of project inputs and the corresponding disbursement estimates. It is envisioned that a number of adjustments will be necessary based on project implementation experience. These adjustments will be made and documented through Project Implementation Letters (PILs). The basis for such adjustments will be the negotiated contracts with the US firm, contracts with local technicians, pro-forma invoices requested from potential suppliers of goods and services, and recommendations made by the U.S. technical assistance experts and IRENA once project implementation is well underway.

The allocations to the protected area and buffer zone components (specifically the Miskito Cays and Bosawás) are roughly based on unsolicited proposals, which are attached as annexes to this paper. The actual funding for each category will be based on cooperative agreements between the NGOs and USAID.

B. Conditions Precedent

Prior to the first disbursement under the Grant or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, the Grantee shall, 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) a legal opinion of the Attorney General of Nicaragua, or other counsel acceptable to A.I.D., stating that this Agreement has been duly authorized, or ratified by, and

executed on behalf of the Grantee, and that it constitutes a valid and legally binding obligation of the Grantee in accordance with all of its terms; and

(2) a statement of the name(s) of the person(s) holding or acting in the office of the Grantee specified in Section 8.2 of the Agreement and of any additional representatives, together with a specimen signature of each person specified in such statement.

Regarding assistance to IRENA, IRENA will be required to meet the following condition:

Prior to the first disbursement under the Grant or to the issuance by A.I.D. of documentation pursuant to which disbursements will be made to IRENA, IRENA shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., information to demonstrate that it has in place the accounting, procurement, and administrative systems, and related internal controls to be able to manage effectively and properly account for any funds which A.I.D. may provide to IRENA under the Project.

Regarding implementation of the Plant Protection and Integrated Pest Management Component, or any other activity which may have an adverse environmental impact, the following condition will apply:

The disbursement of any funds under the Project for the procurement and/or use of pesticides under the Project, including technical assistance in pesticide management, or for any project activity which may have an adverse impact on the environment, is prohibited until USAID/Nicaragua approves such action based on the findings of the two Environmental Assessments carried out on the Project, when approved by the LA Bureau Environmental Officer, pursuant to A.I.D. Environmental Procedures, 22, CFR 216. Project implementation plans will be modified, as necessary, to incorporate mitigative measures developed under the EAs. These provisions are limited to Project areas which may

adversely affect the environment and do not prohibit the initiation and implementation of Project activities, such as technical assistance and training, that will not have potential significant impacts on the environment.

Table VI - 2
 Natural Resources Management Project
 (No. 524-0314)
 Estimated Budget
 Institutional Strengthening Component

Budget Item	(in \$000s)				Total	Currency	
	Year	1	2	3		4	FX
International Technical Assistance:							
Project Coordinator-36 months	80.0	84.0	88.2		252.2	252.2	
Short-term TA-30pms	60.0	63.0	66.2		189.2	189.2	
Support costs (allowances)	54.0	57.0	60.0		171.0	171.0	
Post Differential (20%)	16.0	17.0	19.0		52.0	52.0	
Indirect costs & fees (80 %)	168.0	176.8	186.7		531.5	531.5	
Initial S.T TA (IQC)	55.00				55.0	55.00	
Sub-total	433.0	397.8	420.0	0.0	1,250.8	1,250.8	
Local hired TA							
Controller (30pms)	21.0	44.1	46.3		111.4		111.4
Accountant (36pms)	24.0	25.0	26.3		75.3		75.3
Budget specialist (36pms)	24.0	25.0	26.3		75.3		75.3
Personnel specialist (36pms)	24.0	25.0	26.3		75.3		75.3
Systems specialist (36pms)	24.0	25.0	26.3		75.3		75.3
Indirect & fee (0%)	0.0	0.0	0.0		0.0		0.0
Sub-total	117.0	144.1	151.3	0.0	412.4		412.4
Travel for intl TA							
5 RT Airfares @ \$1200 ea.	3.6	6.0	6.0		15.6	15.6	
Per diem (150 days/y @ \$166/day)	27.6	27.6	27.6		82.7	82.7	
RT incidental Travel costs	0.1	0.1	0.1		0.3	0.3	
0 % Indirects & fee					0.0	0.0	
Sub-total	31.3	33.7	33.7	0.0	98.6	98.6	
Training							
In-country:							
On-site courses (44)	104.0	170.0	154.0	0.0	428.0		428.0
Seminars (6)	0.0	17.0	17.0	17.0	51.0		51.0
Indirects & fees (20%)	20.8	37.4	34.2	3.4	95.8		95.8
	124.8	224.4	205.2	20.4	574.8		574.8
External:							
Persons' degrees (8)		106.0	112.0	117.0	335.0	335.0	
Miscellaneous	0.0	2.0	2.0	2.0	6.0	6.0	
	0.0	108.0	114.0	119.0	341.0	341.0	
Sub-total-Trng.	124.8	332.4	319.2	139.4	915.8		

Commodities:

Hardware:						
1 IBM PS/80 w/server	7.0				7.0	7.0
2 IBM 30G31 & 1.8	4.0				4.0	4.0
5 IBM terminals	3.0				3.0	3.0
1 HP Laser printer	1.0				1.0	1.0
2 IBM proprinters	1.0				1.0	1.0
1 UPS	5.0				5.0	5.0
1 Voltage stabilizer	3.0				3.0	3.0
1 Tape back-up	4.0				4.0	4.0
11 IBM PS/1		13.0			13.0	13.0
1 bynormal modem		1.0			1.0	1.0
1 scanner		1.0			1.0	1.0
						0.0
Software:						
1 Accounting package	11.0				11.0	11.0
1 LAW for 16 users	3.0				3.0	3.0
1 desktop publishing	1.0				1.0	1.0
						0.0
Office Equipment:						
1 Copier	10.0				10.0	10.0
1 Facsimile machine	2.0				2.0	2.0
12 desks	7.0				7.0	7.0
12 desk chairs	3.0				3.0	3.0
4 file cabinets	1.0				1.0	1.0
12 calculators	4.0				4.0	4.0
12 occasional chairs	3.0				3.0	3.0
45 manual typewriters		18.0			18.0	18.0
45 file cabinets		12.0			12.0	12.0
::						
Office Supplies:						
Computer Paper	1.0	1.0	2.0	2.0	6.0	6.0
Printer supplies	1.0	1.0	2.0	2.0	6.0	6.0
Staplers, pencils, etc.	1.0	1.0	1.0	1.0	4.0	4.0
Equipment service	5.0	5.0	6.0	7.0	23.0	23.0
						0.0
Communications Equipment:						
1 PBX with 20 extensions	10.0				10.0	10.0
1 Radio Base station						0.0
745 portable units		36.0			36.0	36.0
1 Antenna for base		1.0			1.0	1.0
1 TECOR antenna use fee		1.0			1.0	1.0
						0.0
Vehicles						
2 4x4 diesel cars	40.0				40.0	40.0
8 4x4 diesel cars		168.0			168.0	168.0
15 125cc trailbikes	23.0	28.0			51.0	51.0
						0.0
20% Freight, insurance & fee	30.8	57.4	2.2	2.4	92.8	92.8
Sub-total Commodities	173.8	344.4	13.2	14.4	545.8	545.8
Office rehabilitation	35.0				35.0	35.0
Grand Total _ Incl. Streng.	914.88	1252.38	937.39	153.80	3,258.40	2,236.2

Table VI - 3
Natural Resources Management Project
(No. 524-0314)
Estimated Budget
Policy Devpt., Dialogue & Implementation

Budget Item	(in \$000s)				Total	Currency	
	1	2	3	4		FX	LC
International Technical Assistance:							
Nat. Res. Policy Experts(10pms)	42.0	20.0			62.0	62.0	
Indirects & fees (80%)	33.6	16.0			49.6	49.6	
Sub-total	75.6	36.0	0.0	0.0	111.6	111.6	
Travel - intl. T.A.							
3 RT Airfares	2.4	1.2			3.6	3.6	
Per diem @ \$166/day	24.9	24.9	0.0	0.0	49.8	49.8	
Incidental travel costs	0.1	0.1			0.2	0.2	
Sub-total	27.4	26.20	0.00	0.00	53.6	53.6	
Commodities-Planning/Policy Unit							
386 model computers (2)	9.0				9.0	9.0	
Dot matrix printers (2)	1.4				1.4	1.4	
Photocopier (1)	6.0				6.0	6.0	
Freight & ins. (20% of above)	3.3				3.3	3.3	
Computer software	1.5	1.5	1.5		4.5	4.5	
Computer supplies	2.5	1.5	1.0	1.0	6.0	6.0	
Photocopier supplies	0.5	1.0	0.5	0.5	2.5	2.5	
Sub-total Commodities	24.18	4.00	3.00	1.50	32.7	32.7	
Other expenses-Planning/Policy Unit							
Equipment maintenance	1.5	2.0	2.0	2.0	7.5		7.5
Publications	3.0	4.0	3.5		10.5		10.5
Local travel	2.5	2.0	1.5	1.0	7.0		7.0
Operating expenses	15.0	18.0	35.0		68.0		68.0
Sub-total	22.0	26.0	42.0	3.0	93.0		93.0
Grand Total Policy Component	149.2	92.2	45.0	4.5	290.9	197.9	93.0

Table VI - 4
Natural Resources Management Project
(No. 524-0314)
Estimated Budget
Environmental Education Component

Budget Item	(in \$000s)				Total	Currency	
	Year					FX	LC
	1	2	3	4			
International Technical Assistance:							
Envir. Educ. Trainer (2 pms)	0.0	3.5	3.7	3.9	11.0	11.0	
Media Specialist (1pm)	0.0	3.5	3.7	3.9	11.0	11.0	
Indirect costs & fees (80 %)	0.0	5.6	5.9	6.2	17.7	17.7	
Sub-total	0.0	12.6	13.2	13.9	39.7	39.7	
Travel for intl. TA							
5 RT Airfares @ \$1200 ea.	2.4	2.4	1.2		6.0	6.0	
Per diem (90 days @\$166/day)	5.0	5.0	5.0		14.9	14.9	
RT Incidental Travel costs	0.1	0.1	0.1		0.3	0.3	
Indirects & fee (0%)	0.0	0.0	0.0		0.0	0.0	
Sub-total	7.5	7.5	6.3	0.0	21.2	21.2	
Local hire TA							
Trainer (36pms)		6.0	6.3	6.6	18.9		18.9
Educator (72 pms)		12.0	12.6	13.2	37.8		37.8
Indirect & fee (0%)	0.0	0.0	0.0		0.0		0.0
Sub-total	0.0	18.0	18.9	19.8	56.7		56.7
Training							
In-country:							
On-site courses (1)	0.0	5.0	0.0	0.0	5.0		5.0
Strategy workshop (1)	0.0	2.5	0.0	0.0	2.5		2.5
Trainers' training courses(5)	0.0	3.0	0.0	0.0	3.0		3.0
Evaluation workshop (1)	0.0	0.0	0.0	3.0	3.0		3.0
ADP training courses (1)	2.0	0.0	0.0	0.0	2.0		2.0
Indirects & fees (20%)	0.4	2.1	0.0	0.6	3.1		3.1
Sub-total	2.4	12.6	0.0	3.6	18.6		18.6

Table VI - 4 (continuation)

Commodities:							
Projectors/ screens (3)		1.8			1.8	1.8	
Generators (2)		1.0			1.0	1.0	
VCRs and Monitors (3)		2.7			2.7	2.7	
Hi-R Video camera (1)		3.5			3.5	3.5	
SLR Cameras & lenses (2)		2.0			2.0	2.0	
Film & video supplies		3.0	3.0	3.0	9.0	9.0	
4x4 diesel vehicles (2)	48.0				48.0	48.0	
Freight & insurance (20%)	9.6	2.8	0.6	0.6	13.6	13.6	
Sub-total Commodities	57.6	16.8	3.6	3.6	81.6	81.6	
Other Costs							
Office renov. & furnishings	0.0	5.0	5.0		10.0	10.0	
Vehicle operations	1.0	3.0	3.0	3.0	10.0	10.0	
Media study		12.0			12.0	12.0	
Reproduction of reports		10.0	10.0	10.0	30.0	30.0	
School visitation study		12.0			12.0	12.0	
Didactic materials		24.0	24.0	12.0	60.0	60.0	
Contingency	5.0	10.0	10.0	10.0	35.0	35.0	
Sub-total	6.0	76.0	52.0	35.0	169.0	169.0	
Grand Total Env. Education	73.5	143.5	94.0	75.9	386.9	311.6	75.3

Table VI - 5
Protected Areas and Buffer Zones Component
Budget Summary by Year and Category
(Includes inflation factor)
(in US\$000s)

	Year				Total	Currency	
	1	2	3	4		FX	LC
Technical Assistance-Inter.	42	101	114	79	336	336	
Travel & per diem	62	178	85	92	417	417	
Local personnel	105	181	198	211	693		693
Training	58	117	68	54	295	295	
Vehicles	147	54	115	0	316	316	
Commodities	145	135	108	121	507	507	
Office & furnishings	60	35	23	24	142		142
Supplies & Operating Exp.	65	102	109	118	394		394
Special studies	30	73	77	90	270	270	
NGO indirect costs (0)	57	119	107	102	385	385	
Total AID contrib.	771	1,095	998	891	3,765	2,526	1,229
Estimated NGO Matching Contrib.					1,236		1,236
Total for component					4,991	2,526	2,465

Table VI - 5A
Miskito Cays Protected Area and Buffer Zone
Budget Summary by Year and Category
(Includes inflation factor)
(in US\$000s)

	Year				Total	Currency	
	1	2	3	4		FX	LC
Technical Assistance-Inter.	0	45	52	54	151	151	
Travel & per diem	0	72	38	40	148	148	
Local personnel	0	52	53	60	168		168
Training	0	24	12	8	44	44	
Vehicles	0	27	0	0	27	27	
Commodities	0	12	8	8	24	24	
Office & furnishings	0	5	5	5	15		15
Supplies & Operating Exp.	0	10	11	12	33		33
Special studies	0	60	60	70	190	190	
NGO indirect costs (25%)	0	77	60	64	200	200	
Total	0	384	298	319	1,000	784	216

Table VI - 5B
Bosawas Protected Area and Buffer Zone
Budget Summary by Year and Category
(Includes inflation factor)
(in US\$000s)

	Year				Total	Currency	
	1	2	3	4		FX	LC
Technical Assistance-Inter.	42	45	50	13	150	150	
Travel & per diem	62	84	43	46	235	235	
Local personnel	105	115	125	135	480		480
Training	58	82	43	46	229	229	
Vehicles	147	0	113	0	260	260	
Commodities	145	90	96	111	442	442	
Office & furnishings	60	15	16	17	108		108
Supplies & Operating Exp.	65	80	86	93	324		324
Special studies	30	13	17	20	80	80	
NGO indirect costs (25%)	57	42	47	38	185	185	
Total	771	566	636	519	2,493	1,581	912

Table VI - 5C
Chococente Wildlife Refuge
Budget Summary by Year and Category
(Includes inflation factor)
(in US\$000s)

	Year				Total	Currency	
	1	2	3	4		FX	LC
Technical Assistance-Inter.	0	11	12	12	35	35	
Travel & per diem	0	22	6	6	34	34	
Local personnel	0	14	15	16	45		45
Training	0	11	11	0	22	22	
Vehicles	0	27	2	0	29	29	
Commodities	0	33	4	4	41	41	
Office & furnishings	0	15	2	2	19		19
Supplies & Operating Exp.	0	12	12	13	37		37
Special studies	0	0	0	0	0	0	
NGO indirect costs (0)	0	0	0	0	0	0	
Total	0	145	64	53	262	161	101

Table VI - 6
Plant Protection & Integrated Pest Mgt.
Budget Summary by Year and Category
(Includes inflation factor)
(in US\$000s)

	Year				Total	Currency	
	1	2	3	4		FX	LC
Technical Assistance-Inter.	76	70	73	0	219	176	43
Travel & per diem	63	64	62	0	189	10	179
Pesticide Monitoring Service	20	5	0	0	25		25
Training	81	63	57	0	201	201	
Commodities	49.7	28	6	0	84	83.7	
Research grants	87	93	100	0	280		280
Other Costs (freight, misc.)	2	0	0	0	2	2	
Total	379	323	298	0	1,000	473	527

VII. PROJECT ANALYSES SUMMARIES

A. Institutional Analysis

(1). **Background.** IRENA was created in 1979 with responsibility for planning, management, regulation and control of all natural resources. This includes the execution of forestry policies, guaranteeing the conservation and expansion of forestry resources, and the proper and sustained use of natural resources.

IRENA has been reorganized several times since 1979 resulting in a general reduction in authority and capability. By 1990 IRENA had lost most of its qualified people and its authority in all regions of the country. Following the installation of the new GON in April 1990, the autonomy and authority of IRENA was renewed.

In 1990, the World Wildlife Fund (WWF) conducted a study of IRENA organization and prepared a report titled "Proposal for re-structuring of the Nicaraguan Institute for Natural Resources and the Environment". The study recommended a major re-structuring of IRENA with a transitional organizational structure to be implemented in 1991 and a final organizational structure to take place in 1992. No reorganization was undertaken because the GON was unable to fund IRENA at the required level. However, IRENA is still considering implementation of the WWF recommendations.

In summary, IRENA is empowered with comprehensive control of natural resources and the environment, but has been under-funded, the development of its staff has been neglected, some of its responsibilities have been diverted to other GON institutions, and its linkages with other GON institutions has been erratic.

Fortunately, recently the GON has assigned high priority to the area of natural resources and environmental protection and IRENA's authority and responsibilities have been re-established. Currently, some improvements in IRENA's administrative capability have been initiated with Swedish assistance.

(2). **Institutional Needs.** IRENA has authority to disburse funds, dispose of assets, and does not require the approval of any other agency of the government to carry out its assigned functions, excepting real estate transactions, which need to be approved by the Controller of the Republic. IRENA has three sources of funding: 1. Government Budget of \$US 3.1 million (50%), 2. The Swedish Aid Program of \$US 2.8 million (45%), and 3. IRENA's own resources of \$US 300,000 (5%). Given the inability of the GON to fully fund IRENA, there is a need to improve its internal revenue generating capability.

To perform its mandate effectively, IRENA needs to improve

its capability in many areas. The WWF study and IRENA administration have identified the following areas as having the greatest need for technical assistance and support: planning, finance and administration, international relations, inter-institutional coordination, policy formulation, environmental education, and methods and techniques to protected Nicaragua's ecosystems.

Improvement in staff skills, knowledge and productivity is a very high priority. While the top level administrators have excellent qualifications in natural resources science and have a sincere interest in the success of the institution, the years of governmental neglect has left IRENA with over 600 employees, many of whom do not have the skills to fulfill (or understand) their responsibilities, or have the desire to fulfill the goals of the institution. There is also a definite need to improve inter-institutional linkages and relationships and to establish lines of communications and coordination for the effective implementation of the law, plans, and programs affecting the management of natural resources. Specifically, key actions to strengthen IRENA should include:

- Improve its contracting, procurement, control and administrative capabilities so it can utilize effectively its resources and any other resources it can muster in the future.

- Improve its planning, budgeting, accounting, personnel management, data processing, management information compilation and analysis, and information control. To do this IRENA needs to employ five Nicaraguan technical assistants who will constitute a "shadow administration" with line duties in their respective areas of expertise and will be in charge of the design and implementation of the new personnel, accounting, and related operations systems.

- Obtain adequate data processing systems, as well as the necessary office equipment, office upgrading, communications equipment, and supplies to support the functions of its staff.

- Rehabilitate its office space to house the personnel, equipment and technical assistants.

As soon as IRENA brings its internal management capability up to standard, it would be able to better focus on its capability to finance itself and carry out its statutory responsibilities more effectively.

The phasing of recommended actions for improving IRENA's internal financing capability and fulfilling its statutory responsibilities include:

-- During the second year of the project, begin funding the integration of the regional offices into the system by contracting technical assistants and trainers who will assist in the maintenance of financial control and responsibility at the regional and district level, through supervision, training and administrative procedures.

-- During the second year, install the regional communications systems and mobilize regional staff with vehicles to increase regulatory performance, management performance and the collection of fees.

-- At the outset of the project, improve employee skills and knowledge by:

** carrying out extensive on-site training, through on-site presence of specialists in accounting, management information systems, forest patrol, fire fighting, and other needed skills. Such specialists could work with teams of five persons over a 25-day period each, in both the central office. Up to 217 people would be trained during a three year period.

** carrying out six in-country seminars covering management, community relations, accounting, ecology, and other needed topics during a three year period.

** Financing university training for up to eight participants on natural resources management at Central American institutions. Five of these candidates could begin studies during the second year of the project and three candidates during the third year. All would be expected to complete their programs by the project termination date.

B. Policy Analysis

The policy analysis concludes that Nicaragua has some natural resources policies in place and also an emerging process for policy dialogue on natural resources. Both the policies and the process need strengthening, however, to solve the country's natural resource problems.

Nicaragua faces four critical natural resource issues: deforestation; watershed management; pesticides; and biodiversity conservation. The country needs better statements of policy and improved policy implementation to resolve each issue. Because each of these critical issues is a complex issue, affected by

policies aimed at subjects other than natural resources, Nicaragua must also focus on several sets of trans-sectoral policies. Land use, rural infrastructure, land tenure, property rights, and land taxation are the most important cross-cutting policy themes affecting natural resources.

The policy analysis recommends policy actions with regard to each natural resource issue and each trans-sectoral policy. The analysis also recommends building on existing policy dialogue capacity in CONAMOR and IRENA to carry out policy dialogue through the Project.

C. Financial and Economic Analysis

The GON earmarked approximately US\$ 17 million and appropriated US\$ 3.1 million to IRENA for FY91. Actual disbursements have been in arrears since the appropriation and IRENA administration is not confident that the entire US\$ 3.1 million will ever be disbursed.

In addition to the short term cash crisis evidenced by this underdisbursement, the GON is looking at an equally severe long term financial crisis (see financial and economic analysis in the annex). Given this very difficult economic situation for Nicaragua it is not reasonable to expect increased GON appropriations to IRENA in the foreseeable future.

Therefore, to meet the natural resources management objectives of the GON, IRENA must obtain financial resources by other means. Currently, several international donors are helping to sustain and improve the operations of IRENA, but these sources are not expected to continue indefinitely. This is a principal reason for the emphasis on the revenue generating aspect of the institutional strengthening component of the NRM project. Without a rapid increase in IRENA generated revenues from natural resource use fees and from IRENA services, it is highly unlikely that other project components will be sustained after 1996 and the other statutory responsibilities of the institution will not be fulfilled.

Moving IRENA towards financial self-sufficiency by 1996 will require major efforts to: improve its internal financial controls, improve its administrative performance, find new sources of revenue, and improve its operational efficiency.

The two NGO's participating in the NRM project receive financial support from many sources and are not dependent upon the GON. There is little reason to expect that other sources of revenues to the NGO's will diminish during the life of this project and therefore impact the success of the protected areas and buffer zone activities.

The plant protection component will depend upon the continued functioning of the MAG, another government ministry. While the MAG is subject to the same funding uncertainties as is IRENA, the plant protection component is a part of the PAS project which alleviates some of funding uncertainties in the future. Nevertheless, there is also an opportunity for the plant protection component to support itself in the future with fees and other non-governmental sources of revenue.

The budget tables included as annexes to this paper show all disbursements by item, destination, output for each component, for major item groupings distributed over four years and summarized for all years. Data for tables were obtained from interviews with relevant Nicaraguan institutions, from financial officers of USAID, from other similar project papers and from previous knowledge and experience of the project team.

Contingencies were set at 8%, a somewhat higher number than normal. The economic and political environment in Nicaragua is expected to remain unstable for most of the life of this project, requiring a higher than normal amount of flexibility to be built into activities and budgets. Inflation is forecast to be 7.5% and is applied to non-commodity disbursements occurring after the first project year. Indirect costs for NGO's were provided by the relevant NGO.

Standard procedures call for some combination of a net present value (NPV), internal rate of return (IRR) or a benefit-cost (B/C) analysis to help determine the desirability of a project. Benefits can fall into one or more of three categories: 1. private, 2. social or public, and 3. non-quantifiable. Where costs and benefits can be quantified and the benefits are private, the NPV and IRR approach is appropriate. Where the costs and benefits are social or public, the NPV and B/C approach is appropriate. Where the costs and/or benefits are non-quantifiable, some compromises must be made in the analysis.

The NRM project concentrates on setting the stage for producing financial and economic benefits in the future, i.e. "second tier" results. For example, institutional strengthening will result in improved administration and new policies for natural resource use and management, the "first tier". The improved administration, and the new policies will put in place new management practices that may generate measurable benefits, the "second tier". Therefore, NPV, IRR or B/C analysis is difficult at best for most of the components of the NRM project.

Nevertheless, an analysis is presented for the revenue generating aspect of the institutional strengthening component comparing the 1996 value of the future increased stream of internally generated IRENA revenues to the accumulated costs of bringing IRENA management and operations up to standard by 1996.

Factors to be considered in conducting NPV, IRR, and B/C analysis for the protected areas and buffer zones component, the environmental education component and the plant protection component are also discussed.

The distribution of the \$9 million to the different components and disbursement categories fits with the major needs of natural resources management and the existing limitations of GON institutions and available domestic financial and human resources. For example, the heavy emphasis on quickly improving the performance of IRENA (35.6 percent of \$9 million) is justified in light of the importance of this institution for natural resources use and management in Nicaragua and in light of the present debilitated state of the institution.

Emphasis has been placed on bringing in new, more competent human resources and improving the skills and knowledge of current personnel. Therefore, there is a major investment in technical assistance in training. The training is not at an academic or university level, but at the applied level.

Funds for protected areas and buffer zones also emphasize the building of systems, skills and regulations that can be sustained in the future. The distribution of these funds for Chococente will be delayed until the second project year because of the current inability of IRENA to effectively utilize them until they have gone through one year of institution strengthening. The allocation of nearly \$4 million to protected areas and buffer zones (44.4 percent of \$9 million) highlights the importance of producing tangible results throughout Nicaragua and is responsive to the crisis caused by repatriation, migrating agriculture and destruction of valuable natural resources.

Funds for plant protection (11.1 percent of \$9 million) also emphasize system building, skill development and regulatory improvement. The overall problem of pesticide use in Nicaragua requires a long term and very costly effort which can only be begun with this initial \$1 million.

At the end of this project the institutional strengthening component will have produced a step increase in the annual internally generated revenue stream from three sources. These increased revenue streams will begin in 1996 at the end of the NRM institutional strengthening activities and will continue for five to fifteen years.

Only the optimistic scenario will produce positive benefits under all different years and discount rate assumptions. The most likely scenario produces positive benefits when the stream of revenues is realized for more than 7 years and the discount rate is under 10 percent. No positive results are obtained under the pessimistic scenario. While the results are not positive for

all scenarios, they are sufficient given the general uncertainty that exists in Nicaragua to justify the investment in IRENA strengthening.

D. Technical Analysis

(1) Environmental Education

The Environmental Education Component will strengthen IRENA's capacity to develop and implement environmental education programs. A major portion of the efforts under this Component will go toward training of IRENA, NGO, and Ministry of Education staff. Developing a national plan, equipping IRENA offices, and undertaking two pilot projects are also programmed.

The technologies to carry out environmental education and awareness activities are generally known and proven, but the field is evolving rapidly. Recent research is changing the ideas about the effectiveness of traditional approaches. The availability of new media and the rapid diffusion of media technology (especially video) mean that entirely new methods and techniques can be used. This Component undertakes to field test two approaches in small pilot projects.

IRENA is encouraged to explore the possibilities for cooperation in this component with the United States Peace Corps (PC) to take advantage of the support for Environmental Education that the Peace Corps receives under another AID Project, the Forest Resources Management Project (FRM II). This Participating Agency Service Agreement (PASA) can fund volunteer and counterpart training, workshops, and materials, and can send advisors in environmental education and a number of other environmental fields (protected areas, agroforestry, coastal management, etc.) for needs assessments, workshop design and delivery, and special projects. The delayed start of this Component will allow time for these contacts and discussions.

(2) Protected Areas and Buffer Zones

The proposed activities under the Protected Areas and Buffer Zones Component of the project have been generally tested in the Central American region.

These activities, for example, focus on training, equipping, and staffing. Secondary activities involve research, survey, and inventory efforts to support planning and management. Throughout the range of activities, considerable emphasis is placed on participation of local residents in program design and decision-making.

The buffer zone development activities focus directly on

enabling local residents to adapt their current practices to the ecological constraints of the natural resource base. The primary goal is improving rural welfare through sustainable economic development, but an important secondary benefit of this is a decrease in destructive pressures on the reserves themselves.

E. Social Soundness and Women in Development Analysis

The Miskito Cays Protected Area (MCPA) was developed in response to concerns by Miskitos and the newly formed NGO, Mikupia, about how they would protect their marine resources after the civil war. Care must be exercised to maintain the focus of Mikupia on community service and away from personal gain. To do so, employee salaries must be equal across the board, and employees must not at the same time be board members. The component must balance marine reserve activities with on-land community development activities directed primarily toward women, who are the traditional owners of land in this matrilineal society.

The proposed Bosawas Reserve is threatened by the possibility of massive resettlement of former Contras, particularly on the western border at Bocay, and the central government must direct the resettlement effort to concentrate on the area up-river from the proposed Reserve boundaries. This sub-component will make resettlement in this area even more attractive by offering a package of rural agricultural extension services there and by denying it to those who insist on entering the Reserve. The extension activities should involve the former as much as possible, including organizing farmer representatives as agricultural promoters, providing them with training, and working with and through them to provide agricultural extension.

The Chococente Wildlife Refuge combines tropical dry forest and sea turtle egg-laying beaches. This sub-component should focus primarily on the turtle beaches, where it should limit access to turtle egg exploitation to local residents, organize residents for turtle collection to allow equitable collection by all, organize those not involved in egg collection at a particular time to participate in monitoring egg exploitation, and in allowing women to return to their primary role as egg collectors. The Project should also organize residents into an egg-marketing cooperative so that they will gain four times the beach value of eggs by marketing themselves in Managua.

F. Environmental Analysis

As a natural resources management and environmental activity, the project has been designed to minimize negative environmental impacts and to be in compliance with Sections 118 and 119 of the Foreign Assessment Act.

Of the five project components, The project has four components, the Protected Areas and Buffer Zones (PABZ) and the Plant Protection and Integrated Pest Management (IPM) components will include activities with direct environmental impacts.

Regarding the PABZ, the three sites - Miskito Cays Reserve, Bosawas Reserve, and Chococente Wildlife Refuge - represent a cross section of Nicaragua's life zones. They range from the Pacific coastal beach and piedmont through the northern central highlands, and down into the Atlantic coastal plain and continental shelf. With proper management of these sites, the GON can protect a representative portions of the country's natural flora and fauna. The principal environmental issues in these three areas are: (1) tropical forest destruction and degradation, (2) resource piracy and depletion of marine and terrestrial biological resources, (3) low productivity of present cropping systems, and (4) pesticides in the environment.

Regarding specific activities, the design team considered two scenarios for project activities:

1. The Project as described in previous sections of this paper. Such design was chosen because it will have a maximum beneficial effect on the conservation and sustained-use of both marine and terrestrial biological resources in Nicaragua. Details of the interventions in and around the protected areas will depend on the plans developed by the GON, international NGO's providing technical assistance, local NGO's implementing interventions, and local communities participating in project planning and implementation. The broad parameters of interventions envisioned are expected to have very beneficial effects on conservation and development of renewable natural resources in three important areas, and to promote sustained use of both marine and terrestrial biological resources. The project will help to limit the uses of resources within the parks to research, monitoring, and low-impact, sustained-yield extraction of renewable resources. In the buffer zones resource uses will entail more intensive use of land and more concentrated application of capital, labor and possibly agricultural chemicals. Here the project will (1) extend resource-conserving practices for farming and resource extraction, and (2) facilitate development of social and economic infrastructure. By developing services and infrastructure in the buffer zone, the project will discourage incursion of settlers into the protected areas.

These activities would result in a less exploitive social and economic environment and would increase local participation in environmental decision-making, expand local economic opportunities, and provide more effective protection for biological diversity, marine resources, and primary forests.

Some project activities have a potential for adverse

environmental impacts. These include the construction of physical infrastructure in the buffer zones, and the physical interventions within the protected areas, such as extraction of animals and forest products and building trails, guard stations, or structures to facilitate education or tourism. Compliance with protected area restrictions is, at present, voluntary. Protected area guards do not have authority to halt unauthorized or illegal activities within the reserves. Thus project interventions must be carefully planned and monitored to assure they do not provide access for settlers or persons who would extract resources using methods or intensity not authorized in the area's management plan. Environmental assessment of the detailed designs for physical interventions will be necessary for each site, and should be provided for in the project's level of effort and funding.

2. A "No Action" scenario, would contribute to the continuation of the present patterns of deforestation, environmental degradation, loss of biological diversity and soil resources, and reductions in water quality and quantity. Deterioration of the two reserves and the wildlife refuge will continue if no action is taken. The socio-economic impoverishment of reserves, refuges, and buffer zone inhabitants would continue.

The Private Agricultural Services (PAS) Project (524-0315) deferred the EA of its pesticides component to that of the Natural Resources Management (NRM) Project (524-0314). The EA for the NRM Project thus indicates a condition precedent based on its analysis and recommendations governing the purchase and use of any pesticides under the components of both projects that relate to the use of pesticides.

The principal environmental issue facing the pesticides component of these projects is the development of safe and efficient pesticides use programs, especially on crops for the export markets.

The EA regarding pesticides considered three alternatives. the Pesticide and Pest Management component as designed in the NRM PID and the related activities under the PAS PP would have the beneficial effect of increasing and stabilizing the incomes and well being of private agricultural producers of exportable crops. This would be achieved by supporting the testing of agricultural exports for pesticide residues, the training of farmers and professionals in pesticides use and IPM, and the distribution of information on pesticides and IPM.

The IPM component would address the regulation and monitoring of the production and use of pesticides and proposes to provide and validate IPM technological packages and demonstrate that the IPM program can be a preferable alternative

to a traditional control program based solely on pesticide use.

A. "No Action" scenario, would contribute to the continuation of the present pattern of environmental degradation and pesticide related human health problems as well as the rejection of potentially valuable export crops for the international markets.



GOBIERNO DE SALVACION NACIONAL

Managua, 20 de Agosto 1991

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Su Despacho

Estimada Doctora :

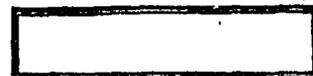
El Gobierno de Nicaragua ha establecido entre sus prioridades la estructuración de una política de protección y conservación de los recursos naturales y medio ambiente. Esta voluntad de nuestro Gobierno ha sido inclusive manifestada en diferentes foros internacionales tal como en la reciente reunión de Presidentes de L.A. en México.

Nuestros recursos naturales han sufrido por décadas la explotación sin medida ignorando los efectos adversos al medio ambiente que ahora se traducen en inundaciones, sequías, tolvaneras, contaminación, etc.

IRENA es el organismo gubernamental encargado de afrontar esta situación y de crear un marco institucional dirigido a ordenar el uso y conservación de nuestros ya sufridos recursos naturales.

IRENA tiene la mística, la voluntad y el convencimiento para enfrentar el reto. Conocemos nuestras limitaciones y debilidades, pero también nuestras fortalezas, las necesidades del país y nos anima un profundo amor por Nicaragua.

En este esfuerzo IRENA solicita por su medio la ayuda económica y moral del Gobierno y pueblo Americano, a través de la Agencia Internacional de Desarrollo (AID), por un monto aproximado de 9.0 Millones de dólares, con la cual nos será menos difícil tener éxito en nuestras proyecciones.



GOBIERNO DE SALVACION NACIONAL

Estamos seguros que con la ayuda de AID, una vez que hayamos reestructurado nuestro sistema financiero vamos a estar en condiciones para solicitar y recibir ayuda internacional que urgentemente necesitamos para desarrollar nuestros programas.

IRENA ofrece participar en este proyecto, con un monto aproximado de 2.6 millones de Dólares durante la duración del mismo, aportando el apoyo logístico, consistente en personal, facilidades de oficina, utilidades, servicios, y toda la información e inventarios sobre recursos naturales recopilada en los últimos 20 años.

Desde ya ofrecemos toda nuestra colaboración para que con la ayuda de AID, podamos llevar a feliz término un proyecto tan necesario para el presente y futuro de nuestro país, lo saluda.

Atentamente,

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Jaime Incer B.
 DR. JAIME INCER B.
 DIRECTOR GENERAL
 IRENA



Annex 1 Logical Framework

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
<p><u>Goal:</u></p> <p>Environmentally sustainable, broad-based economic growth in Nicaragua.</p>	<p>Annual changes in GDP, adjusted to take account of changes in economic value of the national stock of natural resources.</p>	<p>National statistics on value of agriculture and fisheries production and exports; area & cover of commercially viable forest; productive value of agricultural land; national income from tourism.</p>	<p>Adequate political will and the required authority vested in IRENA to implement rational natural resources policies (even if effects of policies are contrary to special interests). Government policies will encourage local organizations to take responsibility for control of natural resource use.</p>
<p><u>Purpose:</u></p> <p>To improve management of renewable natural resources, to protect biological diversity in selected sites, and support sound, environmentally safe pest management practices in Nicaragua.</p>	<p>IRENA's institutional capability will have been strengthened to the point where it will be able to prepare projects for funding by the donor community and it will be financially stable with an adequate budget to sustain its operations and carry out its mandate effectively.</p> <p>The GOM will have developed appropriate policies guiding the sound use of natural resources and will have an enhanced capacity in IRENA to implement those policies.</p> <p>A national strategy for Environmental Education will have adopted and IRENA will have a trained cadre of environmental educators properly equipped to carry out the strategy and related envir. educ. activities.</p> <p>Citizen awareness of the importance of natural resources contributing to support for policies and regulations that conserve renewable resources and protect the environment. Diffusion of farming practices that conserve soil, forest, and fauna productivity first within</p>	<p>Policy inventory baseline at beginning and updated at end of project.</p> <p>Surveys of farmers, hunter-gatherers, loggers, fishermen.</p> <p>Surveys of major commodity crop producers.</p> <p>Site visits; baseline and updated aerial observation of forest condition & deforestation extent, resource use monitoring reports by NGO's implementing project components.</p>	<p>GOM police and courts will enforce restrictions on use of natural resources.</p> <p>IRENA leadership has adequate political backing to reduce staffing levels and implement effective decentralization of functions & decisions.</p>

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NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
<p>Outputs:</p> <p>1a. Institutional Strengthening: Irena's management, operational, financial and technical capability strengthened.</p> <p>1b. IRENA staff trained.</p> <p>1c. Reduction in IRENA staff.</p> <p>1c. Academic training provided to key IRENA staff.</p>	<p>and later beyond project's intervention areas.</p> <p>Demarcation of protected area boundaries, reduced deforestation rates within boundaries, reduced taking of coastal resources by unauthorized persons (e.g. foreign fishing vessels).</p> <p>Adoption of integrated pest management practices by major producers of coffee, cotton, fruits, and vegetables.</p> <p>Major Nicaraguan buyers of coffee, cotton, fruits, vegetables requiring producers to meet strict pesticide residue standards.</p> <p>At least 200 IRENA personnel trained.</p> <p>Reduction of staff in the central office by at least 100 employees and corresponding increase field office staff.</p> <p>Presence on IRENA central staff of a fully qualified controller with a graduate degree, a fully qualified natural resources planner with a graduate degree, a certified accountant, and five professionally trained natural resource managers.</p> <p>Financial stability in IRENA to sustain its operations with a recurring appropriation from the GON of US\$ 3.0 million plus its own internally generated revenues.</p>	<p>Audit at Central Office and key regional offices.</p> <p>Payroll records.</p> <p>Annual accounts of IRENA.</p> <p>Interviews with IRENA officials.</p>	<p>IRENA leadership has adequate political backing to reduce staffing levels and implement effective decentralization of functions & decisions.</p>

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
<p>2. Policy Development, Implem. & Dialogue: Review of existing policies. Policy dialogue process.</p> <p>Key ENR policies, regulations, and plans developed and implemented.</p>	<p>Policy inventory carried out.</p> <p>Functional process implemented for formulating natural resources policy; strengthen existing fora and provide mechanisms for resolving policy conflicts between agencies.</p> <p>Policy fora established and operating.</p> <p>New forestry law and regulations promulgated and applied.</p> <p>Land use capability regulations in place; maps completed/used.</p> <p>Proposal for national watershed management project completed, presented to international development agencies.</p> <p>Public infrastructure plan completed and used to influence basic decisions on rural infrastructure.</p>	<p>Media coverage of policy fora.</p> <p>Published policy statements & management plans.</p> <p>Baseline and follow-up assessments of procedures.</p>	<p>Public adequately knowledgeable and motivated to support policies that foster sustainable resource management.</p>
<p>3. Environmental Education: Environmental Education Strategy.</p> <p>Training in environmental education.</p> <p>Training and environmental education materials developed.</p> <p>School environmental education.</p>	<p>National Strategy for Environ. Educ. and related action plans completed.</p> <p>Trained environmental educators in IRENA and collaborating institutions, and an equipped environmental education dept.</p> <p>Didactic materials, slides, photographs, audio and video tapes, newspaper articles, public service announcements, etc., that convey environmental messages.</p> <p>School visitation program tested and an evaluation of the results.</p>	<p>Memoranda of understanding between IRENA and other organizations regarding implementation of the EE strategy.</p> <p>Media survey. Survey of teachers.</p>	<p>Funding for developing resource management plans is made available by government or other donor-assisted projects.</p> <p>Local residents receptive to</p>

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NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
<p>4. Protected Areas & Buffer Zones: Planning for protection of ecosystems.</p>	<p>IRENA protected area system plan completed, in use by the agency as a basic tool for setting priorities and making decisions.</p>	<p>Review of management plans; community surveys and interviews;</p>	<p>extension efforts of NGO's personnel.</p>
<p>Training of local communities.</p>	<p>Protection of natural resources of the reserves through effective patrolling, enforcement, and community relations.</p>	<p>IRENA records of protected area demarcation; site visits to observe rangers and extensionists, assessments of deforestation rates.</p>	<p>Official backing for local residents' efforts to control poaching & resource piracy.</p>
<p>Training of local communities.</p>	<p>At least 3 local community organizations and NGO's will be trained and working on effective conservation and management activities in cooperation with IRENA and other local and national organizations.</p>	<p>IRENA records of protected area demarcation; site visits to observe rangers and extensionists, assessments of deforestation rates.</p>	<p>Local interest and participation; availability of resources; availability of staff for training; international NGO support; ability of local NGO's to raise funds.</p>
<p>Miskito Cays:</p>	<p>Protection and natural resources conservation plans developed and carried out in three areas: Miskito Cays, Bosawás, and Chococente.</p>	<p>IRENA records of protected area demarcation; site visits to observe rangers and extensionists, assessments of deforestation rates.</p>	<p>Support by government agencies for Strategy; availability of advisors; access to free media time.</p>
<p>Cooperation between IRENA and local communities arranged.</p>	<p>A plan to protect biodiversity and natural resources in Miskito Cays developed and carried out by NGO.</p>	<p>IRENA records of protected area demarcation; site visits to observe rangers and extensionists, assessments of deforestation rates.</p>	<p>Education personnel perceive EE to be adequately important to justify curriculum changes.</p>
<p>Bosawás: Plan to protect forests and natural resources.</p>	<p>IRENA and local communities sign formal arrangements for cooperation in the Miskito area.</p>	<p>IRENA records of protected area demarcation; site visits to observe rangers and extensionists, assessments of deforestation rates.</p>	<p>Education personnel perceive EE to be adequately important to justify curriculum changes.</p>
<p>Training</p>	<p>A patrolling, enforcement and community relations plan developed and carried out to protect the forests and natural resources of the Bosawás Reserve.</p>	<p>IRENA records of protected area demarcation; site visits to observe rangers and extensionists, assessments of deforestation rates.</p>	<p>Education personnel perceive EE to be adequately important to justify curriculum changes.</p>
<p>Training</p>	<p>A team of least 3 persons from community trained to promote sound environmental protection and conservation practices in Bosawás.</p>	<p>IRENA records of protected area demarcation; site visits to observe rangers and extensionists, assessments of deforestation rates.</p>	<p>Education personnel perceive EE to be adequately important to justify curriculum changes.</p>

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
<p>Chococente: Refuge Protection Plan.</p>	<p>One local NGO strengthened.</p> <p>A plan developed and carried out to protect the refuge and its resources.</p>	<p>Reports of pesticide testing services. Survey of major agriculture production firms. Monitoring training events. Project evaluation reports. Review of training and outreach materials. Survey of Ministry of Health pesticide technicians.</p>	<p>Organizations involved in plant protection and pesticide use willing to invest in methods to reduce negative effects of pesticide use. Pesticide users capable of learning improved methods for pest control. Special interests (e.g. pesticide suppliers) do not muster significant resistance to new methods that use less pesticide.</p>
<p>4.Plant Protection and IPM: Pesticides regulations.</p>	<p>New pesticides regulations adopted.</p> <p>Research carried out to determine ways to improve plant protection and reduce pesticide damage.</p>	<p>Reports of pesticide testing services. Survey of major agriculture production firms. Monitoring training events. Project evaluation reports. Review of training and outreach materials. Survey of Ministry of Health pesticide technicians.</p>	<p>Organizations involved in plant protection and pesticide use willing to invest in methods to reduce negative effects of pesticide use. Pesticide users capable of learning improved methods for pest control. Special interests (e.g. pesticide suppliers) do not muster significant resistance to new methods that use less pesticide.</p>
<p>Pesticide research.</p>	<p>Frequency of accidental traumatic pesticide poisoning reduced by half.</p>	<p>Reports of pesticide testing services. Survey of major agriculture production firms. Monitoring training events. Project evaluation reports. Review of training and outreach materials. Survey of Ministry of Health pesticide technicians.</p>	<p>Organizations involved in plant protection and pesticide use willing to invest in methods to reduce negative effects of pesticide use. Pesticide users capable of learning improved methods for pest control. Special interests (e.g. pesticide suppliers) do not muster significant resistance to new methods that use less pesticide.</p>
<p>Pesticides residues and practices plan.</p>	<p>Pesticide residues on agricultural products reduced to levels that do not cause unacceptable risk to consumers; safe pesticide use practices adopted by agriculture & health workers.</p>	<p>Reports of pesticide testing services. Survey of major agriculture production firms. Monitoring training events. Project evaluation reports. Review of training and outreach materials. Survey of Ministry of Health pesticide technicians.</p>	<p>Organizations involved in plant protection and pesticide use willing to invest in methods to reduce negative effects of pesticide use. Pesticide users capable of learning improved methods for pest control. Special interests (e.g. pesticide suppliers) do not muster significant resistance to new methods that use less pesticide.</p>
<p>Producers using IPM methods.</p>	<p>Largest 50 producers of export crops using IPM methods to increase profits.</p>	<p>Reports of pesticide testing services. Survey of major agriculture production firms. Monitoring training events. Project evaluation reports. Review of training and outreach materials. Survey of Ministry of Health pesticide technicians.</p>	<p>Organizations involved in plant protection and pesticide use willing to invest in methods to reduce negative effects of pesticide use. Pesticide users capable of learning improved methods for pest control. Special interests (e.g. pesticide suppliers) do not muster significant resistance to new methods that use less pesticide.</p>

ENVIRONMENTAL THRESHOLD DECISION

Project Location : Nicaragua
Project Title : Natural Resource Management
Project Number : 524-0314
Funding : \$9 million
Life of Project : 7 years (FY 91-98)
IEE Prepared by : Richard L. Owens
 USAID/Nicaragua
Recommended Threshold Decision : Positive Determination
Bureau Threshold Decision : Concur with Recommendation
 Comments : An Environmental Assessment will
 be carried out focusing on the
 Wildlands/Biodiversity/Protected
 Areas component of the project.
 Copy to : Janet C. Ballantyne, Director ✓
 USAID/Nicaragua
 Copy to : Richard L. Owens, USAID/Nicaragua
 Copy to : John Cloutier, USAID/Nicaragua
 Copy to : Wayne Williams, REA/CEN
 Copy to : Mark Silverman, LAC/DR/CEN
 Copy to : IEE File

John O. Wilson Date MAR -5 1991
 John O. Wilson
 Deputy Chief Environmental Officer
 Bureau for Latin America
 and the Caribbean

MEMORANDUM

August 3, 1991

To: The Files

From: Angel M. Diaz

Subject: NRM DAEC Review - Decisions and Clarifications

The subject review was held August 2, 1991. It was chaired by the Deputy Mission Director and attended by representatives of the PDIS, LA, PEPS, ARDO, CO, and CON offices. The following summary of the decisions, conclusions and clarifications made at the review is keyed to the issues paper distributed for the meeting.

1. Issue: Role of the Gon. The Project proposes to sign a Project Grant Agreement with the GON and identifies IRENA as the "focal point" for host country involvement. An IRENA representative will chair an Advisory Committee composed of representatives from CONAMOR, local NGOs, US PVOs, USAID, and other groups. The Ministry of Agriculture is to play a role in administering the RENARM buy-in. Will IRENA sign the Project Agreement as the technical or counterpart ministry involved? What will be IRENA's role in the implementation of those Project activities that are not directly benefiting IRENA, such as the grants for the three protected zones or the RENARM portion? What input has the Ministry of Agriculture had to date in the development of the pest management component?

Decisions/clarifications: It was clarified that:

a. The Project Agreement will be signed by the GON Ministry of External Cooperation and IRENA.

b. IRENA will be the GON coordinating organization for all project activities. IRENA will play this role even for the activities which will not benefit IRENA directly, including the grants for the three protected areas and the IPM project component.

c. The role of the GON Ministry of Agriculture (MINAG) in the implementation of the IPM component will be that of counterpart implementing agency. As such, MINAG it will work jointly with ROCAP/RENARM in carrying out the IPM activities contained in the RENARM buy-in. IRENA, as the GON overall coordinating agency for the Project, will sign a Memorandum of Understanding (MOU) with the MINAG and the Ministry of Health (MINSa) spelling out a mechanism for the exchange of information about the implementation of the IPM.

2. Issue: Contracting and Commodity Procurement Arrangements.

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Due in part to IRENA's weak financial and contracting capability at this time, the Project proposes an AID Direct institutional contract for technical assistance, training and commodity procurement for institutional strengthening of IRENA, the policy component, and the educational campaign. An 8a contracting arrangement is anticipated with the contractor in place about six to seven months after signing the Project Agreement. Yet the PP states that IRENA will receive its office equipment within six months. How is this procurement to be effected? Should it take place under the Public Sector Commodity Project already in place or possibly utilize that project's PSA mechanism? What actions does the Project intend to take to ensure that IRENA will have the required host country contracting and financial capability to manage AID funds directly? Should the contracting of local positions and all local procurement be included under the institutional contract instead of being done in part by IRENA?

Decisions/clarifications:

a. ARDO and CO will contact AID/W to explore the availability of a qualified 8(a) firm to be the U.S firm to work with IRENA in the implementation of the project. If such firm is not identified by Friday, August 9, 1991, the Mission will proceed with the full and open competition process to select the firm.

b. Regarding procurement of commodities, it was decided that the Mission should use the procurement service Agent (PSA) now being used under the Public Sector Commodity Project. It was decided that this arrangement would expedite procurement of project commodities at a lower cost. The original proposal was to include the procurement of the commodities under the institutional contract with a U.S. firm.

c. Regarding IRENA's capability to contract and manage AID funds, it was clarified that IRENA does not have such capability now, nor the systems to do so. For this reason, IRENA will need some immediate technical assistance to train some people and establish the accounting and control systems which AID requires for the proper management and control of any funds given to IRENA. For this purpose, it was decided that ARDO should prepare a PIO/T to obtain the short-term services of a firm, such as Price Waterhouse, to work with IRENA during the initial stages of the project. The Controller will provide the scope of work for the PIO/T. The cost of this assistance is estimated at \$30,000-\$40,000, which will be provided under the PD&S account.

3. Issue: Indicators of purpose attainment. The Project's outputs and End of Status indicators are listed on pages 15-19. The EOPS indicators are unusually numerous and are tied closely to the individual outputs preceding them. What are the key

three or four purpose level indicators which will demonstrate attainment of project purpose?

Decision/clarifications:

a. It was decided that the number of End of Project Status Indicators should be reduced to more clearly reflect the attainment of the project purpose. PDIS will do this and reflect the changes in the final version of the PP.

4. Issue: Budget Information. Budget estimates for the cooperative agreements are based on proposals received. The institutional contract encompasses several project components. What is the estimated value of the institutional contract and upon what assumptions was that amount determined?

Decisions/clarifications:

a. The basis for the estimates of the various project components was clarified. PDIS will also incorporate in the final budget tables the suggestions made in the meeting, including a summary of all the amounts that will be included in the institutional contract with the US firm and the amounts for commodities to be included in the contract with the PSA procurement agent.

b. Regarding the hiring of local specialists by IRENA, it was clarified that the compensation for such specialists must follow IRENA's salary scales, as AID regulations prohibit the payment of salary supplements. This is a project implementation action which the USAID Project Manager and Controller should monitor closely.

5. Issue: Buffer Zones implementation. The Project Paper states that a consortium of US PVOs (PACA) will implement this component. What will be the roles of PACA and CCC? What is the implementation arrangement for tapping into the CCC contract?

Decisions/clarifications:

a. It was clarified that the Programa Ambiental para Centro America (PACA) and the Caribbean Conservancy Corporation (CCC) will be responsible for all the implementation actions under the Miskito Cays and Bosawas sub-components. IRENA will select a local PVO to help implement the Chococente sub-component during the second or third year of the project.

6. Issue: Policy Component. The policy component will be implemented principally through IRENA. A previous draft of the PP had CONAMOR more involved in this function. What is the relationship between the two organizations? How will the policy

component be monitored and evaluated?

Decisions/clarifications:

a. It was clarified that IRENA will be the coordinator for all project components. IRENA will coordinate with CONAMOR as necessary. The decision had been made early on during the project development process that IRENA is the proper institution to play such role as it has a the basic human and physical infrastructure in place and the mandate to carry out the types of activities included in the project.

7. Issue: Environmental Education. The Environmental Education component is broad and could include activities in almost any area? Is this component coordinated closely enough with the other Project components? Why is it a separate component instead of being part of the IRENA activity?

Decisions/clarifications:

a. It was clarified that indeed this component is part of the activities to be implemented by IRENA, and as such is part of the IRENA assistance activities. This is the way the Project Paper describes it.

b. The scope of the Environmental Education component also was clarified. It was emphasized that a key activity to be carried out during project implementation is the development of a National Strategy for Environmental Education, which will provide the framework for other efforts including awareness campaigns, development of didactic materials, development and implementation of mass media campaigns, environmental education programs in schools, etc. This is discussed under the description of the Environmental Education component.

Drafted: PDIS:AMDiaz:8/4/91

Clearance:

PDIS:JCloutier	Date:
PEPS:RBurke	Date:
LA:MVelazquez	Date:
ARDO:ROwens	Date:
ARDO:RConley	Date:
CO:JCorley	Date:
OFIN:RLayton	Date:
DD:KSchofield	Date:

Natural Resources Management Project

(NRM, 524-0314)

Project Paper Annexes and Attachments

Contents

Annex B: Institutional Analysis

Annex C: Policy Analysis

Annex D: Financial and Economic Analysis

Annex E: Technical Analysis

Annex F: Social Analysis

Attachment 1: Selected International Cooperation Projects

Attachment 2: Selected IRENA Cooperative Projects

Attachment 3: Environmental and Development NGO's in Nicaragua

(Draft Versions)

June 1991

Managua, Nicaragua

**Chemonics International Consulting Division, Inc.
2000 M Street NW
Washington DC 20036
USA**

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Annex B

Institutional Analysis

1. Institutional Background

IRENA, the Nicaraguan Institute for Natural Resources and the Environment was created in 1979. The institution was originally responsible for the development of studies, inventories, planning, management regulation and control of all natural resources in the country.

Decree No 410 (May 17 1980) nationalized the production forestry sector and created the People's Forestry Corporation (Corporación Forestal del Pueblo) CORFOP as a part of IRENA. CORFOP later became part of the Ministry of Industry. At present, forest administration is divided between IRENA and CORFOP.

IRENA is responsible for enacting and executing forestry policies, guaranteeing the conservation and expansion of forestry resources, and for the proper and sustained use of natural resources. It is also responsible for the establishment of institutional norms and objectives.

CORFOP is responsible for forest road construction and maintenance, tree cutting, harvest, transportation, industrial transformation, forest product commercialization, creation and support of forestry sector grassroots associations and cooperatives, coordinating and executing forestry sector policies, creating partnerships and enterprises, and contracting for local and foreign credits. Therefore, IRENA clearly retains the regulatory and planning responsibility and authority over forest resources.

The public management and administration of national forest lands (as opposed to forests) is still undefined. Up to now the Ministry of Agriculture and Livestock (MAG) through its Agrarian Reform program was responsible for land distribution, titling, colonization programs without consideration for soil suitability. Nicaragua is in the process of establishing property rights legislation which will eventually permit forest land use regulation and definition.

Important to the financial future of IRENA is Decree 410 which authorizes IRENA to collection fees from natural resource exploitation, and use such funds for the preservation and development of natural resources. Additionally, Decree No 340 authorizes IRENA to create a National Parks Special Fund.

In summary, land use legislation is inadequate, there is very little enforcement of existing legislation and the institutions responsible for land use are generally quite weak.

Further, responsibilities, authority and functions for each institution involved in natural resource management are not clearly specified. This institutional weakness contributes to ineffective management of natural resources. Concerted policies, statutes and actions in strengthening the institutions are required to attain sustained economic growth, especially with regard to the use of natural resources for the long term.

2. IRENA Financial Viability and Sustainability

The GON has appropriated to IRENA \$US3.1 million for FY91. However, actual disbursements are as much as \$160,000 in arrears on a daily basis and there is no assurance that the entire \$US3.1 million will be disbursed by the end of FY91.

The GON sustained an average monthly negative cash flow balance of \$US18.7 million from February 1990 to February 1991. At the end of 1990 external debt exceeded \$9.7 billion (approximately \$2783/capita) with more than \$4 billion in arrears. Even if all external debt is forgiven, the balance of payments deficit is projected to be as much as \$415 million per year through the year 2000. (Source: Central Bank of Nicaragua)

Given the current economic and financial situation in Nicaragua, the GON will be unable to fund any new activities in the natural resources area and very unlikely to continue supporting these activities at current levels (\$3 million) through the end of the century.

3. Organizational Structure

Since its creation, IRENA has gone through several stages of institutional reorganization, driven primarily by socio-political and economic changes. The institution, created in 1979 to be the steward of natural resources management, by 1990 was reduced to be a minor National Directorate (DIRENA) of the former Ministry of Livestock Development and Agrarian Reform (MIDINRA).

During the period of its initial organization (1979-80), IRENA was given responsibility for managing forests, protected areas, fauna, hydrographic basins and environmental quality, and for carrying out environmental education, regulation and control. The institution was adequately funded by the GON and started the design of important projects directed at the natural resources preservation.

From 1981-84, IRENA created a presence throughout Nicaragua through regional delegations. During the same period CORFOP was created and IRENA's autonomy was lost. It became an Institute attached to MIDINRA. The regional delegations became units within IRENA and created a false sense of decentralization, all of which was politically motivated. This added further to institutional weakening.

The 1985-90 period was IRENA's crisis stage. The budget was drastically reduced and IRENA was forced to reorganize provoking the flight of its most qualified human resources. The loss of these human resources left IRENA unable to continue the implementation of important projects.

During 1988-90 the continued weakening and financial restrictions induced another change IRENA's status. It became a General Directorate of MIDINRA under the name DIRENA. The established Regional Delegations were subordinated to the Regional Directorates of MIDINRA, causing a total loss of IRENA control over regional functions. At the same time the headquarters IRENA staff was reduced by 40 percent. As result of the April 1990 political changes in Nicaragua, IRENA recaptured its autonomy.

4. Current Organization

IRENA is currently organized in two offices: (a) The chief executive officer is a Director General, reporting to the national president and appointed with the rank of minister and a member of the executive cabinet. (b) The Vice-Directorate General is directly and functionally attached to the Director General. The Deputy Director has the rank of Vice-Minister. There is no clear definition of responsibilities between these two offices other than the direct line function. The two offices have the following functions:

- Official and legal representation of IRENA
- Coordination and direction of the institution
- Control of IRENA's assets and financial resources
- Inter-institutional coordination and with the private sector
- International coordination with bilateral, multilateral and private organizations

There are three divisions with line functions: a) Planning and Projects Division, b) Information Division, and c) Administrative-Financial Division.

In practice the planning and projects division is totally inoperative. It is staffed with two professional employees who currently produce listings of projects. No planning is done. The division has the following responsibilities:

- Prepare, coordinate and evaluate the annual plans of the institution, as part of the general planning system.
- Supervise and control the quality of plans presented by the technical units to the General Directorate.

- Evaluate and monitor projects in the implementation phase at central and regional levels.
- Prepare and support the project portfolio of research projects, base studies, pre-investments, protection, and promotion, for eventual international cooperation projects.

The functions assigned to the information division are ample and ambitious, but the actual staff of 8 employees is mainly devoted to the preparation of materials for education and publicity campaigns. The division has the following responsibilities:

- Promote and disseminate the technical and scientific work of the institution at the national level, through coordination with the technical divisions.
- Keep the Nicaraguan population aware of the different programs and projects being implemented by IRENA related to the management, use, and protection of natural resources and the environment.
- Implement a permanent Bibliographic Information Service, directed to the users of the Documentation Center.
- Coordinate the flow of information with institutions related to IRENA's functions and receive bibliographical information from international organizations.
- Guide, procure, and strengthen foreign assistance resources in order to consolidate IRENA's programs through training and education programs.
- Support linkages with the General Directorate for Migrations in all matters related to migrations.
- Monitor and support the technical cooperation networks of IRENA.

The Administrative and Financial Division is a conglomerate of administrative, financial, and human resources functions. In the management of financial resources there is a clear conflict of interest in the origination and payment of invoices. Human resources management is limited to the compilation of employee rosters. There is a complete absence of personnel files and job descriptions. The administrative function operates without organization or prescribed procedures. The division has the following responsibilities:

- The organization of operating procedures, related to the registry and control of assets and budgets; the issue of financial, budget, accounting, human resources; and support of administration policies.
- Propose the development of organization plans, methods, and procedures to permit the efficient control and administration of financial resources, human resources, and assets assigned by the GON to the institution.
- Generate useful, timely, and accurate financial and administrative information to support the decision making process of the General Directorate.
- Support the implementation, operation, and updating of administrative-financial systems to achieve proper management of resources.
- Assist and conduct all financial and administrative operations.
- Establish the procedures to enforce the statutes, regulations, policies, and norms related to public administration.

Currently, the Administrative and Financial Divisions is essentially devoted to making payments on a crisis management basis. Accounting is based on an East European system named SUKA. It does not provide for balancing, financial control or auditing. It is basically a mere listing of payments. There are balances in accounts receivable that have been carried for the last three years, the bank accounts are reconciled only every six months with no adjustments, and the accounting cycle is one year behind.

There are four technical directorates with line functions: a) Forestry Directorate. b) Land Use and Hydrographic Watersheds Directorate. c) Environment and Extension Regulation Directorate. d) Regional Coordination Directorate

The forestry directorate has three departments and one program under its control. The general functions are to define and propose the use of the forestry resources and the establishment of regulations for the administration, use, and conservation of forestry resources, and to design and implement reforestation plans directed to industrial lumber extraction and firewood. This directorate is divided into the following departments:

- Forestry Evaluation Department -Plan and execute forestry inventories, at national, regional, or local levels coordinating with private and public industries public and private, and develop the methodologies to be applied for inventory of pines, broad-leaf forests and other plants.
- Forestry Protection Management Department -Conduct and monitor the management plans of pines and plantations at the regional level and with the private sector. Evaluation and reporting of forest fire prevention and control.

- **Wildlife Department** -To execute IRENA's policies in National Parks and Wildlife development, managing the resources assigned by the national budget and other sources. Coordinate activities with other government agencies to cooperate in their management.
- **Farmers' Forestry Program (Programa Forestal Campesino)**- coordination of the Program in the Regions. Extension and technical assistance through forestry technicians.

The land use and watershed directorate is responsible for three departments and its function is defined as the establishment of the technical-scientific information basis for the formulation of strategies for the sustained use of natural resources existing in the physical environment of the watersheds in the country. This directorate contains the following departments:

- **Physical-Natural Studies Department** -Provide the basic water and soils information, generated by base studies, for the adequate planning and management of watersheds.
- **Watershed Planning Department** -Process and compare the physical-natural baseline data of watersheds to formulate use proposals and natural resource management.
- **Resource Use Department** -To establish at national, regional and, local levels, the norms for the use and management of the water and soil resources, to guarantee their rational and sustained use.

The environment regulation and extension directorate is formed by four departments with responsibility for monitoring the application of the established laws and regulations, regulating the use of natural resources and the quality of the environment, and for keeping a general statistical registry of natural resources use through the Natural Resource Information System. This directorate is also responsible for offering technical assistance, training, and extension services for the transfer of technology and suitable methods for the sustained use of the forestry, water and soil resources. This directorate contains the following departments:

- **The Environmental Regulation Department** has the following tasks:
 - **Develop the National Environment Registry**, with the objectives of locating and monitoring all pollution centers endangering the environment, classify them according to their type, degree of danger and other parameters of interest, and define containment measures and sanctions.

- Organize and support the population's participation and inter-institutional coordination for addressing local, municipal and regional environmental problems,
- Analyze and propose technical alternatives for the solution of the identified problems.
- **The Wildlife and Fauna Regulation Department is responsible to Regulate the observance of the law, norms and regulations regarding the use, hunting, traffic and local and international trade of wildlife species.**
- **The Forestry Regulation Department has responsibility to apply the laws, norms and established procedures for the award of permits, licenses, remittances and judgements, for the use and transformation of forestry resources both industrial and commercial, registering all the information related to the quantities and flows, and applying fines for violations.**
- **The Promotion and Extension Department has responsibility to organize and develop training events, extension and technology transfer for local technicians, farmers and the general population, with the purpose of improving the local capabilities to solve environmental problems and the sustained use of natural resources.**

The regional coordination directorate is responsible for the coordination of the 9 regions and 35 districts of IRENA. (See Annex) Because of the lack of regional resources and regional and political pressures, the regions present the most significant institutional problem (and one of the best opportunities for improvement). The regional delegates report directly to the General Directorate bypassing the Coordination Director.

The regions represent an important part of the institution not only because of the need for an IRENA presence in the regions, but also because they are a source of revenues that, given the restrictions of the national budget, becomes the lifeline of IRENA.

5. Restructuring

In 1990 IRENA requested the financial cooperation of the World Wildlife Fund to organize a Working Group to propose the re-structuring and strengthening of the institution. The result of the WWF cooperation was a study titled "Proposal for re-structuring of the Nicaraguan Institute for Natural Resources and the Environment" delivered in November 1990.

The study recommended the re-structuring of IRENA with a transitional organizational structure to be implemented in 1991 and a final organizational structure to take place in 1992. Unfortunately, the assumption of both organizational structures was dependent on the funding of the GON for year 1991 at the levels that could make its implementation possible. Because of the serious problems faced by the GON (see financial and economic analysis section), the funding was only 18% of the requested budget. This forced IRENA to abandon the original re-structuring plans, and make adjustments to accommodate the level of available financial resources.

The transitional organization structure was funded by the GON, but it exists only on paper. The old structure is still in use. The Deputy Director is working on a new structure adjusted to the realities of the present financial conditions. Functionally IRENA is interested in strengthening the institution and has identified the following areas in need of technical assistance and support:

- Planning
- Finance and Administration

- International Relations
- Inter-institutional Coordination
- Policies and laws
- Environmental Education
- Protected Areas

6. Interinstitutional Linkages

IRENA has complementing and overlapping functions with other government agencies in the management of soils, water, and protected areas. The current legislation that affects the relationship among institutions needs to be revised and clarified in order to enable coordinated action.

Participation and linkages in soil management involve the following government agencies:

INETER - NICARAGUAN INSTITUTE OF TERRITORIAL STUDIES. This is a national agency specialized in geographic and territorial studies. Provides basic geographical data on meteorology, seismology, volcanology and hydrology. All these technical areas provides basic information required in decisions affecting the use of lands in agricultural, forestry, and protected areas.

MAG - MINISTRY OF AGRICULTURE AND LIVESTOCK. The Directorate of Agricultural Techniques (DGTA) within this Ministry

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is responsible for basic soil studies, cartography, and soil management. All these areas are of interest to IRENA.

Participation and linkages in water resources management involve the following government agencies:

INE - NICARAGUAN INSTITUTE OF ENERGY. This is a national agency responsible for energy generation and distribution. INE operates a geothermal plant that generates one third of the energy used in Managua. Other plants use petroleum generated energy. Pollution control is of interest to IRENA.

INAA - NICARAGUAN INSTITUTE OF WATER AND WASTE WATER. This is the agency responsible for water supply for human consumption and the treatment of waste water. The Managua basin represents a problem that IRENA is eager to undertake as resources become available, because it represents the number one source of contamination of Lake Managua.

The participation and linkages in protected areas management involves the following government agency:

INTURISMO - NICARAGUAN TOURISM INSTITUTE. This agency and IRENA are interested in developing eco-tourism to take advantage of the superb natural splendor of Nicaraguan parks and forests.

The participation and linkages in fishery resources management involves the following government agency:

INPESCA - NICARAGUAN FISHING CORPORATION. This agency is responsible for the management and policy making for fishing resources. INPESCA is also involved in production and marketing of fish products. IRENA is interested in recapturing the regulatory powers of this sector.

As the coordinating arm of the institutions involved in the protection and development of natural resources, the government created the National Commission for the Environment and Land Planning (**CONAMOR**) which is responsible for coordination at a the cabinet level. Unfortunately, this commission is not operational at least at the ministerial level, but a task force and committees have been meeting in preparatory sessions.

7. Institutional Identification

Project NRM 524-0314 identifies IRENA as the institution responsible for promoting natural resources management and environmental conservation. The institutional strengthening of IRENA is a primary objective of NRM 524-0314. This strengthening, given current national economic circumstances and problems, can only be accomplished by IRENA, with outside assistance. Without strengthening, IRENA will not be able to contribute to the other objectives of this project, nor will it be able to carry out its statutory responsibilities in the management and use of natural resources in Nicaragua. No direct intervention or support from any other Nicaraguan institution or sector is expected.

8. Organization Mandates

IRENA's mandate is based upon the Supreme Decree 56 of August 24, 1979 and the Organization Law 112 of October 9, 1979, giving IRENA jurisdiction over the natural resources and environment (Art.2 Decree 54) to wit:

- 1) Surface and underground soil and water resources.
- 2) Mineral resources, hydrocarbons, and energy sources including geothermal.
- 3) Forestry and wildlife resources, including the national species of flora and fauna in their natural habitat.
- 4) Fishing resources, both in continental and inland waters.
- 5) The ecosystems where the organisms live and reproduce to be used as renewable natural resources.
- 6) The geographic areas which by their hydrometeorological, geological, and ecological characteristics, can be managed and utilized to benefit the integral conservation and rational utilization of natural resources in general.

The general objectives of IRENA are: (Art.3 Decree 56)

- 1) To protect the national sovereignty of Nicaragua concerning the conservation and rational utilization of the natural resources that form the basic wealth of the nation.
- 2) Prescribe and execute the General Plan and Policy for Conservation and Adequate Utilization of the State Patrimony of Natural Resources, in order to regulate the operations of the public and private sector in this field.

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- 3) To research, control, and administer, and, when appropriate, to exploit natural, energy, and environmental resources in the national territory, under the philosophy that these should contribute to the well-being of the Nicaraguan people.
 - 4) To promote the creation of State Enterprises and/or Corporations assisted and coordinated by IRENA for the utilization, processing, and commercialization of natural resources as required.
 - 5) To coordinate the plans, actions, and projects of the public and private sectors directed to natural, energy, and environmental resources.
 - 6) Promote and enact recommendations for a new legal framework directed to the laws, regulations, codes, and other statutes that regulate and sanction all actions that affect the environment and the natural resources of the nation.
 - 7) To safeguard the strict fulfillment of the Law and to apply the corresponding penalties when required.
 - 8) To enhance the public's awareness about the importance of protecting and conserving our natural resources for the progress and the socio-economic development of the nation.
 - 9) To promote, coordinate, and execute the necessary research and planning of the natural resources and environmental sector.

IRENA is assigned the following authority.(Chap.III,Art.10,Decree 112):

- 1) To conduct studies and inventories of the following natural resources: climate, water, soils, subsoils, minerals, forests, vegetation, fishing and wildlife, lakes, rivers, beaches, territorial waters and air space.
- 2) To evaluate natural resources information required for planning and natural resources conservation projects.
- 3) To regulate the use and utilization of the natural resources of the country; to this effect it will be responsible for the issue, supervision and cancellation of concessions, licenses and permits; the transportation of forestry products, fauna, minerals and energy producing products.
- 4) To have a registry of all natural and legal persons that capitalize on Natural Resources under license, concessions or permits.

- 5) To design, implement and supervise policies related to protection of the environment to secure the ecological balance of the territory.
- 6) To implement development policies for management of natural resources.
- 7) To control and assist those activities and civil works necessary for the development, conservation and rational and sustainable use of natural resources and the environment.
- 8) To reserve and conserve those areas that present special conditions for the ecology, flora, fauna and scenic views, with scientific, educational, recreational and tourism objectives of national and international interest in coordination with other government agencies.
- 9) To protect, in coordination with the Nicaraguan Institute of Water and Waste Water (INNA), hydrographic basins for proper soil and water management directed to multiple and integral development and benefit from the conservation and utilization of resources.
- 10) To supervise and coordinate with the Nicaraguan Institute of Water and Waste Water irrigation and water management projects.
- 11) To conduct, promote and coordinate activities for forestry, and ichthillogical and wildlife renewal in their respective environments.
- 12) To prospect the national territory, searching out mineral and energy sources for proper utilization by those agencies designated by the government.
- 13) To regulate the use of ocean shores and beaches, lakes and rivers, watersheds, keys, underwater banks, volcanoes, crater lagoons, and all the national lands given or transferred to IRENA, which will coordinate those activities with all state agencies that have any authority in those areas.
- 14) To maintain a safeguard and control system, through inspections, to ensure the rational use of natural resources and the environment, in coordination with the proper governmental agencies.
- 15) To establish norms of control and supervision of persons, institutions, industries, processes, and other factors that provoke environmental contamination in cities and rural areas.
- 16) To establish minimum standards for air, soil and water quality that will enhance the physical and social well being of the population, in coordination with other government agencies.

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- 17) To regulate the treatment and disposal of waste waters and emissions from rural and urban industries.
 - 18) To promote educational campaigns, courses, seminars and other activities of educational nature and motivation directed toward environmental preservation and the rational utilization of natural resources, coordinated with other government agencies.
 - 19) To create a data bank of natural resources and the environment to centralize available information.
 - 20) To conduct and promote scientific and technological research programs associated with natural resources and the environment.
 - 21) To advise other institutions, private and public, in matters related to natural resources and the environment when requested.
 - 22) To promote pilot independent development projects among communities, to demonstrate the practical benefits of sound natural resources and environmental management.
 - 23) For all infrastructure projects that could affect, directly or indirectly, natural resources and the environment, previous authorization of IRENA will be required.
 - 24) To execute all matters related to its fixed assets, and all legal actions or contracts deemed necessary to the achievement of its objectives. In reference to estate property, IRENA will require the previous approval of the Government to mortgage, sell or exchange. In no case can IRENA sell, exchange or lease out the natural resources specified in this law.
 - 25) To scrutinize the strict observance of this law and its regulations.
 - 26) To enact the necessary regulations for the organization and proper administration of IRENA and its development programs.
 - 27) Enact any other regulation intrinsic to its objectives.

Articles 12 and 13 of Decree 112 state that it is the duty of IRENA to know and discharge all matters related to Natural Resources and the Environment with the statutes and procedures established in the current laws. It also confers the authority to take all measures and provisions required to prevent the improper use of the natural resources that are not

provided for in the current specific legislation, with the limitation that such measures should be those strictly necessary and in cases in which the lack of IRENA's intervention would cause irreversible damage.

According to Art. 16 of the Organization Law, IRENA is the only government institution authorized to issue, supervise and revoke reconnaissance permits, licenses, and concessions for the exploration and exploitation of natural resources.

Decree 410 of May 17, 1980, assigns to IRENA the following objectives:

- 1) Enact and execute the nation's forestry policies.
- 2) Achieve integral, rational, and sustainable utilization of the forestry resources of the country.
- 3) Ensure the conservation, protection, improvement and expansion of such resources.
- 4) Impose on to violators of the present law and other legal instruments of the forestry sector, the established penalties or fines.

In summary, and according to the laws in effect, all other institutions with competence in the management of natural resources are subordinated to IRENA with respect to their impact on the environment, and IRENA by law is empowered to be the steward of natural resources.

9. Administrative Analysis

a. Organization

IRENA is an autonomous Institute created by constitutional law and supported by appropriate legislation as defined by the legislative excerpts previously presented. Even though the institution is empowered with comprehensive control of natural resources and the environment, many functions are still under the tutelage of other institutions operating in sectors affecting its sphere of influence.

There is a definite need for inter-institutional linkages and relationships both formal and informal and the establishment of the necessary lines of communications and coordination for the effective implementation of the law, plans, and programs affecting the management of natural resources.

b. Financial Status.

IRENA has autonomy in the disbursement of its funds, and disposition of assets and does not require the approval of any other agency of the government, with the exception of real estate transactions, that need to be approved by the Controller of the Republic.

The institution has three sources of funding as seen below:

TABLE 1

1991 IRENA BUDGET IN 1,000's of US Dollar

Government Budget ^{1/}	3,100	50%
Swedish Aid Program ^{2/}	2,800	45%
IRENA's Resources ^{3/}	<u>300</u>	<u>5%</u>
TOTAL	6,200	100%

Source: IRENA

1/ The GON funding for 1991 was 82% below the requested budget of US\$ 17 million due to the internal financial crisis of the country. This low level of contribution will in all probability continue for the foreseeable future (see financial and economic analysis section).

2/ The Swedish Aid Program provides the GON with an assistance of US\$ 4.0 million of which US\$ 1.2 million are used as direct assistance to CORFOP and other institutions for forestry programs and projects. SIDA has a projection of US\$ 31 million through 1994, but this appropriation is currently being revised by SIDA.

3/ IRENA's own resources are produced by the assessment and collection of fees, licenses, permits, and concessions. The contribution of this resource to the overall budget is extremely low when compared to the total budget. It is estimated that an improvement in controls and incentives could double the collections almost immediately.

c. Pattern of Organization

IRENA is loosely organized. After the political changes in 1989, IRENA was inherited as an almost extinct institution, burdened with a large and unqualified staff. The institution is struggling to regain the stature that law bestows and regain management control.

At the head of the organization is a recognized and respected scientist and environmental advocate who holds the position of Director General with Minister rank. He

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At the head of the organization is a recognized and respected scientist and environmental advocate who holds the position of Director General with Minister rank. He is also a member of the Central American Commission on the Environment. His ability to move in the upper levels of decision making is undisputed and he can represent a key element in the success of the NRM Project.

The institution needs a complete renovation of its organizational structure. There is an on-going effort to reorganize IRENA, but the endemic lack of financial resources coupled to the low quality of human resources, politically influenced union activity, and a complete absence of administrative and financial controls, makes this task a difficult and challenging one.

As part of the Swedish assistance program, SIDA has provided two nicaraguan consultants who are performing line duties as Controller and Coordination Director at IRENA. These two individuals are paid directly by SIDA at a level that is well beyond the basic professional salary in Nicaragua. On the other hand they are two competent professionals who, in their brief period of activity, have been able to grasp the institutional problems and even with limited resources, are working at solving them.

d. Authority

Administrative authority is concentrated in the director general's office with some delegation to the Deputy Director General, the Controller and the Coordination Director. The technical units manage projects funded by bilateral or international groups such as: NORAD, DANIDA, WWF, SIDA, CARE and OLAFO. However, the management of these units is also centralized in the General Directorate, with the Unit Managers reporting directly to the Director General.

IRENA is a highly centralized institution and decision making powers are largely vested at the highest level. However, given current conditions as previously described, this is the most effective arrangement for managing the institution at the present time. This is due to the low quality of the human resources, the prominent role of politics within the institution, and the lack of an organizational structure

The delegation of authority and decentralization of management is recognized as an essential requirement to have a flexible, effective, and efficient organization. The Director General's attitude is positive towards these changes if given the minimum of tools and

resources to attain success. Furthermore, the long-term goal is to decentralize IRENA, to the point where the majority of the staff will be located in the field, and the reduction of headquarters staff will permit a more efficient use of resources and increase the presence of IRENA in the regions.

e. Human Resources

The quality of human resources is currently a major problem. During the last ten years, personnel were hired without consideration for their professional or technical abilities. The complete absence of personnel files makes it almost impossible to assess their professional quality and technical skills, experience, tenure, or other elemental data.

An informal sample of ten employees at different levels of the institution revealed an unawareness of institutional objectives, procedures, and regulations. The salary structure is also a source of dissatisfaction.

The group that constitutes the top level management (the Director General, the Deputy Director General, the Controller and the Coordinator) are well qualified professionals. All have post graduate degrees in the US, and have worked in the US for the last ten years. This core group is well aware of the institutional problems and limitations, but is also determined to bring the institution to a preeminent situation in Nicaragua. In addition to outside assistance, their attitude is perhaps the best, albeit fragile, hope for the full accomplishment of IRENA's responsibilities.

The controller is a former treasurer of the Central Bank of Nicaragua and has experience in the implementation of computerized financial systems. He holds a law degree and master degrees in economics and business administration. The coordinator holds a degree in agronomy and a masters in business administration.

IRENA documents show a total of 685 employees. The distribution of employees by category and source of funding is shown in Annex I. There are three salary sources as follows: 1. The budget of the GON, 2. Project Funds, and 3. IRENA's own funds. The payroll checks for the employees paid by the GON budget are cut at the Ministry of Finance. Therefore, IRENA does not keep a payroll ledger for these employees. This group can be considered as the "legal" employees of the institution with the tenure and benefits allowed by law.

Project employees, paid by the particular project to which they are assigned, technically are temporary employees through the completion of the project. They are paid equivalent benefits, but they do not qualify for tenure benefits as public servants. In the case of the employees paid with IRENA's own funds, they are also technically not part of the civil service system.

In 1990 the GON enacted an executive decree, known as the conversion plan, by which all employees of the public sector were invited to leave the public service in exchange for a lump sum payment of the equivalent of US\$ 2,000. By June 15, 1991, 98 employees had accepted this option. The future success of this plan depends upon economic alternatives available to current employees and pay levels within the institution.

f. Corruption

The lack of controls and procedures leaves the door open for corruption, especially in the assessment and collection of fees by IRENA. The internal problem is illustrated by the common estimate that only 50% of the monies collected in the region ever reach IRENA. Some regions retain part of the collections to pay for their administrative expenses. The external problem is the evasion of payment of fees by producers. In the long term this problem can only be solved by a greater presence of IRENA in the regions and the enforcement of laws and regulations.

10. Summary of Findings

a. Organizational Structure

The organizational structure as it exists on paper is neither observed nor practiced. Authority is highly concentrated in the upper levels of management and is not delegated to middle management levels. The decision making for all administrative matters rests in the office of the Director General.

There are mitigating reasons for this concentration. For all practical purposes IRENA began a new existence in 1990. The new government inherited an organization plagued with problems, ransacked of resources and structurally inefficient. A highly centralized and concentrated decision making structure is the most effective for an organization in this stage of development. However, there is significant risk that this structure will be perpetuated guaranteeing eventual failure of the institution. Upper management is aware of these risks, and they want to move to a more flexible and but highly structured organization, improving the lines of communication and delegation of authority as soon as the necessary basic elements of management are implemented.

b. Management

The management of the institution is also concentrated at the upper level. The inclusion of two local consultants paid by the Swedish Aid Mission has significantly improved this situation. These two consultants are currently assigned with line functions as controller and international coordinator.

The financial and administrative management functions will have to take precedence, as the basic foundation for sound management of the institution. Planning should be viewed as the most important management tool for sustainable implementation of plans and programs. SIDA will be funding this effort.

Technical management seems to be in a better position, since there is more specificity to their functions and they are interested in their area of activity. Technical training would be an important motivating factor for technical management improvement.

c. Staffing

Without a rapid improvement in the quality of the human resources IRENA's future is at risk. This improvement can be accomplished through attrition and replacement with a higher quality staff (turnover) and by training of the existing staff. Turnover is being encouraged by the GON conversion program implemented in 1990. However, the most positive and immediate action available to IRENA is the training of existing qualified staff and the addition of highly qualified staff (technical assistants). Because of the very short term need to upgrade human resource skills and knowledge, the institutional strengthening component does not require significant training at the university level, but rather on-the-job training through seminars and workshops in the use of the systems, the application of procedures, and the use of management tools.

While financial remuneration will not improve staff quality, improved pay scales will make it possible to retain quality employees and can be used to encourage training. The salary structure as of May 31, 1991 is as follows in its equivalent in US\$:

Directorate level monthly salary is from \$153 to \$230

Professional level monthly salary is from \$ 99 to \$117

Service level monthly salary is from \$ 20 to \$ 52

With this salary structure affecting all personnel, regardless of the source of funding, it is difficult to imagine that IRENA will have the ability to attract or retain qualified professional, technical, or even service workers. The high level of unemployment in the country might be one of the reasons that explains the permanency of these employees on their jobs. The other reason might be that corruption is so profitable, that the salaries are only nominal for some of the employees.

The technical staff working in field projects can compensate their level of income by the payment of per diem when they are away of their home base. This is not a regular source of income and represents a sacrifice by the employee.

There is an opportunity for IRENA to allocate some of its increased fee revenues (achieved by the improvement of its financial and administrative controls) to salary improvement, either in the form of "production bonuses" or performance recognition. This scheme will not only provide an incentive, but also can improve the efficiency in the collections of revenues.

IRENA currently has over 850 employees. Statutory responsibilities and anticipated long term funding levels suggests that a staff of approximately 100 persons in the Managua office and 250 in the regional offices would be optimum. This level of staffing will only be possible with the high level of skills and knowledge resulting from the proposed training and technical assistance program and some salary enhancements. In addition to these improvements in IRENA staffing, the use of local NGO's will also assist the institute in fulfilling its statutory responsibilities.

d. Physical Facilities

The physical facilities are very poor condition and in need of repair or replacement. Many offices have leaky roofs endangering office equipment and records. This also reduces productivity of dedicated staff. Files are kept in open piles and wooden cabinets that can easily burn. Cartographic maps of great archival value are kept in wooden files and there is only one employee with the knowledge of their location.

Office equipment in general is old and needs repair or renovation. The few computers available are donations from foreign assistance programs and are used principally for word processing. The offices of the Administrative Financial Division are scattered in two buildings, where they use two XT 8088 computers to generate reports and lists.

e. Performance

In practice, IRENA is unable to fulfill all its statutory responsibilities because of ineffective financial and management systems, a weak organizational structure, inadequate funding by the GON, and a lack of appropriate staff skills. Therefore, the institutional strengthening component of the NRM should be directed toward the following improvements, which apply to the regional and district offices as well as the central IRENA office in Managua.:

1. improvements in internal financial control,
2. improvements in administrative structure and performance,
3. finding new sources of revenue, and
4. improvements in operational efficiency.

11. Recommendations

Given IRENA's financial limitations, the quality of the human resources and the financial and administrative disorder, it is imperative to support the strengthening of these functions, to enable the institution to regain control of its operations and provide the basic financial and administrative data that will permit a better use of resources and effective decision making process. Without this basic foundation, no other effort in improving the institution will have an effective impact. Furthermore, this is the only process by which IRENA will qualify as a recipient of foreign assistance.

Phase I

To achieve this purpose, the NRM Project should focus on getting IRENA to overcome the problem, providing the necessary technical assistance for a limited and reasonable time and level of effort, and give the institution the chance to prove its ability to manage itself.

Recommended actions for rapidly improving IRENA's internal management are as follows:

1. Immediately bring the contracting, procurement, control and administrative capabilities of IRENA up to standards necessary to meet USAID fiscal requirements and regulations by
 - immediately bringing in technical assistance, through and IQC contract, to design and assist in implementation of systems and procedures that will ensure the integrity of the procurement and contracting process and the design and establishment of an accounting system with the necessary controls to meet generally accepted standards that are in compliance with USAID fiscal requirements and regulations and
 - completing the technical assistance activities within the first 6 months of the project.
2. Immediately improve the planning, budgeting, accounting, personnel management, data processing, management information compilation and analysis, and information control of IRENA by providing funds for
 - employing five Nicaraguan technical assistants who will constitute a "shadow administration" with line duties in their respective areas of expertise and will be in charge of the design and implementation of the new systems with the assistance of the IQC Contractor,

- retaining these five technical assistants for a period not to exceed the life of the project.
3. Within the first two years of the project, provide directly all the necessary computer hardware to achieve project purposes plus a software package to be determined by the IQC Contractor in consultation with IRENA and AID after a needs review.
 4. Within the first two years of the project, provide funds for all the necessary office equipment, office upgrading, communications equipment, and supplies to permit the adequate development of this phase of the Project.
 5. Within the first year of the project, provide funds for the rehabilitation of office space that will house the personnel, equipment and technical assistants.

Phase II

As quickly as IRENA brings its internal management capability up to standard, it can begin to focus on its capability to finance itself and carry out its statutory responsibilities more effectively. Recommended actions for rapidly improving IRENA's internal financing capability and fulfilling its statutory responsibilities are as follows:

1. During the second year of the project, begin funding the integration of the regional offices into the system by contracting technical assistants and trainers who will assist in the maintenance of financial control and responsibility at the regional and district level, through supervision, training and administrative procedures.
2. During the second year put the regional communications systems in place and mobilize regional staff with vehicles to increase regulatory performance, management performance and the collection of fees.
3. Beginning in the first year of the project improve employee skills and knowledge by:
 - providing funds for extensive on-site training including on-site presence of specialists in accounting, management information systems, forest patrol, fire fighting, and other needed skills working with 5 persons at a time over a 25 day period, in both the central office and in the field for up to 217 people spread over three years,

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- providing funds for six in-country seminars covering management, community relations, accounting, ecology, and other needed topics spread over three years,
 - providing funds for up to 8 external university degrees related to natural resources management at Central American institutions with 5 candidates beginning during the second project year, addition of 3 more candidates during the third project year, and completion of these 3 candidates during the fourth project year.

13. Project Goals

Phase I

The implementation of Phase I of the Project, will permit IRENA to gain control of institutional finances and to set up all the administrative procedures, that in turn will permit a knowledge of the real situation of the institution and the ability to implement the necessary changes to improve its overall management.

An appropriate organizational structure can then be developed, not only based on the mandates, but also the rational allocation of resources. This phase will also permit the training of a core of administrators, that eventually will be part of a qualified management team of the institution.

Phase II

This phase will incorporate the Regions as part of the management changes in the institution, begin to generate greater revenues to IRENA, and begin the implementation of IRENA's statutory responsibilities. The regions play a vital role in the survival of the institution because, with proper administrative and financial controls, they can provide increased revenues that can give IRENA the financial flexibility that it needs to implement its plans, projects and programs.

Finally, a capable financial and administrative structure will permit IRENA to secure assistance from the international community without constraints or delays.

The organigram in Annex II shows the organizational structure that the team preparing this project paper expects to be developed at the end of the NRM Project.

Annex D

FINANCIAL AND ECONOMIC ANALYSIS

1. Introduction

a. Terms of Reference

This report examines the financial and economic viability of NRM Project 524-0314 and follows the guidelines in AID Handbook, Chapter 3. The terms of reference for this component of the Project Paper are given in USAID PID for Nicaragua, dated February, 1991.

b. Scope and Organization of this Report

Section 2 presents a brief analysis of the economic situation in Nicaragua and its potential impact on the financial viability and sustainability of this project, as directed in the statement of work. Section 3 presents the rationale for the financial and economic analysis that follows. Section 4 explains and discusses each of the tables presented in section 6. The following data are presented in section 6:

- Budget Summary and Financial Plan by Component and Source
- Budget Summary and Financial Plan by Component and destination
- Budget Summary and Financial Plan by Input
- Budget for all Components in nine categories for four years
- Budget for each component by category for four years
- Financial analysis of institution strengthening component
- Financial analysis of training

Section 5 presents factors to be considered in performing economic analysis of the protected areas, and integrated pest management components.

2. Economic sustainability

a. Nicaraguan Economy

The GON sustained an average monthly negative cash flow balance of \$US18.7 million from February 1990 to February 1991. At the end of 1990 external debt exceeded \$9.7 billion (approximately \$2783/capita) with more than \$4 billion in arrears. Even if all external debt is forgiven, the balance of payments deficit is projected to be as much as \$415 million per year through the year 2000. (Source: Central Bank of Nicaragua)

b. Funding of IRENA

The GON has appropriated to IRENA \$US3.1 million for FY91. However, actual disbursements are as much as \$160,000 in arrears on a daily basis and there is no assurance that the entire \$US3.1 million will be disbursed by the end of FY91. Given the medium term economic situation for Nicaragua as described above, there is very little potential for increased GON appropriations to IRENA in the foreseeable future. This suggests that IRENA will have to generate a significant portion of its own revenues.

c. Financial Sustainability

To meet the natural resources management objectives of the GON and IRENA it will be necessary for IRENA to attain a higher level of financial self-sufficiency before the end of the century. The institutional strengthening component of this project places a high priority on converting IRENA into a more financially self-supporting institution by 1996. Without attaining this status, it is highly unlikely that other project components will be sustained after 1996 without continuous infusions of external grants and loans.

Moving IRENA towards financial self-sufficiency by 1996 will require major efforts in the following areas:

- improvements in internal financial control
- improvements in administrative performance
- finding new sources of revenue
- improvements in operational efficiency

3. Rational for Financial and Economic Analysis

a. Introduction

This project has four components: Institutional Strengthening, Protected Areas and Buffer Zones, Environmental Education, and Plant Protection. Streams of benefits from these components will occur in the future, and in some cases will continue to grow well beyond the the project endowment. For example, converting IRENA into a more self-sustaining and productive institution will have the secondary effect of improving natural resources utilization for the next century, the establishment and maintenance of protected areas and buffer zones will assure that future generations will benefit from biodiversity and other outputs, and improved pesticide management will increase the value of agricultural output and reduce the cost of human health care.

Standard procedures call for some combination of a net present value (NPV), internal rate of return (IRR) or a benefit-cost (B/C) analysis to help determine the desirability of a project. Benefits can fall into one or more of three categories: 1. private, 2. social or public, and 3. non-quantifiable. Where costs and benefits can be quantified and the benefits are private, the NPV and IRR approach is appropriate. Where the costs and benefits are social or public, the NPV and B/C approach is appropriate. Where the costs and/or benefits are non-quantifiable, some compromises must be made in the analysis. For example, if costs are quantifiable it may be possible to do a least cost analysis to obtain some political or social goal. In other cases, very rough estimates of costs or benefits can be made and a sensitivity analysis performed to indicate marginal feasibility of the project.

The NRM project concentrates on setting the stage for producing financial and economic benefits in the future, i.e. "second tier" results. For example, institutional strengthening will result in improved administration and new policies for natural resource use and management, the "first tier". The improved administration, and the new policies will put in place new management practices that may generate measurable benefits, the "second tier". Therefore, NPV, IRR or B/C analysis is difficult at best for most of the components of the NRM project.

Nevertheless, in anticipation of these measurable second tier benefits, it is desirable to have a plan to begin measuring the benefits as well as the costs of specific project components in the future. The appropriate approaches are discussed for each component below.

b. Institutional Strengthening

While the four components of the NRM 534-0314 project lend themselves to all three types of analysis, the ability to quantify costs, and especially benefits is quite limited. First, with regard to the institutional strengthening component, there has been no experience with

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comparable activity in Nicaragua, and only recently in other parts of Central America. For example, the RENARM project (596-0150) is strengthening two academic institutions in Central America, and the Maya Biosphere Project (520-0395) is strengthening Guatemalan protected areas agencies. The former was initiated in 1989 and the latter in 1990.

Therefore, there is no attempt to project the financial or economic benefits resulting from improved IRENA natural resources policy making, policy implementation, regulation and management. On the other hand, the administrative and management strengthening of IRENA as an institution is expected to produce increased retention and collection of natural resource user fees. This lends itself to an NPV, which is provided.

c. Protected Areas and Buffer Zones

Protected areas analysis has been the subject of several other USAID funded projects in Central America and the Caribbean (See 520-0395 and 532-0148). In both cases the outputs of protected areas were sufficiently specified to permit some financial and economic analysis. In the case of Jamaican PARC project (532-0148) a B/C analysis was used resulting in a ratio of 1.8. For the Maya Biosphere project (520-0395) sample inputs and outputs are illustrated and a prescription for future B/C analysis if given, assuming that the outputs can be better measured in the future.

Both of these projects represent protected areas with some developed infrastructure and market based utilization, lending themselves to output quantification. The three protected areas included in this project (Mosquito keys, Bosawas and Chacocente) are currently utilized primarily for firewood gathering and artisinal exploitation of wildlife. Unfortunately, there are no domestic data showing the quantities being utilized and market values for these protected areas products are either non-existent or unreliable.

Studies of fuelwood gathering in the Philippines (Dixon, J.A. and E.L. Hyman) used the opportunity cost of adult and child labor to estimate the shadow price of fuelwood (approximately \$17/cubic meter). While the opportunity cost of labor is probably as low in Nicaragua as in the Philippines, there are enough differences in wood quality and travel distances to disqualify this figure as a proxy for Nicaragua.

Therefore, because of inadequate data, the economic analysis of the protected areas and buffer zones component of this project consists of recommendations for future data gathering and analysis.

d. Environmental Education

The environmental education component of this project supports a portion of the development of an environmental education program. It does not describe nor prescribe an environmental education program. Since a financial and economic analysis must be based upon some foreseeable costs and outputs, such analysis is not possible for this component. Nevertheless, some suggestions are made for financial and economic analysis, if and when environmental education is initiated in Nicaragua.

e. Plant Protection

The plant protection component includes a wide range of actions to reduce the use of harmful pesticides in Nicaragua. While general benefits of these actions are described, there has been very little quantification of these benefits. Existing evidence suggests that producers could switch to integrated pest management at the same, or slightly higher pest control cost without sacrificing yields and there is sufficient anecdotal evidence to demonstrate that the benefits will more than offset the possible increased production cost incurred by the producer. The financial and economic analysis of the plant protection component will outline important considerations in conducting future analysis.

4. Explanation of Tables

a. Budget Summaries and Financial Plans

The NRM project provides for technical assistance, training, policy analysis, equipment purchases, materials and supplies, consultants, administrative support, evaluations, audits, and NGO support. The grand total cost of the NRM project is \$9 million. The PID approval cable authorized a total of \$9 million to begin in 1991 and to be completed in 1998. For various reasons explained elsewhere in this paper, the total \$9 million is disbursed over four years with the majority in the first two years (27.9 and 33.5 percent).

The Swedish International Development Agency (SIDA) will be complimenting the NRM project by providing approximately \$US26 million to a forestry sector project (CORFOP) during 1992-1994. Not all of SIDA's expenditures relate to the four components of the NRM project (i.e. the Campesino forestry program, SI-A-PAZ, and watershed recovery). However the SIDA project will contribute to improved forest practices on the Atlantic slope and will strengthen the planning and forestry management components of IRENA. The role of SIDA has been taken into consideration in programming USAID funds.

There are five financial summary tables. Table 10 shows disbursements for all project components by major disbursement category spread over four years. Percentage

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allocations among the 7 major disbursement categories are also provided. Personnel costs in the form of technical assistance and consultants comprise the largest percentage (28.2) with commodities the second largest (21.0). Commodities are comprised principally of equipment necessary to improve the performance of IRENA and the protection of the Miskito Cays, Bosawas and Chacocente areas.

Table 11 shows disbursements by major category for each of the four project components, spread over four years. It also includes percentage allocations within components and among components. The protected areas and buffer zones component utilizes 44.4 percent and the institutional strengthening component 35.6 percent of the total \$9 million.

Table 12 shows disbursements in local currency and US dollars by component and disbursement category as well as the counterpart contributions. Given the cash shortfall of counterpart institutions, their contributions will be in personnel dedicated to specific aspects of the institutional strengthening, environmental education and plant protection components. Approximately 15 percent of the \$9.09 million (including counterpart contributions) will be disbursed in local currency, mostly for local services and supplies.

Table 13 illustrates the allocations of the \$9 million to categories of outputs. The allocations to the protected area and buffer zone components (specifically the Miskito Cays and Bosawas) are illustrative only since this work will be based upon unsolicited proposals received by USAID.

The budget summary by destination of funds (Table 14) shows amounts destined to IRENA (45.9 percent for institutional strengthening, Chacocente protected area and environmental education), to PACA (29.9 percent for the Bosawas protected area), to CCC (12.7 percent for the Miskito Cays protected area and to MAG (11.5 for plant protection).

b. Institutional Strengthening Budget

The institutional strengthening budget allocates \$1176.9K (36.7%) to technical assistance, \$1110.2K (34.6%) to training, and \$832.3K (26.0%) to commodities such as computing support and field vehicles. The budgeted activities for institution strengthening include an IQC Contractor to complete work in the first six months, and five technical assistants to bring IRENA administrative systems up to standard, plus equipment and facilities to support these activities. While policy analysis is treated as a sub-component in this paper, the budget is included under institutional strengthening. However, it is shown under its own heading with a sub total (\$634.3K).

Contingencies (8%) and inflation (7.5%) have been incorporated into the line items of the table. This compounds the amounts over the four years, however, this is offset by the front loading of expenditures.

The training, plus communications equipment, vehicles, and office equipment purchased during the second year will improve field operations and help generate new revenues for IRENA's future operations. The policy making and implementation capacity of IRENA will be improved with technical assistants, training and office support of this important function.

A major consideration in the institutional strengthening component is increasing the financial self-sufficiency of IRENA so that it can carry out natural resource management and educational programs in the future, in spite of the economic and financial distress of the GON. The budgeted activities for institution strengthening include an IQC Contractor to design and implement systems and procedures, the hiring and support of five local consultants, all the adequate, necessary and reasonable computer hardware and software, all the necessary office equipment, communications equipment, supplies, the rehabilitation of office space, field vehicles and the integration of the regional offices into the system.

More specifically the budget and financial plan for institutional strengthening specifies 6 person months (PMs) for an accounting systems specialist, 2 for a budget specialist, 1 for a systems specialist, 3 for a personnel specialist and 3 for an administrative specialist. The budget also includes the daily support while in Managua (per diem) and 5 round trips to Managua. Technical assistants include the continuation of the current controller (currently supported by SIDA) for another 42 months at \$3,500 per month, the addition of an accountant for 48 months at \$1,500 per month, the addition of a budgeting specialist for 48 months at \$1,000 per month, the addition of a personnel specialist for 48 months at \$1,500 per month and finally the addition of a systems specialist for 48 months at \$1,500 per month.

The hardware, software and office equipment purchased during the first year will support these technical assistants as well as compliment the meagre resources of existing staff. Office and Communications equipment purchased during the second year will support the regional and district staff as they improve their management and accounting functions in the field. The two cars purchased during the first year will provide transportation for the technical assistants between the Managua office and the regional offices. The vehicles purchased in the second year will increase the visibility of, enforcement from and communication between each of the regional offices.

c. Protected Areas and Buffer Zones Budget

The protected areas and buffer zones budget combines NGO activities in the Miskito Cays and Bosawas areas with major expenditures in the first two components. The

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Chacocente area will be covered by IRENA. Expenditures for the Bosawas component will begin in the first year and for the Bosawas and Chacocente in the second year. Major expenditure categories include technical assistance (\$1103.2K, 27.6%), commodities (\$963.2K, 24.1%), and operations (\$809.2K, 20.2%). This component comprises 44.4% of the NRM project budget.

Four tables show the budget and plan over four years for each of the protected areas and for all three areas combined. Inflation and contingencies have been incorporated into the table line items. Only two of the NGOs include indirect costs in their proposals.

d. Environmental Education Budget

The environmental education budget allocates 49 percent to special studies, 23.6 percent to operations, and 16.2 percent to commodities beginning in the second year of the project. This component comprises only 5.5% of the NRM project and will be administered by IRENA.

f. Plant Protection Budget

The plant protection budget distributes the \$1 million (11.1% of the NRM project budget) in expenditures over the first three years of the project. The majority of the expenditures for establishing the pest control technical assistance service are in the first year under the assumption that this program will be maintained with other funding in the future. Research grants to domestic institutions (28%) are evenly distributed over the three years since there are no Nicaraguan institutions capable of efficiently absorbing large amounts of research grants at this time.

In the same manner, the training expenditures (20%) are also spread evenly over the three years to maximize the natural distribution of information between training programs and to improve the likelihood that the most trainable persons will be found for each program. Equipment purchases and the pesticide monitoring services will be funded in the first year of this project to provide a sound basis for future activities.

Contingencies and inflation are distributed to each line item in the table. MAG will be the administrator of this component.

g. Financial analysis of Institution Strengthening

At the end of this project the institutional strengthening component will have produced a step increase in the annual internally generated revenue stream from three sources. These

increased revenue streams will begin in 1996 at the end of the NRM institutional strengthening activities and will continue for five to fifteen years. While the improvements put in place during the institutional strengthening component of this project will begin to degrade immediately at the end of 1996, the improved quality of staff resulting from the intensive training program should sustain the revenue flows until staff turnover and individual entrepreneurship offsets the revenue benefits gained.

The time over which this degrading takes place is difficult to predict under the present uncertain conditions in the country. Therefore, a range of time horizons are presented in the analysis. At that time a new investment in institutional strengthening will be needed to maintain this stream.

The annual revenue stream increase for each scenario is assumed to be level for various time horizons extending from the end of this project (1996). This stream of increased revenue which begins in 1996 is discounted back to 1996 using a discount rates from 8.26% (the 5/29/91 U.S. government bond yield) to 10%. and is compared with the project investment in institutional strengthening up to that point.

The projected project investment that will contribute directly to increased IRENA revenues in the future is estimated to be \$1.894 million and includes all equipment and supplies to support field personnel, and a portion of the technical assistance, in-country training.

Interviews with central IRENA administration as well as regional supervisors suggest that under the best of conditions current revenues could be doubled through better "policing" of current fee generating uses (improved collections). This improved policing is an anticipated result of skills training, the addition of vehicles and communications equipment. In addition, improved internal financial control could reduce internal "leakages" of as much as 50% (improved retention).

Finally, increased incentives and operational procedures are expected to yield new revenue generating activities amounting to as much as \$50,000 per year (new collections). For example, a rehabilitated technical information service could sell services to other government agencies and the private natural resource extraction sector. Also fees could be charged for eco-tourism and for pasturing animals. There is also an opportunity to gradually increase current fees as long as this results in increased revenues.

Results indicate that only the optimistic scenarios will produce positive benefits under all different years and discount rate assumptions. The most likely scenario produces positive benefits when the stream of revenues is realized for more than 7 years and the discount rate is under 10 percent. No positive results are obtained under the pessimistic scenario.

Results might have been slightly different if revenues and costs had been discounted back to the present. However, not enough was known about the annual flows of costs and

revenues during the period of the project to accomplish this analysis. Furthermore, choosing various institutional strengthening costs as those that would contribute to increased is somewhat difficult. In the budget distributions to output table, only \$640.2k is distributed to the output titled "internal IRENA revenues generated for stability". The use of this more conservative figure would clearly make even the most pessimistic scenario yield positive results.

h. Financial Analysis of Training

Three scenarios are presented ranging from emphasis on short-term skill development to longer term professional development. While the PID suggested the longer term approach, IRENA is in a short term crisis and needs a rapid upgrading of personnel skills. The short term scenario assumes that a 217 employees would receive some intensive skills development over a three year period, 120 would receive more extensive training and 3 could receive two year licencias or professional training outside Nicaragua. The long term scenario would support the professional training of 12 persons and skills development of 247.

The extensive on-site training requires on-site presence of specialists in accounting, management information systems, forest patrol, fire fighting, and other needed skills working with 5 persons at a time over a 25 day period, in both the central office and in the field. These specialists would instruct, supervise, oversee and practice with 5 IRENA staff at their own place of work during the 25 day period. For the medium term scenario, a total of 12 of these training exercises would be completed in the first and second year of the project and 9 in the third year.

Two in-country 5 day seminars would be provided in each of the second, third and fourth years accomodating 20 persons in each seminar. Seminar topics for the second and third year would focus on the institutional strengthening needs of IRENA and during the fourth year on field operations.

The external degree program would require the selection of 3, 8 or 12 candidates with the majority beginning their programs in the first project year. The institutional strengthening budget assumes that the medium term scenario will be appropriate. Therefore, 8 degree candidates will be supported with 5 beginning their programs in the second project year, 3 in the third project year and all completing by the end of the fourth project year. Candidate selection should be based upon academic qualifications, previous job performance and potential for returning to IRENA in the future. Because of the urgent training needs for IRENA staff, these should be 2 year degrees at a maximum and should be taken in a Central American or Mexican institution. This will eliminate the English language requirement and increase the probability of repatriation upon completion of the degree program.

The choice between the short, medium or long term plan will depend in large part upon the trainability of current employees. It may not be possible to find 12 (or even 3) current employees that could take full advantage of the professional training opportunity or to find 217 employees that could fully benefit from the extensive on-site training.

5. Suggestions for Future Financial and Economic Analysis

a. Protected Areas and buffer Zones

The difficulties in developing financial and economic analysis of protected areas and buffer zones were outlined in section 3 above. The methods of NPV, IRR and B/C are well known and have been used extensively for parks, protected areas and natural resource uses that do not reveal true market values. The principal lesson of this work is the importance of quantifying inputs and outputs early in the establishment of the park or protected area and throughout the existence of the project.

This undertaking is made easier with a more complete understanding of the potential benefits and costs of the project. In the case of the Mosquito Keys, the Bosawas and Chocacente the following outputs (and more) may be realized and have the potential for quantification over time:

- Recreation and tourism- revenues received by recreation and tourism enterprises near the projects, expenditures made by visitors, time spent on various activities by visitors and travel distances to the project.
- Watershed protection- water runoff rates and siltation in downstream areas, water runoff variability over time and average flood levels at downstream sites.
- Ecological processes- periodic sampling and measuring of the of soil nutrients, soil depth, soil texture and composition, particulates in the air, suspended matter in water, turtle populations (Chocacente), firewood production (Bosawas), and lobster propagation (Mosquito Keys).
- Biodiversity- number of different species and number of new species.
- Education and Research- number of school visits, number of independently funded research projects, and number of published articles.
- Consumptive benefits- value of firewood harvested, value of lumber harvested, value of animal products harvested, value of fishery products harvested, and value of irrigation water collected.

- **Nonconsumptive values-** community stability, social stability, cultural enhancement, and literature and art produced.
- **Future values-** area of comparable protected areas in the world, and number of areas with comparable ecological mixes.

Monitoring only a small fraction of the above items of the three protected areas will provide extremely valuable data for measuring the financial and economic benefits in the future. Likewise an accounting of the direct costs, the indirect costs and the opportunity costs of establishing and maintaining the three protected areas will provide the necessary data for performing the NPV, IRR, and B/C analysis in the future.

Direct costs are any direct budget outlays (such as that proposed in the protected areas and buffer zone component of this NRM project) that can be attributed to the development and maintenance of the protected areas. Continuing direct costs might include a portion of the NGO and IRENA administrative and overhead costs, as well as required research and training. Important for the Mosquito Keys and the Bosawas are the costs of resettlement outside the protected areas and the buffer zones, costs of alternative fuel sources and any other incentives necessary for reducing the destruction of these two areas, and to a certain extent the Chocacente.

Indirect costs may include any damages to persons, crops, homes, etc. caused by the development and maintenance of the protected areas. For example, malaria bearing mosquito populations may increase causing an increase in medical costs for surrounding residents, or wild foraging or rooting mammals may increase causing damage to domestic crops. The cost of protecting against this damage or the cost of the damage itself must be included in the cost calculations and therefore require monitoring and quantification.

The opportunity costs of the three protected areas include the reduction in current harvests of wood and animal products as well as the increased damage to fragile agricultural lands outside the protected areas due to population concentration. The loss of agricultural production from potential new land clearing is another opportunity cost that must be added to the damage to surrounding agricultural lands.

The various considerations in compiling and using the above data, the technical methods for computing NPV, IRR and/or B/C and the interpretation of results are beyond the scope of this analysis. Excellent guidance can be found in manuscripts such as J.A. Dixon and P.B. Sherman, "Economics of Protected Areas", The East-Center, Island Press, Washington, D.C.

b. Environmental Education

The financial analysis of training presented in section 5 could also be applied to environmental education as soon as the appropriate data are available. There are several scenarios that could be analyzed. One scenario which could be labeled "the general public scenario" places more priority on a broad understanding of natural resources and conservation. The "mixed scenario" and the "targeted scenario" places more emphasis on improved resource use by those living near protected areas, by commercial exploiters of natural resources and those living in or near forested areas. The latter has more potential for contributing to increased IRENA revenues in the short run and producing more visible short term results in actual natural resource use.

c. Plant Protection

The costs of implementing pesticide management program which includes all the elements described under this component includes the training, testing, research, regulation and administration as well as the increased production costs to the farmer (if any). Much of the cost would be represented by an up front investment in facilities, training, administrative structure and policy development. This would occur within the first 3 or 4 years of the program. However, the increased agricultural production costs and regular monitoring and training costs would continue into the indefinite future.

All costs except increased production costs are relatively easy to quantify. Much of this data is found in the budgets for Plant Protection. However, there is no clear evidence that producers could reduce chemical pesticide use at the same, or lower pest control cost and maintain current yields. Field trials, or sampling of producers over several years would be necessary to determine the cost impacts of changes in pesticide control practices. Further, it may be possible that pests would build up resistance to the new pest control methods in the future requiring an increase in control and costs to maintain yields, or resulting in a yield reduction. Such a possibility suggests long term research.

A 1983-85 project in Honduras revealed clear economic advantages from reduced production costs and increased bean yields when integrated pest management was substituted for traditional chemical approaches (Impacto Economico de Practicas Culturales y Quimicas en el Control de la Babosa del Frijol en Honduras). While not as well quantified, other benefits are relatively easy to identify. First there are direct benefits to the producer. Pesticide free food products have access to an expanded international market. For example the U.S., Japanese and European markets set rigid standards for food product pesticide content. Producers that can meet these standards receive higher product prices and the potential for increased export sales. Producers also benefit from a potentially wider range of exportable products which may reduce their economic risk. One approach to integrated pest

management is the implementation of polyculture, further contributing to a reduction in economic risk.

Benefits to the producing nation (Nicaragua) include improved balance of payments resulting from the increased agricultural exports. Also, health care costs are decreased and expected productive life of farm workers is increased with a reduction in pesticide use and improved handling practices. Finally, there is a clear if not quantifiable health benefit from reduced pesticide use in the environment. Consumers of pesticide contaminated products incur higher health care costs and live shorter lives. Reductions in soil and water pesticide contamination reduces water treatment costs and improves the health of those using or in contact with contaminated soil and water.

A B/C analysis incorporating these elements would show the present value of the stream of private and public benefits in comparison to the present value of the private and public costs. While the benefits may accrue into the indefinite future, the discounting period will be realistically effected by changes in production technology, cropping patterns and social structures. For example, hybridization of new crops may eliminate the need for any pest control practice within 5 years cutting short the potential benefits of the up-front investment in the plant protection project. Also, changes in consumer tastes and preferences may make current products uneconomic regardless of pest control practices, again cutting short the potential benefits of the up-front investment.

6. Tables

Table 1
Budget for Institutional Strengthening
 (Costs are shown in thousands of US dollars)

	No.	Year 1 <u>Cost</u>	Year 2 <u>Cost</u>	Year 3 <u>Cost</u>	Year 4 <u>Cost</u>	Total
Constutants through IQC firm						
Accounting System Specialist	6 PM	36.0				36.0
Budget System Specialist	2 PM	8.0				8.0
Systems specialist	1 PM	6.0				6.0
Personnel sepcialist	3 PM	12.0				12.0
Admin. specialst	3 PM	12.0				12.0
Indirect labor costs		125.8				295.8
Per Diem 455 da at \$166/da		75.5				75.5
Airfares US-Managua-US	4 RT	<u>3.0</u>				<u>3.0</u>
Subtotal, expatriate T.A.		<u>278.3</u>				<u>278.3</u>
Local-hire personnel						
Controller	42 PM	21.0	52.4	54.3	56.4	184.1
Accountant	48 PM	18.0	22.5	23.3	24.2	88.0
Budget specialist	48 PM	18.0	22.5	23.3	24.2	88.0
Personnel specialist	48 PM	18.0	22.5	23.3	24.2	88.0
Systems sepcialist	48 PM	<u>18.0</u>	<u>22.5</u>	<u>23.3</u>	<u>24.2</u>	<u>88.0</u>
Subtotal, local-hire personnel		93.0	142.4	147.5	153.2	536.1
Computer hardware						
IBM PS/80 w/server	1	7.0				7.0
IBM 30G31 @ 1.8	2	3.6				3.6
IBM terminals	5	3.0				3.0
HP laser printer	1	1.3				1.3
IBM proprinters	2	0.8				0.8
UPS	1	5.0				5.0
Voltage stabilizer	1	3.0				3.0
Tape back-up	1	4.0				4.0
IBM PS/1	11		12.0			12.0
Bynormal modem	1		1.0			1.0
Scanner	1		<u>1.0</u>			<u>1.0</u>
Subtotal, computer hardware		<u>27.7</u>	<u>14.0</u>	0.0	0.0	<u>41.7</u>
Software						
1 Accounting package		11.0				11.0
1 LAN for 16 users		3.2				3.2
1 desktop publishing		<u>0.6</u>				<u>0.6</u>
Subtotal, computer software		14.8				14.8

Table 1, continued

	No.	Year 1 Cost	Year 2 Cost	Year 3 Cost	Year 4 Cost	Total
Office equipment						
Copier	1	10.3				10.3
Facsimile machine	1	1.8				1.8
desks	12	6.8				6.8
Desk chairs	12	3.4				3.4
File cabinets	4	1.4				1.4
Calculators	12	4.1				4.1
Occasional chairs	12	2.7				2.7
Manual typewriters	45		17.5			17.5
File cabinets	45		11.6			11.6
Subtotal, office equipment		30.5	29.1			59.6
Office supplies						
Computer Paper		1.1	1.3	1.4	1.6	5.4
Printer supplies		1.1	1.3	1.4	1.5	5.3
Staplers, pencils, etc.		1.4	1.3	1.0	1.0	4.7
Equipment service		4.6	5.2	5.4	5.8	21.0
Subtotal, office supplies		8.2	9.1	9.2	9.9	36.4
Communications equipment						
PBX with 20 extensions	1	10.0				10.0
Radio Base station						
/45 portable units	1		34.0			34.0
Antenna for base	1		1.0			1.0
TECOR antenna use fee	1		0.5			0.5
Subtotal for comm.equipment		10.0	35.5			45.5
Vehicles						
4X4 diesel cars	2	40.0				40.0
4X4 diesel cars	16	0.0	320			320.0
125cc trailbikes	30	46.0	8.0			54.0
Subtotal, vehicles		86.0	328.0	0.0	0.0	414.0
Office rehabilitation		35.0				35.0
Training						
On-site training		205.4	232.7	176.0		614.1
Seminars	6		25.9	25.0	26.8	77.7
External degrees			97.0	149.8	60.4	307.2
Subtotal, training		205.4	355.6	350.8	87.2	999.0

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Table 1, continued

	No.	<u>Year 1 Cost</u>	<u>Year 2 Cost</u>	<u>Year 3 Cost</u>	<u>Year 4 Cost</u>	<u>Total</u>
Policy Analysis						
Technical Assistance						
PMs Internat. Splsts.	36	205.4	46.5			251.9
PMs Domest. Splsts.	18	38.8	12.9			51.7
Travel and perdiem		43.4	15.5			58.9
Training						
Short Courses @ 15	6	47.1	44.9			92.0
Seminars @ 2	8	11.4	7.8			19.0
Equipment						
386 model computers	4	18.3				18.3
Dot matrix printers	4	2.3				2.3
Photocopiers	2	5.7	6.5			12.2
Operations						
Computer software		3.4	2.6	2.5		8.5
Computer supplies		4.6	2.6	2.0	1.0	10.2
Photoc supplies		1.4	1.6	1.2	1.1	5.3
Equipment maintenance		3.4	3.9	3.7	4.0	15.0
Publications		5.7	6.5	6.2		18.4
Local travel		4.6	3.9	2.5	2.0	13.0
Misc supplies		8.8	8.9	3.7	2.2	23.6
Operating expenses		<u>14.8</u>	<u>16.5</u>	<u>2.5</u>		<u>33.8</u>
Subtotal, other costs		<u>419.1</u>	<u>180.6</u>	<u>24.3</u>	<u>10.3</u>	<u>634.3</u>
Freight & insurance CIF to Cabezas		<u>34.1</u>	<u>75.5</u>	<u>0.0</u>	<u>0.0</u>	<u>109.6</u>
Grand Total		<u>1242.6</u>	<u>1169.8</u>	<u>531.8</u>	<u>260.6</u>	<u>3204.8</u>

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Table 2

Budget and Plan for Bosawas Protected Area

(Costs are shown in thousands of US dollars)

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Total</u>	<u>Percent</u>
Personnel	105.0	115.0	125.0	135.0	480.0	18
Technical Assitance	55.0	59.1	63.5	23.1	200.7	8
Travel & per diem	62.0	84.0	43.0	46.2	235.2	9
Training	58.0	82.0	43.0	46.2	229.2	9
Vehicles	147.0		113.0		260.0	10
Equipment	145.0	90.0	96.0	111.0	442.0	17
Office & Furnishings	60.0	15.0	16.1	17.3	108.4	4
Supplies & opering	65.0	80.0	86.0	92.5	323.5	12
Special studies	45.0	25.0	27.0	33.0	130.0	5
Sub total	742.0	550.1	612.6	504.3	2,409.0	93
NGO indirect	59.4	44.0	49.0	40.3	192.7	7
Grand Total	801.4	594.1	661.6	544.6	2,601.7	100

Table 3

Budget and Plan for Miskito Cays Protected Area

(Costs are shown in thousands of US dollars)

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Total</u>	<u>Percent</u>
Personnel		51.6	55.5	60.0	167.1	15
Technical Assitance		50.0	60.0	60.0	170.0	15
Travel & per diem		72.0	36.0	40.0	148.0	13
Training		24.0	12.0	8.0	44.0	4
Vehicles		27.0			27.0	2
Equipment		12.0	6.0	6.0	24.0	2
Office & furnishings		4.5	4.9	5.2	14.6	1
Supplies & operating		10.0	10.7	11.5	32.2	3
Special studies		80.0	86.0	92.5	258.5	23
Sub total		331.1	271.1	283.2	885.4	80
NGO indirect costs		82.8	67.8	70.8	221.4	20
Grand Total		413.9	338.9	354.0	1,106.8	100

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Table 4
Budget and Plan for Chacocente Protected Area
 (Costs are shown in thousands of US dollars)

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Total</u>	<u>Percent</u>
Personnel		14.8	16.0	17.1	47.9	16.7
Technical Assit.		11.6	12.5	13.4	37.5	13.0
Travel & per diem		22.8	4.2	4.5	31.5	11.0
Training		10.8	11.6		22.4	7.8
Vehicles		29.0	2.9		31.9	11.1
Equipment		28.2	3.5	3.7	35.4	12.3
Office & furnish		15.1	2.3	2.5	19.9	6.9
Supplies & oper		12.0	12.9	13.9	38.8	13.5
Special studies		16.1		6.2	22.3	7.8
Grand total		160.4	65.9	61.3	287.6	100.0

Table 5
Budget Detail for Chacocente Wildlife Refuge
 (Costs are shown in thousands of US dollars)

Personnel				
Extensionist @ 450/m*12		5.4	5.4	5.4
Two Asst. 2 x 350/m x 12		8.4	8.4	8.4
	=====	=====	=====	=====
		13.8	13.8	13.8
Technical assistance				
Sociologist @120/d x 30d/yr		3.6	3.6	3.6
Extension Spec @120/d x 60d/yr		7.2	7.2	7.2
	=====	=====	=====	=====
		10.8	10.8	10.8
Travel + per diem				
R/T Costa Rica @200 x 6		1.2		
per diem @ 45/d x 80d/y		3.6	3.6	3.6
per diem, CR 6 x 120 x 14		10.8		
r/t, per diem @ Bosawas		5.6		
	=====	=====	=====	=====
		21.2	3.6	3.6
Training				
Trip to Bosawas		4.0	4.0	
Trip to Tortugero/Santa Rosa		5.0	5.0	
In-service		1.0	1.0	
	=====	=====	=====	=====
		10.0	10.0	
Vehicles				
4-wd pickup		24.5		
motorcycle		2.5	2.5	
	=====	=====	=====	=====
		27.0	2.5	

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(Table 5, continued)

Equipment				
Field gear @600 x 8		4.8		
Radio and portable		5.0		
Pump (windpower)		4.0		
Tubing		2.4		
Solar panels & charger		3.0		
Misc	—	7.0	3.0	3.0
		<u>26.2</u>	<u>3.0</u>	<u>3.0</u>
Office and furnishings				
Renovations		12.0		
Furniture		1.0	1.0	1.0
Laboratory	—	1.0	1.0	1.0
		<u>14.0</u>	<u>2.0</u>	<u>2.0</u>
Supplies and operations				
fuel: vehicle and generator		3.0	3.0	3.0
office, film, etc		1.0	1.0	1.0
food allowance		7.0	7.0	7.0
field (batteries, bulbs)	—	0.2	0.2	0.2
		<u>11.2</u>	<u>11.2</u>	<u>11.2</u>
Studies and Contracts				
socio-economic study		10.0		
boundary marking	—	5.0	—	5.0
		<u>15.0</u>	<u>—</u>	<u>5.0</u>

Note: Table 4 reflects these budget items plus inflation (7.5%).

Table 6
Budget and Plan for all Protected Areas
(Costs are shown in thousands of US dollars)

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Total</u>	<u>Percent</u>
Personnel	105.0	181.4	196.5	212.1	695.0	17
Technical Assistance	55.0	120.7	136.0	96.5	408.2	10
Travel & per diem	62.0	178.8	83.2	90.7	414.7	10
Training	58.0	116.8	66.6	54.2	295.6	7
Vehicles	147.0	56.0	115.9		318.9	8
Equipment	145.0	130.2	105.5	120.7	501.4	13
Office & furnishings	60.0	34.6	23.3	25.0	142.9	4
Supplies & operating	65.0	102.0	109.6	117.9	394.5	10
Special studies	45.0	121.1	113.0	131.7	410.8	10
Sub total	<u>742.0</u>	<u>1041.6</u>	<u>949.6</u>	<u>848.8</u>	<u>3,582.0</u>	<u>90</u>
NGO indirect costs	<u>59.4</u>	<u>126.8</u>	<u>116.8</u>	<u>111.1</u>	<u>414.1</u>	<u>10</u>
Grand Total	<u>787.0</u>	<u>1,162.7</u>	<u>1,062.6</u>	<u>980.5</u>	<u>3,992.8</u>	<u>100</u>

Table 7
Budget and Plan for Environmental Education
 (Costs are shown in thousands of US dollars)

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Total</u>	<u>Percent</u>
Personnel		8.3	8.9	9.6	26.8	5
Technical Assistance		7.0	4.9	2.8	14.7	3
Travel & per diem		40.0	24.7	21.7	86.4	17
Training		10.5		3.5	14.0	3
Vehicles		48.0			48.0	10
Equipment		27.0			27.0	5
Office & Furnishings		5.0	0.5	0.6	6.1	1
Supplies & operating		16.0	7.5	8.1	31.6	6
Special studies		<u>104.0</u>	<u>67.7</u>	<u>72.8</u>	<u>244.5</u>	<u>49</u>
Sub Total		265.8	114.2	119.1	499.1	100

Table 8

Budget Detail for Environmental Education

(Costs are shown in thousands of US dollars)

Budget Item (calculation notes)	#	Year Two	Year Three	Year Four
Personnel				
Trainer @ 240/m	1	3.1	3.1	3.1
Educator @ 200/m	2	5.2	5.2	5.2
		-----	-----	-----
		8.3	8.3	8.3
Technical assistance				
EE Trainer @ 240/d		4.8	2.4	2.4
Media Specialist @ 220/d		2.2	2.2	
		-----	-----	-----
		7.0	4.6	2.4
Travel and per diem				
International, 1200/week pd 5 r/t		8.0	6.0	1.8
National, 45/d		2.0	2.0	2.0
Participants, 45/d		30.0	15.0	15.0
		-----	-----	-----
		40.0	23.0	18.8
Training				
EE Concepts & Techs		3.0		
Strategy Workshop		2.5		
Training of Trainers		3.0		
Evaluation Workshop				3.0
Computer training		2.0		
		-----	-----	-----
		10.5		3.0
Vehicles				
4-WD pickup, diesel, dbl cab 2		48.0		
		-----	-----	-----
		48.0		
Equipment				
Projectors, screens	3	1.8		
Generators	2	1.0		
VCR's and monitors	3	2.7		
Hi-R video camera	1	3.5		
Desk-top publishing equip		12.0		
SLR cameras and lenses	2	6.0		
		-----	-----	-----
		27.0		
Office & furnishings				
Furniture		2.0	5.0	5.0
Renovation		3.0		
		-----	-----	-----
		5.0	5.0	5.0

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(Table 8, continued)

Supplies & operating expenses			
Vehicle operations	3.0	3.0	3.0
Office operations	1.0	1.0	1.0
Film & video supplies	12.0	3.0	3.0
	=====	=====	=====
	16.0	7.0	7.0
Special studies and contracts			
Media study	12.0		
Reproduction of reports	20.0	15.0	15.0
School Visitation study	12.0		
Didactic materials	36.0	24.0	24.0
Bus transport	24.0	24.0	24.0
	=====	=====	=====
	104.0	63.0	63.0

Note: Table 7 reflects these budget items plus inflation (7.5%).

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Table 9

Budget and Plan for Plant Protection

(Costs are shown in thousands of US dollars)

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Total</u>	<u>Percent</u>
Pest Control Tech. Asst. Service						47
Personnel	76.0	69.8	74.9		220.7	
Transportation	62.5	64.0	62.4		188.9	
Printed Material	32.6	23.3			55.9	
Basic and Applied Research Service						28
15 Research Grants	86.9	93.1	99.6		279.6	
Training Service						20
Seminars	37.6	28.3	31.8		97.7	
Workshops	43.4	34.9	25.0		103.3	
Pesticide Registration Service						0
386 Computer	2.5				2.5	
Dot Matrix Printer	0.5				0.5	
Pesticide Monitoring Service						2
Medica	10.0				10.0	
Pesticide Residues	10.0	5.0			15.0	
Pesticide Information Unit						2
Office Equipment	5.4				5.4	
Facsimile Machine	2.2				2.2	
Office Supplies	6.5	4.7	5.0		16.2	
Freight and Insurance						0
CIF Pto. Cabezas	<u>2.1</u>				<u>2.1</u>	
Grand total	378.2	323.1	298.7		1,000.0	100

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Table 10
Budget Summary and Plan by Category
 (Costs are shown in thousands of US dollars)

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Total</u>	<u>Percent</u>
Technical assistance	894.9	604.5	568.7	474.2	2,542.3	28
Training	402.9	598.8	474.2	144.9	1,620.8	18
Studies	131.9	318.2	280.3	204.5	934.9	10
Operations	280.2	467.0	304.8	246.6	1,298.6	14
Commodities	652.9	811.8	266.3	158.3	1,889.3	21
Indirect costs	59.4	126.8	116.8	111.1	414.1	5
Evaluate & audit	<u>90.0</u>	<u>90.0</u>	<u>90.0</u>	<u>30.0</u>	<u>300.0</u>	<u>3</u>
Total	2,512.2	3,017.1	2,101.1	1,369.6	9,000.0	100
Percent	28	34	23	15	100	

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Table 11
Budget and Plan by Component
 (Costs are shown in thousands of US dollars)

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Total</u>	<u>Percent</u>	
Institutional strengthening							
Technical assistance	658.9	217.3	147.5	153.2	1,176.9	37	
Training	263.9	408.3	350.8	87.2	1,110.2	35	
Operations	31.6	33.2	12.4	8.2	85.4	3	
Commodities	<u>288.2</u>	<u>511.0</u>	<u>21.1</u>	<u>12.0</u>	<u>832.3</u>	<u>26</u>	
Sub total	1,242.6	1,169.8	531.8	260.6	3,204.8	100	36
Protected areas & buffer zones							
Technical assistance	160.0	302.1	332.5	308.6	1,103.2	28	
Training	58.0	116.8	66.6	54.2	295.6	7	
Studies	45.0	121.1	113.0	131.7	410.8	10	
Operations	127.0	280.8	192.8	208.6	809.2	20	
Commodities	352.0	220.8	244.7	145.7	963.2	24	
Indirect costs	<u>59.4</u>	<u>126.8</u>	<u>116.8</u>	<u>111.1</u>	<u>414.1</u>	<u>10</u>	
Sub total	801.4	1,168.4	1,066.4	959.9	3,996.1	100	44
Environmental education							
Technic assistanc		15.3	13.8	12.4	41.5	8	
Training		10.5		3.5	14.0	3	
Studies		104.0	67.7	72.8	244.5	49	
Operations		56.0	32.2	29.8	118.0	24	
Commodities		<u>80.0</u>	<u>0.5</u>	<u>0.6</u>	<u>81.1</u>	<u>16</u>	
Sub total		265.8	114.2	119.1	499.1	100	6
Plant protection							
Technic assistance	76.0	69.8	74.9		220.7	22	
Training	81.0	63.2	56.8		201.0	20	
Studies	86.9	93.1	99.6		279.6	28	
Operations	121.6	97.0	67.4		286.0	29	
Commodities	12.7				12.7	1	
Sub total	<u>378.2</u>	<u>323.1</u>	<u>298.7</u>		<u>1,000.0</u>	<u>100</u>	11
Evaluation and audits	<u>90.0</u>	<u>90.0</u>	<u>90.0</u>	<u>30.0</u>	<u>300.0</u>		<u>3</u>
Grand total	2,512.2	3,017.1	2,101.1	1,369.6	9,000.0		100

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Table 12
Budget by Currency Requirement
 (Costs are shown in thousands of US dollars)

	<u>FX</u>	<u>LC</u>	<u>Total</u>
Institutional strengthening			
IQC management company	530.2		530.2
Technical assistance		587.8	587.8
Commodities	683.8		683.8
Supplies and maintenance		279.8	279.8
Training	1,110.2		1,110.2
Local travel		13.0	13.0
IRENA personnel		40.0	
Sub total	<u>2,324.2</u>	<u>880.6</u>	<u>3,204.8</u>
Protected areas and buffer zones			
Personnel	695.0		695.0
Technical Assistance	408.2		408.2
Travel & per diem	414.7		414.7
Training	295.6		295.6
Vehicles	318.9		318.9
Equipment	501.4		501.4
Office & maintenance	142.9		142.9
Supplies and operations	394.5		394.5
Special studies	410.8		410.8
NGO indirect cost	414.1		414.1
Sub total	<u>3,996.1</u>		<u>3,996.1</u>
Environmental education			
Personnel	8.0	18.8	26.8
Technical assistance	14.7		14.7
Travel & per diem	25.9	60.5	86.4
Training	8.4	5.6	14.0
Vehicles	48.0		48.0
Equipment	27.0		27.0
Office & maintenance	4.3	1.8	6.1
Supplies and operations	15.8	15.8	31.6
Special studies	195.6	48.9	244.5
IRENA personnel		28.0	28.0
Sub total	<u>347.7</u>	<u>179.4</u>	<u>527.1</u>
Plant protection			
Technical assistance	176.6	44.1	220.7
Training	201.0		201.0
Studies	279.6		279.6
Operations	97.2	228.8	326.0
Commodities	12.7		12.7
MAG personnel		22.0	22.0
Sub total	767.1	294.9	1,062.0
Evaluations and audits	300.0		300.0
Total	<u>7,735.1</u>	<u>1,354.9</u>	<u>9,090.0</u>
AID contribution	7,735.1	1,264.9	9,000.0
Counterpart contribution		90.0	
Minimum matching contrib. by NGO's	1,236		
(NGO contribution is not included in line items of this table.)			

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Table 13
Budget Distribution to Outputs
 (Costs are shown in thousands of US dollars)

<u>Output</u>	<u>Budget</u>	<u>Percents</u>
Institutional strengthening		
IRENA qualified to receive USAID funds	574.6	22
IRENA staff reduced	166.6	7
IRENA finance staff qualified and trained	1,189.2	46
Internal IRENA revenues generated for stability	<u>640.2</u>	<u>25</u>
Sub total	2,570.5	100 29
Policy		
Land regulations in place	82.5	13
Public infrastructure plan completed	50.7	8
Property rights policy and regulations in place	76.1	12
Tax collection process in place	31.7	5
Forestry law and regulations promulgated	69.8	11
Watershed management proposal completed	57.1	9
Pesticide regulations adopted	50.7	8
IRENA protected areas plan completed	95.1	15
Natural resources policy inventory completed	<u>120.5</u>	<u>19</u>
Sub total	634.3	100 7
Miskito Cays protected area		
Natural resources protected	332.0	30
Communities developed and biodiversity conserved	332.0	30
Local organizations and communities cooperating	221.4	20
Coverage expanded by trained IRENA & NGO people	<u>221.4</u>	<u>20</u>
Sub total	1,106.8	100 12
Bosawas protected area		
Forests and natural resources protected	650.4	25
Indigenous commun. participating	130.1	5
Communities developed, biodiversity conserved	910.6	35
Local organizations and communities cooperating	390.3	15
IRENA and NGO people designing similar projects	<u>520.3</u>	<u>20</u>
Sub total	2,601.7	100 29
Chacocente protected area		
Refuge and it's resources protected	172.6	60
Buffer zone community welfare increased	<u>115.0</u>	<u>40</u>
Sub total	287.6	100 3
Environmental education		
IRENA environ. educators trained and equipped	174.7	35
Environmental education strategy developed	99.8	20
Environmental education materials developed	124.8	25
School visitation and evaluation developed	<u>99.8</u>	<u>20</u>
Sub total	499.1	100 5
Plant protection		
Producers required to meet pesticide standards	290.0	29
Pesticide poisoning incidence reduced by half	360.0	36
Largest 50 export producers using IPM methods	<u>350.0</u>	<u>35</u>
Sub total	1,000.0	100 11
Evaluations and audits	<u>300.0</u>	<u>3</u>
Grand total	9,000.0	100

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Table 14
Budget Summary by Destination of Funds
 (Costs are shown in thousands of US dollars)

	IRENA	PACA	CCC	MAG	Total	Percents
Institutional strengthening						
Technical assistance	1,176.9				1,176.9	37
Training	1,110.2				1,110.2	35
Operations	85.4				85.4	3
Commodities	832.3				832.3	26
Sub total	3,204.8				3,204.8	100 36
Protected areas & buffer zones						
Technical assistance	85.4	680.7	337.1		1,103.2	28
Training	22.4	229.2	44.0		295.6	7
Studies	22.3	130.0	258.5		410.8	10
Operations	70.3	558.7	180.2		809.2	20
Commodities	87.2	810.4	65.6		963.2	24
Indirect costs	0.0	192.7	221.4		414.1	10
Sub total	287.6	2,601.7	1,106.8		3,996.1	100 44
Environmental Education						
Technical assistance	41.5				41.5	8
Training	14.0				14.0	3
Studies	244.5				244.5	49
Operations	118.0				118.0	24
Commodities	81.1				81.1	16
Sub total	499.1				499.1	100 6
Plant protection and IPM						
Technical assistance				220.7	220.7	22
Training				201.0	201.0	20
Studies				279.6	279.6	28
Operations				286.0	286.0	29
Commodities				12.7	12.7	1
Sub total				1,000.0	1,000.0	100 11
Total	3,991.5	2,601.7	1,106.8	1,000.0	8,700.0	97
Audits and evaluations	137.6	89.7	38.2	34.5	300.0	3
Grand Total	4,129.2	2,691.4	1,144.9	1,034.5	9,000.0	100
Percent	46	30	13	11	100	

Table 15
 Economic Analysis of Increased IRENA Revenues
 (Revenues & Costs in Thousands of U.S. Dollars)

Scenarios for Increased Annual Collections				
Annual revenues:	Scenario			
	Optimistic	Most Likely	Pessimistic	
New collections	50	40	30	
Improved retention	150	100	50	
Improved collections	<u>500</u>	<u>200</u>	<u>100</u>	
Sub-Total	700	340	180	
Total cost to 1996:	1,894	1,894	1,894	
The 1996 value of stream of revenue from 1996 less cost to 1996				
<u>Optimistic scenario</u>				
Yrs. of rev. from yr. 1996	Discount Rates			
	<u>8.26%</u>	<u>9.00%</u>	<u>9.50%</u>	<u>10.00%</u>
15	4,004	3,748	3,586	3,430
13	3,560	3,347	3,210	3,078
11	3,041	2,870	2,759	2,653
9	2,432	2,303	2,219	2,137
7	1,718	1,629	1,571	1,514
5	882	829	794	760
The 1996 value of stream of revenue from 1996 less cost to 1996				
<u>Most likely scenario</u>				
Yrs. of rev. from yr. 1996	Discount Rates			
	<u>8.26%</u>	<u>9.00%</u>	<u>9.50%</u>	<u>10.00%</u>
15	971	847	768	692
13	755	652	585	521
11	503	420	366	314
9	207	144	104	64
7	(139)	(183)	(211)	(239)
5	(546)	(572)	(588)	(605)
The 1996 value of stream of revenue from 1996 less cost to 1996				
<u>Pesimistic scenario</u>				
Yrs. of rev. from yr. 1996	Discount Rates			
	<u>8.26%</u>	<u>9.00%</u>	<u>9.50%</u>	<u>10.00%</u>
15	(377)	(443)	(485)	(525)
13	(491)	(546)	(582)	(615)
11	(625)	(669)	(697)	(725)
9	(782)	(815)	(836)	(857)
7	(965)	(988)	(1,003)	(1,018)
5	(1,180)	(1,194)	(1,203)	(1,212)

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Table 16
Financial Analysis of Training
 (Revenues & Costs in Thousands of U.S. Dollars)

	Type of Training			Cost (US\$'000)
	Extensive On-Site (people)	In-country seminars (people)	External Degree (people)	
Short term plan	217	120	3	800
Med term plan	167	120	8	800
Long term plan	127	120	12	800

*The medium term plan is assumed in the institutional strengthening budget which also shows the distribution of expenditures over time. The total cost does not include contingencies and inflation.

Sources of data for Table 16:

Extensive on-site at \$600/day for 25 days per 5 people (3000/person) spread over the first three years of the project.

In-country seminars at \$10,000 each for 20 people (500/person) spread over the second three years of the project.

External degree at \$30000 per degree per person (in CR or Mex) with 5 candidates during the second project year, addition of 3 more candidates during the third project year, and completion of these 3 candidates during the fourth project year.

Annex E
USAID/Nicaragua Natural Resources Management Project
Technical Analysis

I. Protected Areas and Buffer Zones

A. Summary

The Protected Areas and Buffer Zones Component of the AID/Nicaragua Natural Resources Management (NRM) Project involves inter-disciplinary and multi-institutional efforts directed at specific geographical sites. Under this component, research and conservation efforts in selected parks and reserves combine with agricultural, forestry, and other community development efforts in their buffer zones (areas of direct influence adjacent to a protected area). Buffer zone development is a technique for achieving two complementary goals: (1) reducing buffer zone pressure on the protected area and its resources, and simultaneously (2) compensating buffer zone residents for any foregone benefits.

1. Institutional Aspects

IRENA has the legal authority to establish and manage national parks and reserves, but lacks the staff, equipment, and administrative systems to manage the two proposed Reserves. The Project proposes an innovative approach: pairing US-based NGO's with the Reserves to facilitate field-based technology transfer and administrative support. Targets for the technology transfer will be IRENA itself and the local community organizations and NGO's.

The PACA Consortium has considerable experience with terrestrial park and buffer zone activities. The Caribbean Conservation Corporation has a developed track record concerning marine and coastal research and management. Since the Bosawas sub-component is the larger of the two, it is recommended that the Miskito Cays efforts make maximum possible use of the training and particularly NGO strengthening of the Bosawás sub-component. PACA has indicated its willingness to offer this trans-component cooperation.

2. Technical Aspects

The technologies to carry out the biodiversity conservation and buffer zone development activities are generally known and proven. Most have received considerable refinement and adaptation in the Central American region.

The protected area activities, for example, focus on training, equipping, and staffing. Secondary activities involve research, survey, and inventory efforts to support planning and

management. Throughout the range of activities, considerable emphasis is placed on involving the local residents effectively in the program.

The buffer zone development activities focus directly on the local residents and adapting their current practices to the ecological constraints of the natural resource base. The primary goal is improving rural welfare through sustainable economic development, but an important secondary benefit of this is a decrease in destructive pressures on the Reserves themselves.

B. Background

The modern history of national parks and protected areas in Nicaragua can be traced back to the passage of legislation in 1956 that formed the legal basis for subsequent natural resource administration and management. The effort to establish national parks and other protected areas in Nicaragua began in 1958 with the declaration of the Cosigüina Peninsula as a "zona de refugio de fauna silvestre" or wildlife refuge. The Somoza government declared Cerro Saslaya a national park in 1971, but these areas were typical "paper parks" with no *in situ* field presence or enforcement.

In 1978 and 1979, Catastro Nacional conducted a series of studies to identify wildland areas for potential inclusion in the park system. One of the additions to the system was Masaya Volcano, which became a national park in 1979. Because Nicaragua still did not have a government agency empowered to manage these national parks, the Masaya effort was carried out by a team of national and international specialists with support from the Banco Central de Nicaragua.

In September of 1987, the Sandinista Government created IRENA (Institute for Natural Resources and Environment), charged with protecting the forest and wildlife resources of the country. Socio-political decisions of the new Sandinista government at first promoted conditions suitable to achieving this goal. For example, a large environmental education center, widely considered the best in Central America, was designed and built in Masaya Volcano National Park.

Even as it was losing stature and personnel, IRENA was still able to make a significant start on a protected area system. A 1983 study identified 35 areas as potential additions to the system. A total of 1,726,500 ha of land was recommended for protection. Phase I focused on the Pacific Region of the country because it is the most densely populated, most degraded, most important economically, fastest changing, and the most threatened by habitat destruction. A subsystem of 17 areas, covering 145,100 ha or 1.1% of the nation, was established in the Pacific region. Fourteen of these were placed in the provisional category of "reserva natural" until further study could determine their appropriate designations.

Unfortunately, the economic, social, and political turmoil occurring in the country; the flight of technical expertise; and IRENA's steadily reduced stature within the government prohibited the full plan from being implemented. This forced IRENA to reduce on-site management in the three priority areas of the Pacific Region (Masaya, Chacocente, and Zapatera) to a minimum. There was never a permanent management presence in the other 14 legally established areas. IRENA's National Park Service was hit especially hard by personnel and budget reductions and the total number of professional and technical employees plummeted from 70 in the mid 1980's to 7 by the end of 1989.

Fundamental changes came via marked adjustments in IRENA's mission with five separate restructurings during the past ten years. With each restructuring IRENA became more subservient to the Ministry of Agricultural Development and Agrarian Reform (MIDINRA). The guiding IRENA strategy during the latter 1980's became exploitation of the resource base it held the mandate to protect. Activities promoted by IRENA included the wholesale harvest and export of round logs, replacement of natural forests with exotic plantations, and the participation of IRENA representatives in the buying and selling of wildlife for domestic food trade and the international marketing of large numbers of wildlife, wildlife products, and seafood.

The new government elected in 1990 set out to reverse the excessive sectoralization of economic decision-making that had ignored the long-term values of natural resource conservation. IRENA was given cabinet-level autonomy as an institute under the Presidency. President Chamorro established an inter-ministerial commission (CONAMOR) as the principal advisory council on all matters related to environmental and sustainable development policies. In no other Central American country has there developed this level of political support linking economic planning and natural resource conservation.

Two important studies are scheduled to be completed in 1991 and their reports published. One is entitled the *National Conservation for Development Strategy*. The second report is a combined document: the *Nicaraguan Tropical Forest Action Plan and Land Use Program*. Together these studies and their respective reports set the framework for a comprehensive re-directing of national and local efforts to harmonize environment, conservation, and development.

C. The Wildland Resources of Nicaragua

1. Flora and Vegetation

The flora of Nicaragua is very rich. Well in excess of 10,000 species are known and more species will certainly be added to the list as inventory efforts are resumed. The botanic literature on Nicaragua is incomplete and most of it is out of date. Studies during the past decade focused more on forest inventory work for timber production rather than on basic natural resource surveys.

Precipitation plays an important role in the spatial distribution and structure of vegetation in Nicaragua. Rainfall across Nicaragua decreases from south to north and from east to west. The wettest location in the country is a lowland area in the southeast near the mouth of the San Juan River, where annual precipitation exceeds 6,000 mm. The driest areas are in the western part of the country, particularly the western slopes of the central highlands and the western slopes of the Pacific coastal foothills.

The five major plant communities recognized in Nicaragua are (1) lowland evergreen rain forest, (2) lower montane rain forest, (3) seasonal evergreen rain forest, (4) semi-evergreen rain forest, and (5) deciduous forest. Special communities of more limited range are present as wetlands, beaches, and pine savanna climax. The most important factor controlling the distribution of the plant communities is the length and severity of the dry season, but where there are elevational differences, the effect of temperature prevails.

Lowland Evergreen Rain Forest This is the dominant community of the Caribbean lowlands and is the least disturbed plant community in Nicaragua. The forest is typically tall, with emergent canopy trees above the nominal 30 m height. Species composition of the forest is diverse with no single species or species group dominating. Cedar and mahogany have been selectively cut from this forest over a wide area but these removals have had little effect on the overall composition. The principal locations of disturbances in these types of forests are near settlements along the major rivers, along the coast, and along the limited road system.

Lower Montane Rain Forest The north-central highlands were originally covered by lower montane rain forest. The eastern portion of this zone is relatively undisturbed except near rivers, but the western zone has been almost completely converted to agricultural uses. This is Nicaragua's most important coffee-growing region. Stands of mature trees remain only on the steepest inaccessible slopes.

Seasonal Evergreen Rain Forest This forest type originally covered the south and east slopes adjacent to Lake Nicaragua and extended in a narrow band northwest along the drier western slopes of the highlands. Much of this zone has been deforested and the land converted to agricultural uses, especially grazing. In 1963 the only extensive mature stands of this forest type were reported in the area lying to the east of Lake Nicaragua. This forest type is a transition between the wetter lowland evergreen rain forest to the east and the drier semi-evergreen forest to the west.

Semi-Evergreen Seasonal Forest The dominant vegetation community of the Central Depression and Pacific Region of Nicaragua is the semi-evergreen seasonal forest. Taylor reported in 1963 that no primary stands of this formation remained in Nicaragua and that mature secondary stands were uncommon. The area formerly covered by this formation is now a mosaic of numerous small secondary plant communities of various ages. Where fire and grazing are controlled, regeneration can be swift and the species diverse. Where damage by fire and grazing are prolonged, thorny Acacia trees begin to dominate.

Deciduous Seasonal Forest Nicaragua's deciduous seasonal forest has been largely replaced by various secondary plant communities. The forest type occurred only in the Central Depression and in a rain shadow on the Pacific coast. Several of the most densely populated urban areas lie within this region.

(Other Formations)

Riverine and Swamp Formations Where water supply is increased and soil aeration is poorer, particular forest formations develop. Along rivers and streams, the plant community forms a gallery forest. Where the poorly drained area is broader, the community may be a tall swamp forest with emergents in excess of 30 m.

Mangroves Mangrove forests are found along both coasts, but the mangroves on the Atlantic side are much more extensive.

Salt Meadows In the river delta formed by the Real and Negro Rivers where they enter the Gulf of Fonseca, a series of herbaceous and savannas communities form salt meadows on very low-lying sandy flats that are subject to occasional seawater flooding.

Beach Communities Beach communities display a series of zones and plant successions. They are well developed on the Caribbean and Pacific shores and along the freshwater beaches of Lake Managua and Lake Nicaragua.

Upland Pine and Oak Forests Nicaragua is the southernmost limit of the genus *Pinus*. Upland pines cover roughly 1500 km² of land, mostly in the northern highlands in the Cordillera Segovia. Three species of pine, growing to 25-30 m are logged to varying degrees. Where fire is excluded, upland pine communities are often invaded by mixed hardwood species, particularly the genus *Quercus* or the oaks.

Pine Savanna The Caribbean lowland pine savannas are regions of grassland with scattered pines *Pinus caribea*. They have been continuously logged since the 1920's and few large pines remain in accessible areas.

The last three decades have seen a steady removal of forests and an increase in the land initially under cultivation, but eventually converted to cattle pasture or abandoned. The data are alarming, as the following table shows. Although accurate figures are not available for the past decade, the rough estimate for the amount of deforestation during the 1990-1991 dry season (ending in May of 1991) is that 200,000 ha of forest was cut.

Table E-1: Land Use Changes in Nicaragua: 1960 - 1990
(area in 1,000's km²)

Year	Cultivated		Pasture Lands		Forested Lands	
	km ²	%	km ²	%	km ²	%
1960	13.0	10%	17.1	14%	64.3	54%
1970	14.3	12%	33.8	28%	56.2	47%
1980	15.1	13%	34.2	29%	44.8	38%
1990	?		?		?	

2. Fauna and Biodiversity

The native vertebrate terrestrial fauna of Nicaragua has not been extensively studied. In round figures, Nicaragua's vertebrates include 750 birds, 600 reptiles and amphibians, 200 mammals, and 100 freshwater fishes for a total of 1750 vertebrates.

Although the fauna is diverse, the numbers are not in keeping with what one might expect from the largest country in Central America. One contributing factor to this reduced biodiversity is that Nicaragua lacks the widely varied topography, heavy rainfall, and high mountains that characterize more biologically diverse Central American neighbors. Lower mountain ranges trap less precipitation and offer fewer variations in habitat and ecosystems.

With lower mountains and broad coastal plains offering fewer barriers to species movements, Nicaragua has fewer endemic species than some of its neighbors. For example, there are no endemic birds known from Nicaragua. Yet this lack of endemics does not mean that Nicaragua does not have biologically rich areas of considerable significance.

While Nicaragua may lack total species biodiversity and endemics, it can lay claim to the largest tropical rain forest in Central America, the most extensive sea-grass beds in the Western Hemisphere, the widest extent of continental shelf and coral reef in the Caribbean, and largest lakes in Central America. The mangroves along the Atlantic coast are some of the most extensive in the region. The mangroves in the Gulf of Fonseca are some of the most economically important and productive resources on the Pacific coast.

An additional factor is that the human population of Nicaragua is still relatively low in comparison with smaller neighbors. The urban population density in some areas (parts of Managua) may exceed 1,000/km² and average above 200/km² in heavily urbanized departments. The rural population in many areas is less than 10/km², greatly reducing the human pressure on rural and wildland areas. This creates an opportunity to establish

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effective management of existing wildland areas and create the units that are lacking in the system (or proposed but not implemented) while competition for the resources is reduced.

This situation is changing rapidly. The cessation of warfare has opened previously conflictive areas to re-settlement. Efforts to demobilize Resistance and Sandinista fighters are focusing on land distribution as a short-term solution because the battered economy is not capable of creating instant employment for thousands of former soldiers and their families. One effect of the demobilization and re-settlement programs is an expansion of the agricultural frontier as a solution to these socio-political and economic problems.

Unfortunately an expansion of the agricultural frontier is not a long-term solution to the problem. It promotes agricultural uses of lands that cannot support intensive cropping and leads to cattle grazing on lands that would be more productive for society if managed in forest. Nicaragua already has vast areas of once-valuable forests that today are used for low-productivity extensive grazing.

The rate of deforestation has sky-rocketed in the past 12 months. During the period of conflict, deforestation in Nicaragua dropped from the 1979 level of 100,000 ha/year to roughly 20,000-30,000 ha/year. With the end of the conflict, deforestation was expected to rise rapidly as bottled-up demand for land was released. The anticipated figure for the 90-91 dry season was 150,000 ha deforested, but recent calculations by INRA, the agrarian reform agency, place the figure at 200,000 ha. This suggests an urgent need to strengthen and expand natural resource conservation and management efforts, especially the national parks and reserves, before the forest resource is gone. If the current rate of deforestation were sustained, Nicaragua's forests outside of the national park system would disappear by the year 2001. Even if the rate is cut in half, these forests would still be gone by 2009.

D. IRENA and National Parks

The power and authority to develop and manage national parks and reserves in Nicaragua rests with IRENA. Since the creation of IRENA in 1979, national parks have been a fundamental part of the agencies portfolio. The system plan developed in 1983 was intended as the guiding document for the establishment of what would have been Central America's most ambitious national park system. Unfortunately the agency almost immediately began to suffer reduction in budget, authority, and personnel.

As the re-structuring and re-vitalization of IRENA gets underway in 1991, national parks again will play a fundamental role. A significant part of the external assistance which focused almost exclusively on the forestry sector during the past decade is being re-directed toward basic conservation. In other cases, new bi-lateral and international funding is available for support of conservation projects.

1. Administration of Protected Areas

IRENA has an office at the directorate level to administer the protected area system. The title is Directorate of Wildlands, Wetlands, and Coastal Zones. Three separate departments are included in the directorate: Wildlands, Wetlands and Coastal Zones, and Fauna. Staffing patterns for the directorate are shown in Table F-1 below.

Status of Protected Areas The protected area system of Nicaragua consists of (1) decreed and managed areas, (2) decreed but not managed areas, and (3) proposed areas. In the first group are Volcan Masaya, Chacocente, and Zapatera Island. Table F-2 presents the full (decreed and proposed) protected area system.

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Table E-2: Staffing Pattern of Wildlands Directorate

Wildlands, Wetlands, and Coastal Zones Directorate	(Total)	51
Director/Biologist		1
Secretary		1
Wildlands Department		
Department Chief		1
Biologists/Ecologists		4
Cartographer		1
Driver		1
Masaya Volcano National Park		
Administrator		1
Superintendent		1
Chief Ranger		1
Rangers		*9
Guide		1
Night Guards		3
Toll Booth Clerk		1
Driver		1
Maintenance		1
Chacocente Wildlife Refuge		
Chief Ranger		1
Rangers		4
Cook		1
Zapatera Archipelago National Park		
Administrator		1
Ranger		1
Wetlands and Coastal Zones Department		
Department Chief		1
Ecologists/Biologists		2
Mangrove Project		
Biologists		2
Wildlife Department		
Department Chief		1
Biologists		2
National Zoo		
Administrator		1
Rangers		4

* The staff of 51 is in a state of flux because IRENA personnel are eligible for the GON's "Programa de Conversión Ocupacional" (supported by AID), an incentive program designed to encourage excess government personnel to leave the government and find employment in the private sector.

Table E-3: Parks and Reserves (Existing and Proposed)

Wildland Area Name and Status	Year	Proposed	Anticipated
<u>Legally Established and Managed</u>			
Volcan Masaya	1979	5,500	
Chacocente-Rfo Escalante	1983	4,800	
Zapatera Archipelago	1983		
<u>Legally Decreed but Not Managed</u>			
Cosigüina	1958		
Estero Padre Ramos			
Estero Real			
Isla Juan Venado			
Cerro Saslaya	1971		
Cordillera de los Maribios	1983		
Volcan San Cristobal-Casita,			
Volcan Telica-Rota,			
Volcan Pilas-El Hoyo,			
Volcan Mombacho,			
Volcan Momotombo,			
Tilpepe Peninsula			
Tisma Lake			
Omotepe Island	1983		
Volcan Concepción and Volcan Madera			
Pacific Southwest Coast			
SIAPAZ		350,000	
Solentiname National Monument,			
Los Guatuzos Wildlife Refuge,			
La Inmaculada Fortress Historic Monument,			
Rio San Juan - Indio - Maiz			
Yucul Forestry Genetic Resource Reserve			
<u>Proposed Additions</u>			
Bosawás	1991 ?	1,100,000	650,000
Cayos Miskitos	1991 ?	800,000	800,000
Dipilto			
El Bosque			
Cerro Kilambé			
Peñas Blancas Massif			
Rio Estanzuela Falls			
Cerro Tomabu			
Chaguitillo Archaeological Site			
Santa María de Ostuma			
Rio Yasic Falls			

Pancasán Historic Site
Cerro Musún
Motua, Tecomapa, and Playitas Lakes
Amerrisque Cordillera
Cerro Waylawas
Centros de Bana - Cruz
Wounta Lagoon
Wankarlaya Lagoon
Rio Grande de Matagalpa
Makantaka

2. Donor Assistance to the Wildlands Directorate

Donor assistance to the national parks office was crucial to maintaining the field presence in priority areas during the '85-'90 period when IRENA was in decline. Major external assistance (e.g., SIDA) during that period was directed at forest resource exploitation schemes, leaving the national parks office with little support. World Wildlife Fund-US (WWF-US) was one of the significant contributors to protected areas. The following section draws directly on internal documents WWF-US provided on their Nicaragua Program.

During the 1980's, WWF-US supported environmental education, training activities, planning efforts, protection, equipment, and research for the Nicaraguan protected areas system. These funds amounted to US\$ 125,000 through June 1990.

Specific projects included:

- Volcan Masaya Environmental Education Center
- Consolidation efforts in Padre Ramos, Chacocente, Volcan Masaya, and Volcan Maderas
- Institutional Support to NGO's
- International Seminar on the Rio San Juan (SIAPAZ)
- Second National Congress on Biology and Ecology
- Technical Assistance to IRENA
- IRENA Re-structuring Working Group
- Technical Assistance in Debt-for-Nature Swaps

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- Emergency Funding for Masaya, Chacocente, and Zapatera
- Miskito Coast Community Consultations and Workshops

WWF-US assistance to the national parks of Nicaragua is scheduled to continue and grow through the 1990's, with a shift in emphasis. During the past decade, military conflict precluded working in the more diverse Central Highlands or Atlantic Lowlands. WWF-US support focused on the greatly fragmented and threatened dry tropical forest life zone of the Pacific slope. Political reconciliation now creates new opportunities to work in the central and eastern regions of the country. WWF-US is responding to this opportunity by shifting their geographical focus to the areas of greater biodiversity importance that had previously been neglected. Comprehensive program grants will focus on Miskito Cays, and potentially Bosawás, Gulf of Fonseca, and SIAPAZ. Complementary assistance will continue for Pacific slope sites with national importance in thematic areas such as environmental education (Masaya) and sustainable resource use (Chacocente).

The Swedish government, through SIDA, has indicated an intention to support protected areas and buffer zone activities in Nicaragua in addition to forest production projects. One of their primary projects proposes work in the SIAPAZ region. A separate conservation component would fund a director and vehicle for the Bosawás Reserve.

The Protected Areas Component of the NRM Project is designed to incorporate and complement these activities. The two major protected areas and buffer zones activities (Miskito Cays and Bosawás) in the Project develop significant coordination mechanisms for activities in the reserves and strong cooperative mechanisms for park outreach to and coordination with the buffer zone communities.

E. Priority Sites for Protected Areas and Buffer Zones Activities

The NRM Project was required to select a small number of sites for initiating Project activities. The selected sites possess significant biodiversity but are threatened by current destructive practices by residents and outsiders. The project sites were selected on the basis of the following criteria:

- Biodiversity: species richness and uniqueness.
- Urgency: level of threat and the need for action.
- Sustainability: likelihood of continuance of the activities after the end of the Project.

(In addition to the criteria above, the team placed a premium on sites where there would be opportunities to develop innovative approaches to park and buffer zone management.)

Based on these criteria, the Project Paper team in consultation with IRENA chose Miskito Cays, Bosawás, and Chacocente. Each of these sites and the related Component activities are described below.

1. Miskito Cays

The Miskito Coast of northeastern Nicaragua is the biologically richest coastal-marine area of comparable size in tropical America. The site includes coastal lagoons and mangrove forests with coral reefs, sea-grass beds, and small coralline islands scattered across the largest continental shelf in the Caribbean. The varied biodiversity encompasses commercially important shrimp, lobster, and finfish, plus sea turtles, manatees, migratory waterfowl, porpoises, parrots, and many other wildlife species.

The land is occupied and governed by the Miskito people, the most numerous indigenous people in Nicaragua. They have their own autonomous government and territory, having protected and defended their coastal resources throughout the five centuries of colonial dominion in the region.

a) The Miskito Cays Reserve

The project takes its name from the Miskito Cays, a series of coralline islands off the Atlantic coast of Nicaragua on the continental shelf. The Miskito Cays Reserve (MCR) is proposed as a 1,000,000 ha resource management area that would encompass land, coastal lagoons, and sea (roughly 80% aquatic and 20% terrestrial).

The goal of the Reserve is the establishment and consolidation of a resource management area for the conservation of biodiversity and maintenance of ecosystem integrity and the creation of economic opportunities and alternatives for the Miskito coastal communities through sustainable utilization of their resources. Training, education, institution building, and community development are integral parts of the overall program.

Planning and organizing for the establishment of the MCR began in 1990 with initial funding from the World Wildlife Fund. A series of community workshops in the area in early 1991 clarified issues and defined priorities. Nicaraguan government agencies, regional institutions, local communities, community organizations, and international NGO's joined efforts in the design of the initiative to create the Reserve.

The proposed Reserve would include strict protection areas, resource recovery zones, resource management areas, controlled harvest areas, and development sites (settlements, towns, piers, infrastructure, agriculture, forestry, etc.).

b) Project Activities for the Miskito Cays Reserve

The overall goal of this Sub-Component is the establishment of a Miskito Cays Reserve that will protect the productive coastal and marine environment,

conserve biodiversity, and improve Miskito economic and social conditions. The purpose of the Sub-Component is to assist the national and regional institutions and the local communities with the planning and establishment of the Miskito Cays Reserve.

Objectives of the Miskito Cays Sub-Component include:

- Preliminary resource inventories and studies to guide planning, design, management, and monitoring of the Miskito Cays Reserve.
- Attract and sustain long-term research interest on species and ecosystems for conservation and management purposes.
- Initiate comprehensive management planning and develop annual operating plans for the Reserve.
- Provide technical and logistical assistance to IRENA, MIKUPIA, coastal communities, and other institutions to support development and implementation of the Reserve.
- Train Nicaraguan and Miskito natural resource specialists and managers in research, management, protection, planning, and institution building.
- Assist in developing resource-based environmental education programs and activities for the Miskito communities and Puerto Cabezas.
- Promote community development projects and activities such as maternal and child health care and others.
- Explore the feasibility of income-generating projects based on sustainable utilization of natural resources, including shrimp cultivation, fishing coops, ecotourism, etc.
- Encourage expansion of the resource reserve concept to the north across the border with Honduras and to the south to other areas of the Nicaraguan Atlantic coast.

Sub-Component activities include:

- Resource and ecosystem mapping. Output: preliminary base maps in Miskito, Spanish, and English of resources, ecosystems, political boundaries, terrestrial and marine tenure.
- Surveys of terrestrial and aquatic ecosystems. Output: baseline data on species, location, status of ecosystems and populations, proposed boundaries, preliminary resource zoning, and research agenda.

- Study of resource piracy. Output: detailed report showing results of surveillance activities, estimates of losses, and preliminary recommendations and action plan for tackling this problem.
- Sea turtle surveys. Output: data on population structure, maps of distribution, trained field technicians, market analysis, report on commercialization of hawksbill turtle shell.
- Management planning. Output: draft management plan; annual operating plan; workshops for communities, researchers, and planners; training in reserve planning.
- Reserve protection and management. Output: trained and hired guards, materials and equipment, office and protection infrastructure, vehicles and boats, radios, buoys, etc.
- Environmental and conservation education. Output: community workshops and participation, exchange program for community leaders, training at Tortuguero, development (and translation) of materials and publications.
- Community development. Output: workshops on diver safety and health, workshops on community health and safety, feasibility study of ecotourism potential, feasibility of fishing cooperative, feasibility study of artisanal mariculture.

c) Expected Achievements and Accomplishments

USAID expects that by the completion of this sub-component:

- Nicaragua will have a legally inscribed, functioning, and recognized reserve in the Miskito region.
- Miskito communities in the Reserve will be incorporated into the design and management of the Reserve and will be participating in the benefits of sustainable resource exploitation programs.
- Management of the Reserve will be in the hands of adequately trained and equipped staff effectively implementing a long-term participatory management plan, following detailed annual operating plans.
- Effective resource conservation and management activities will be underway in the Reserve as cooperative efforts involving IRENA, MIKUPIA, and the local communities.
- Appropriate activities will be underway in each zone of the Reserve so that resource uses are accord with ecologically sustainable patterns and practices, with at least five (5) communities participating actively in the protection and management.

- Direct training of local, regional, and national-level staff (at least 5 technicians and 10 rangers)
- Through intensive attention to technology transfer, the project will leave MIKUPIA and IRENA with individuals and teams capable of designing similar projects in other parts of the Atlantic coast.

d) Implementation Note

The Caribbean Conservation Corporation (CCC), a US-based NGO located in Gainesville, submitted an un-solicited proposal (on behalf of CCC, IRENA, MIKUPIA, WCI, and the University of California) to AID/LAC under the Program for Biodiversity Conservation in Latin America and the Caribbean. AID/LAC approved the grant request. The AID/Nicaragua Mission has prepared a PIO/T Cooperative Agreement Schedule for implementing this project and will be responsible for grant. By amendment to this PIO/T, the Miskito Cays Sub-Component of the NRM Project will be implemented by the CCC and cooperators.

2. Bosawás

The north-central part of Nicaragua is predominantly tropical forest with patches of premontane forest on the upper slopes of the higher ridges and mountain tops. Cerro Saslaya was designated a National Park in 1971, but effective control and management were never established. The war between Sandinistas and the Contras turned the frontier area with Honduras into an area of serious conflict. Now that political reconciliation is underway, the region is returning to its former condition.

The Nicaraguan government is encouraging settlement in the northern frontier area by both former Sandinista military and former Contra resistance fighters. In the area of San José de Bocay, INRA has a Contra re-settlement program.

a) The Bosawás Reserve

The proposed Bosawás Reserve is an enormous block of tropical rain forest in the northern part of Nicaragua. The Reserve derives its name from a composite of the names of rivers in the area. For example, the "Bo" comes from the Bocay River. Protected status was first conferred in the Bosawás region in 1971 with the creation of Cerro Saslaya National Park, 11,800 ha. A 1979 proposal would have enlarged the area to 640,000 ha. The 1982 proposal nearly doubled the area to 1,200,000 ha, but was not legalized. The current proposal (1991) would create reserve of about 710,000 ha. This would be the largest protected area in Nicaragua, covering roughly 5% of the country.

b) Project Activities for the Bosawás Reserve

The purpose of this sub-component is to protect productive tropical forest environments, conserve biological diversity, and improve the social and economic conditions of persons in the Bosawás region.

The specific objectives of this Sub-Component are:

- To encourage and contribute to the inscription of the Bosawás Reserve as a legally recognized unit of the Nicaraguan protected area system.
- To contribute to the development and consolidation of local conservation and development NGO(s) focusing on the Bosawás Reserve and associated buffer zone communities.
- To develop and promote sustainable resource use practices and viable alternatives to resource-destructive exploitation.
- To initiate basic and applied research programs and train local participants in the techniques and methods needed to conduct the studies.
- To develop a comprehensive management plan for the Reserve and surrounding area in cooperation with local communities.
- To develop and promote income-generating and income-increasing programs and activities that incorporate ecological sustainability.
- To contribute to expansion of the participation of women and other under-represented segments of society in the conservation and development process.

b) Project Activities for the Bosawás Reserve

The Bosawás Reserve Sub-Component includes four primary activity areas: needs assessment, NGO development, reserve management, and buffer zone management. The activities will be developed in an integrated fashion to make maximum use of synergistic relationships, economies of scale, and program efficiency.

Activities under the sub-component include:

Combined Reserve-Buffer Zone Activities

- Community-based needs assessments of residents and neighbors in the Bosawás region to identify needs, set priorities, and define projects.
- Base-line surveys and assessments of natural resources; their status and distribution.

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- Identification and development of community-based conservation and development NGO's as *in situ* co-implementors of appropriate activities.
 - Institutional strengthening of IRENA and NGO(s) through training, equipping, staffing, and technical assistance.
 - Strengthening the financial base of IRENA and NGO(s) through the identification and development of creative revenue-producing or fund-raising programs.
 - Developing a comprehensive program of applied research in resource inventory, ecological characterization, socio-cultural conditions, land tenure systems, and economic activities for the Reserve and buffer zone (using local researchers under contract or as cooperators).
 - Researching, developing, and refining a comprehensive long-term management plan for the Reserve and buffer zone, and complementary annual operating plans.
 - Developing and establishing continued resource and socio-economic monitoring program(s) to track progress toward conservation and development goals and provide base-line data for activity design and project evaluation.

Reserve Activities

- Training for Reserve staff, NGO staff, and local leaders in wildland planning and management techniques to ensure their full participation in Reserve development.
- Implementing a reserve protection program in accordance with the operating plan.
- Developing adequate infrastructure (trails, roads, ranger cabins, administrative center, boundary markers, signs, etc.); equipping and training the staff.

Buffer Zone Activities

- Developing ecologically sustainable resource management and use programs for buffer zones areas, using a community-based, participatory process.
- Potential buffer zone activities will be chosen from this illustrative list: sustainable agriculture, integrated pest management, crop diversification, agro-forestry, small-scale timber production, non-timber forest products (such as edible fruits, oils, latex, fiber, medicines).
- Conservation and extension activities to promote identified strategies for sustainable resource use, involving local leaders, government officials, and local farmer-producer organizations.

- Environmental education programs and materials will be developed for rural primary schools and local teachers trained in their use through hands-on participatory workshops.
- Training and technical assistance in formal and non-formal education and extension methods will be provided to Reserve staff, NGO staff, local teachers, extensionists, and local leaders.

c) Expected Achievements and Accomplishments

USAID expects that by the completion of this sub-component:

- Nicaragua will have a legally inscribed, functioning, and recognized reserve in the Bosawás region.
- Indigenous communities residing within the Reserve will be incorporated into the design and management of the Reserve and will be participating in the benefits of sustainable resource exploitation programs.
- Management of the Reserve will be in the hands of adequately trained and equipped staff effectively implementing a long-term participatory management plan, following detailed annual operating plans.
- Effective resource conservation and management activities will be underway in the Reserve as cooperative efforts involving IRENA, conservation and development NGO(s), and local communities.
- Appropriate buffer zone activities will be underway that contribute to stabilizing the mosaic of land uses in accord with ecologically sustainable patterns and practices in at least five (5) communities in the areas around the Reserve.
- Direct training of local, regional, and national-level staff (at least 10 technicians and 50 rangers)
- Through training-of-trainers and pilot field experience, IRENA and the NGO(s) will have individuals and teams capable of designing similar projects in other units of the Nicaraguan protected area system.
- Information and data gathered during surveys, assessments, research, and monitoring will be organized and available for consultation in a central location (probably Managua)

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d) Implementation Note

The PACA Consortium (a joint effort of CARE, Conservation International, and The Nature Conservancy) submitted an un-solicited proposal to AID/Nicaragua in May of 1991. The proposal, entitled Bosawás Natural Resource Management Project, described an ambitious program of protected area, buffer zone, policy, and environmental education activities. AID responded with a request that PACA reformulate the proposal along the more focused lines of protected areas and buffer zones. PACA, with CARE as the in-country lead member, has revised the proposal and will be re-submitting it to AID/Nicaragua in the very near future. If accepted by AID, this proposal would form the basis for a Cooperative Agreement between PACA and AID to implement the activities described in the section above.

3. Chacocente

On the Pacific side of Nicaragua, the valleys are flat to gently rolling and the climate is much drier. Dry forest once predominated but most of the forest has been removed to make room for agriculture. Along the coast, eroded bluffs are interspersed with rocky points and sandy beaches. One area of the coastline that has been protected by remoteness and topography is the Rio Escalante - Chacocente (or simply "Chacocente") region. Forming the boundary between Rivas and Carazo provinces, the Chacocente region harbors some of the last remnants of dry coastal forest on the Pacific side -- perhaps the largest block of intact dry forest from San Juan del Sur to Lstero Real. In addition, the site contains long stretches of sandy beach, habitat that at least two species of sea turtle use for nesting sites.

At the end of the 19th Century, the region was still covered with exuberant forest. There were no population centers of note and forests along the periphery was just beginning to feel the axe as land was cleared for limited cattle ranching and the cultivation of basic grains.

In 1908, timber harvesting came to the region. German immigrant Carlos Hoffman purchased the area and set up a timber export business to his homeland. Just the most valuable trees were cut and hauled out of the forest: Nambur, Caoba, Cedro Real, Guayacán, and Pochote. His business lasted from 1908 until 1913.

After the valuable hardwoods were exhausted, cattle ranching invaded the area. In the 1940's, hunters began eliminating the jaguars and crocodiles, the first for their dietary preference for cattle and the latter for their valuable skins. The 1950's saw another wave of deforestation to supply the Pacific railroad with sleepers. Timbers were hauled to Las Lajas and Veracruz, then carried by truck to the railroad. About the same time, Brahman cattle appeared in the region, so cattle raising increased in intensity.

a) The Chacocente Wildlife Refuge

The increasing pressure on Pacific dry forests brought the Chacocente forests to the attention of government agencies. In 1977 the area was nominated as a potential "Refugio de Vida Silvestre" or wildlife refuge. As studies to substantiate the nomination got underway, one of the important research concerns was the status of the sea turtles. In 1980, IRENA through the Wildlife Department began turtle research. In July of 1983, Chacocente was officially created as a Wildlife Refuge by Decree No. 1249. It established a refuge size of 4,800 ha.

The lower elevations of the Refuge are mostly alluvial, but the upper elevations are a more broken topography. Slopes exceed 100% in many places, with cliffs over 80 m high. Soils on the upper parts of the Refuge are classified IV through VIII, with none appropriate for agricultural or ranching. The lower areas, in soil classes II and III, are alluvial and colluvial but very erodible and subject to flooding.

Of the 4,800 ha in the Refuge, an estimated 1,500 ha are in an essentially unaltered state. The rest show slight to moderate levels of human intervention, with some agricultural and pasture lands adjacent to the small settlements within the Refuge.

Recent socio-economic studies (1989) identified 151 families within the boundaries of the Refuge, totaling 1,101 individuals or an average family size of 7.29. In the Refuge plus buffer zone, there were 358 families and 2,464 individuals (an average family size of 6.88).

The principle resource issues identified in the study were:

- Deforestation: to extend the agricultural frontier;
- Wildfire: thought to be started by hunters;
- Grazing: with consequences for native vegetation;
- Fuelwood collection: especially for production of tiles, bricks, ceramics, and charcoal;
- Gill nets: strung across the beaches and entangling sea turtles;
- Egg collection: especially in the Veracruz area; and
- Human settlements: e.g., Caña de García.

b) Project Activities for the Chacocente Wildlife Refuge

The purpose of this Sub-Component is improve the management of the Río Escalante - Chacocente Wildlife Refuge (Chacocente) to protect biodiversity and encourage the sustainable utilization of the renewable natural resources of the region.

A secondary purpose is to improve the socio-economic status of the human populations in and around the Chacocente Refuge through promotion of practices and

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methods for agriculture, agro-forestry, and resource harvest that recognize the carrying capacity and sustained yield limits of the resources.

The specific objectives are:

- Upgrade the level of protection and control in the Refuge
Sub-Component activities include:
- Improve the physical infrastructure. Output: road and trail improvement, provision of a pump to bring water to the ranger station, mosquito netting for the main buildings, equip additional sleeping quarters, survey and mark borders, radio equipment, and other improvements.
- Increase the level of training and technical skills of refuge staff. Output: public relations training, guard training workshop, ranger training in enforcement, training in field identification of flora and fauna, training in technical research skills, etc.
- Improve transportation. Output: vehicle for work and supply trips, motorcycles for protection and outreach programs.
- Improve the education and outreach programs in the surrounding region. Output: development of interpretation materials and trails for the Refuge, development and implementation of a school visit program to buffer zone schools, promotion of agro-forestry and hill-side agriculture techniques, presentations on Refuge goals and objectives to non-formal groups such as fishermen, ranchers, agricultural cooperatives, etc.
- Provide operating funds for Refuge activities. Output: support for uniforms, food allowance, gasoline for motorcycles, diesel fuel for generator and vehicles, oil and grease for maintenance.
- Update and revise the refuge management plan and establish an objective-driven annual operating plan.

c) Expected Achievements and Accomplishments

USAID expects that by the completion of this sub-component:

- Management of the Refuge will be in the hands of adequately trained and equipped staff effectively implementing a long-term management plan, following detailed annual operating plans.
- Effective resource conservation and management activities will be underway in the Refuge as cooperative efforts involving IRENA and the neighboring communities, especially with respect to turtle egg conservation and exploitation.

- Appropriate buffer zone activities will be underway that contribute to stabilizing the mosaic of land uses in accord with ecologically sustainable patterns and practices in at least five (5) communities in the areas in and around the Refuge.
- Direct training of 5 rangers and 2 technicians.
- Information and data gathered during surveys, assessments, research, and monitoring will be organized and available for consultation in a central location (probably Managua)

d) Implementation Note

Given the relatively small amount of funds needed for this Sub-Component, the implementation mechanism will be a direct grant to IRENA, conditioned on the successful implementation and audit of an approved financial and management control system (also financed by AID, under the Institutional Strengthening Component of this Project).

II. Environmental Education

A. Summary

The Environmental Education Component will strengthen IRENA's capacity to develop and implement environmental education programs. A major portion of the efforts under this Component will go toward training of IRENA, NGO, and Ministry of Education staff. Developing a national plan, equipping IRENA offices, and undertaking two pilot projects are also programmed.

Once the training sub-component is underway, a workshop/seminar will be convened to develop a National Strategy for Environmental Education. This document will build on the two reports expected in the coming months: the National Strategy on Conservation for Development (ECODE) and the combined Nicaraguan Tropical Forest Action Plan and Land Use Program. Development of the environmental education strategy will provide individual institutions with a basis for their own action plans. With newly trained staff and equipment, IRENA's education department will develop and implement an action plan, including a mass media campaign and a school visitation program.

1. Institutional Aspects

IRENA has the legal authority and professional interest to develop and expand the environmental education program, but lacks the staff, equipment, and administrative systems to manage the activity. The Project proposes delaying the Component until IRENA has been strengthened and certified for receipt of AID direct funds. (In the mean time, the small staff of the education department can develop preparatory materials for translating portions of the ECODE report into a National Strategy for Environmental Education.)

The primary beneficiary of this Component will be IRENA, through staff training and equipment. This institutional strengthening of the education department will be directed at two pilot activities: a mass media campaign on environmental awareness and a school visitation program. Both efforts include the financing of studies to assess their impact and effectiveness.

2. Technical Aspects

The technologies to carry out environmental education and awareness activities are generally known and proven, but the field is evolving rapidly. Recent research is changing the ideas about the effectiveness of traditional approaches. The availability of new media and the rapid diffusion of media technology (especially video) mean that entirely new methods and techniques can be used. This Component undertakes to field-test two approaches in small pilot projects.

IRENA is encouraged to explore the possibilities for cooperation in this Component with the United States Peace Corps (PC) to take advantage of the support for Environmental Education that the Peace Corps receives under another AID Project, the Forest Resources Management Project (FRM II). This Participating Agency Service Agreement (PASA) can fund Volunteer and Counterpart training, workshops, and materials, and can send advisors in environmental education and a number of other environmental fields (protected areas, agroforestry, coastal management, etc.) for needs assessments, workshop design and delivery, and special projects. The delayed start of this Component will allow time for these contacts and discussions.

Attachment: Laws and Legalities

Laws and Legalities	Description of the Document
1956	Established government control of natural resources
1958 Decreto Ley	Established Peninsula Cosigüina as a "zona de refugio de vida silvestre" or wildlife refuge.
1971 Decreto 1789	Created Saslaya National Park.
Mayo 1979	Created Volcan Masaya National Park.
24 Agosto 1979 Decreto 56	Created IRENA
Setiembre 1979 Decreto 112	"Ley Orgánica del Instituto Nicaragüense de Recursos Naturales y del Ambiente"
Setiembre 1979	"Ley de la Protección del Patrimonio Cultural de la Nación" for the newly created Ministry of Culture.
17 Mayo 1980	"Cancelación de la Concesiones Forestales Otorgados a Transnacionales Extranjeras"
Marzo 1980 Decreto Ley 340	Created "Servicio de Parques Nacionales" within IRENA.
5 Febrero 1983 Decreto 1194	designated Zapatera as a National Park.
12 Agosto 1983 Decreto 1294	Created Chococente-Rio Escalante as a "refugio de vida silvestre" or wildlife refuge.
19 Setiembre 1983 Decreto 1320	Established preventive protection for the undecreed areas identified in the 1983 study of potential protected areas.

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I. Introduction

The Natural Resources Management (NRM) Project for Nicaragua contains four components: Institutional Strengthening and Policy Dialogue, Pesticide Management, Protected Areas and Buffer Zones, and Environmental Education. On instructions from the AID/Nicaragua Mission, this Social Soundness Analysis (SSA) will focus on the Protected Areas and Buffer Zones Component of the Project. Two protected areas have been highlighted as top priority: the Miskito Cays Reserve (MCR) and the Bosawas Reserve (BR). Other areas have been identified for possible inclusion in the project, including Chacocente, Estero Real, and Volcán Masaya. This SSA will include at a minimum a consideration of MCR, BR, and one of the three smaller areas, Chacocente.

This document is organized by protected area project, following a general section on the socio-cultural context of Nicaragua. Section III analyzes the Miskito Cays, beginning with a short description of the component followed by a discussion of Miskito culture and society, and the socio-political effects of the recent civil war. The sub-section on participation focuses on MIKUPIA, the local community-based NGO, and discusses how it was formed, community interest in MIKUPIA, the role of women, and the reasons for individual and community participation in MIKUPIA and in the Project. The next sub-section identifies Project beneficiaries, while the impact sub-section focuses on the assumptions which will determine the socio-economic and institutional impact of the Project. The issues and recommendations section examines CCC's capability as NGO implementing agency, the relation between MIKUPIA's board and its employees, the MIKUPIA salary structure, and MIKUPIA's relationship with the central government, other NGO's, and IRENA.

Section IV analyzes the Bosawas component, beginning with a short description of the component followed by a discussion of the cultural and geographical regions important to the component: the Rosita-Bonanza-Siuna mining triangle, the Sumu Indians, and the Contra resettlement planned for the Bocay region. The participation sub-section looks at how the PACA will achieve participation in the Bosawas buffer zone, since no local NGO has yet been identified. The impact section analyzes in depth the potential for impact among the demobilized Contras in the Bocay region and the problems involved. The issues and recommendations sub-section examines geographical coverage of the buffer zone, PACA's relationship with IRENA, the problems of identifying a Siuna NGO, extension activities in the buffer zone, and the role of women.

Section V analyzes the Chacocente component, beginning with a short description of the component followed by a summary of socio-economic information collected by IRENA in the last 11 years of work in the region. The participation sub-section highlights IRENA's institutional role in working with the Chacocente area residents and in the special role of women in sea turtle egg collection. The beneficiary sub-section focuses on how turtle egg resource use can be organized, and the impact sub-section looks at the potential impact of the organization of an egg marketing cooperative. The issues and recommendation section looks at institutional relationships and the feasibility of reserving turtle egg collection for local residents.

II. General Socio-cultural Context

A. Demography

The population of Nicaragua, estimated at 3.5 million in 1989, has an average annual growth rate conservatively estimated at 2.9%, and is expected to double in 20 years. The fertility rate of 5.0 births per female, a relatively high birth-to-death ratio of 39:8 per 1,000 people, and the fact that 50% of the population is currently less than 15 years of age, suggest that the country's population can be expected to reach 5.3 million by the year 2000.

Ineffectively balancing these natural increases was a net out-migration due to the armed conflict during the 1980's. Nearly 250,000 Nicaraguans were displaced to refugee camps in Honduras and Costa Rica, and internally to the major cities of the Pacific slope. Another 100,000, primarily the most skilled and trained, immigrated to the United States during this period. With the end of the war, repatriation of displaced persons and voluntary emigrants will add significantly to the demographic equation.

Though Nicaragua is the least densely populated of the Central American republics, with an average of 24 inhabitants/km², population distribution is highly skewed, with nearly 80% of the population located on the Pacific slope and 64% in the large cities (50% in Managua alone), making it the most urbanized country in Central America. The civil war did not just halt the historical migration from the Pacific and central departments to the Atlantic slope, which had been occurring since the 1950's, it actually caused a total reversal of this internal migration pattern. The depopulation of the rural Atlantic region during the past decade has resulted in less than 7% of Nicaragua's population currently located on the Atlantic slope, an area with about 60% of the total land surface of the country.

Nicaragua's ethnic distribution is 69% Mestizo, 17% white, 9% black, and 5% Indian. The black and Indian population, largely Miskito, Sumu, Rama, and Garifuna, is linguistically and culturally distinct from the Mestizo/white majority and is centered on the Atlantic coast. The physical isolation of these people from the power center on the Pacific side has caused an economic and political disenfranchisement of the inhabitants that has only recently been addressed by designation of the Atlantic departments of Zelaya and Rio San Juan as politically autonomous zones (RAAN in the north, RAAS in the south). The limits to political empowerment to the zones is not clear, and there is disagreement as to whether regional government authority extends to natural resources and resource policy.

B. Economy

Nicaragua has never been a rich country and has consistently ranked behind the other Central American republics in terms of GDP. This economic backwardness has been on an increasingly downward track since the devastating earthquake of 1972 destroyed much of Managua, and despite a large influx of international assistance, the city was never adequately rebuilt nor the damaged economic infrastructure restored. The decline continued during the years of a guerrilla war, culminating with the Sandinista triumph in 1979. The economic plunge became even more pronounced during the past 10 years as a result of counter-

revolutionary activity, trade embargoes, and a centralized economic strategy that brought state control to approximately 50% of the agricultural and industrial sectors.

The Sandinista government was never able to rebuild from the decapitalized condition of the national economy that it inherited in 1979. By 1988, GDP had declined to \$2.1B, per capita income was only \$610, and real economic growth was estimated at -8%. The economy was unsustainably supported during the past decade by European socialist countries through payment of artificially high prices on commodity exports, imports of oil and industrial needs at less than world prices, and nearly \$10B in loans, credits, and grants. External debt, nearly all of which is public, is currently estimated at between six and seven billion dollars.

Agriculture governs the economy, accounting for 86% of the export earnings and 44% of the work force. However, production of both the principal export commodity crops (banana, coffee, sugar, meat, seafood, cotton) and basic food grains (corn, beans, rice) has fallen annually since 1983. As much as 25% of the loss is because crops are planted at an inappropriate time.

C. Land Use

Land use patterns vary by geographic region. The Pacific slope with its volcano-enriched soils has traditionally served as the country's bread basket, though over the past three decades much of the land previously dedicated to small grain production for domestic consumption was transformed into large-scale commercial agriculture, primarily cotton, sugarcane, and cattle for export. The traditional red bean production area in Carazo was converted to shadeless coffee. The Central Highlands have been utilized chiefly for permanent crops such as coffee, while the broad Atlantic lowland until the recent civil war was the relief valve for the landless and economically deprived sector from the Pacific corridor.

From 1960 to 1980, Nicaragua experienced the highest rate of deforestation in Central America, with 1,000 km² converted to scrub and pasture annually. Forest cover dropped from 54% to 38% of the country's land surface, while area under cultivation increased from 10% to 13% and pasture land increase dramatically from 14% to 29%. In the last decade, in large measure due to the economic and social disruption caused by the armed conflict, the deforestation rate diminished greatly, though to what level is unknown. Since cessation of fighting, bottled-up demand for land has expanded the agricultural frontier, resulting in a deforestation estimate for the 1990-1991 dry season of 200,000 ha. Forested land remains near what it was in 1980, at 35%, productive arable land has been reduced to between 9% and 11% (89% of which is in the dry Pacific region), and permanent crops cover only 1%. Land converted to pasture has increased to 43% of the total land surface, although most of this is degraded and unsuitable for grazing.

Prime agricultural land ownership changed radically following the Sandinista takeover in 1979 (see Table F-1). Most notable is that the percentage of land in private farms over 360 hectares dropped from 36% to 10% of the total, while the percentage of land in

cooperatives and state farms rose from zero to 21% and 13%, respectively. The disruption suffered by Nicaragua during this period can be inferred from the fact that 5% of land in use in 1978 had been abandoned in 1987.

Table F-1: Ownership of prime agricultural land in Nicaragua, 1978 and 1987

Ownership	Property size (ha)	1978		1987	
		Area 1,000 ha	% of total	Area 1,000 ha	% of total
Private	<7	122	2	93	2
	7-36	894	15	418	7
	36-144	1,750	30	1,746	30
	144-360	944	16	698	12
	>360	2,102	36	554	10
Cooperatives	All	0	0	1,246	21
State farms	All	0	0	775	21
Abandoned	All	0	0	282	5
TOTAL		5,812	100	5,812	100

Source: Ministerio de Desarrollo Agropecuario y Reforma Agraria, 1988

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III. The Miskito Cays Reserve (MCR) Project

A. MCR Project Description

1. Project beginnings

The Miskito Coast in northeastern Nicaragua has the most biodiversity of any Coastal area in tropical Latin America. It has large expanses of the world's most productive tropical ecosystems: mangrove forests, lagoons and estuaries, coral reefs, and sea-grass beds. Together, these make up one of the most concentrated pieces of wildlife territory to be found anywhere in the world. The Miskito Coast's continental shelf is the largest in the Caribbean and contains the largest surviving populations of the threatened green turtle, the endangered hawksbill turtle, and the biggest developmental and fishing grounds for spiny lobster and shrimp. For the turtles, plus the manatees, the adjacent wetlands which provide homes and wintering places for waterfowl, and the interconnecting waterways which harbor caimans and crocodiles, the Miskito Coast is a world class wildlife and environmental region with abundant though threatened biota.

The idea for a Miskito Coast Reserve originated in the 1970's and was supported in 1980-81 by a group of scientists-conservationists invited by the Nicaraguan Ministry of Natural Resources and Environment (IRENA) to visit the area and to make recommendations. The group included Archie Carr (University of Florida), Archie Carr III (New York Zoological Society), Nancy Foster (National Oceanic and Atmospheric Administration, Department of Commerce - NOAA), and Bernard Nietschmann (University of California). With the outbreak of the war in 1981 between the Frente Sandinista and the east coast Indian peoples, the plan was shelved.

In 1990, newly-elected President Violeta Barrios de Chamorro named Dr. Jaime Incer as Minister of IRENA, and Dr. Incer reactivated the plan, organized an October 1990 expedition to the Miskito Cays, and invited Miskito community leaders and international conservationists on the voyage. This reconnaissance and discussions with Miskito turtle hunters and lobster divers in the area convinced members of the expedition to form a committee to organize local, national, and international support for a protected area. By December of 1990, World Wildlife Fund provided a grant to hold seminars and workshops in the Miskito coastal communities, and support from World Wildlife and Cultural Survival permitted a follow-up visit to the region in May, 1991.

Caribbean Conservation Corporation, in cooperation with IRENA, the Communal Affairs office of the North Atlantic Autonomous Region (RAAN), MIKUSKUKA (now Mikupia), University of California/Berkeley, and Wildlife Conservation International, submitted an unsolicited proposal to AID/Washington for the period 7/91 to 6/92 and at the same time a complementary proposal to the John D. and Catherine T. MacArthur Foundation for the same period. The budget for the project was US\$346,100, of which \$150,000 was to come from AID and the remaining \$196,100 from the MacArthur Foundation.

AID/Washington has tentatively approved the project for one year. The NRM Project will extend that project for an additional three years. This Social Soundness Analysis is based on an examination of the proposal to USAID and the MacArthur Foundation, supplemented with other documentation and interviews in Managua, Puerto Cabezas, and Miskito communities. While the wording of the two proposals is not identical (they represent different stages in draft form), they describe the same project. The proposal to AID will be used for commentary, unless substantial differences exist between the two proposals on a particular point.

2. MCR project components

The proposed project focuses on five sets of activities for the first year. The project categories are:

1. Resource Inventories
2. Species and Ecosystem Studies
3. Technical Assistance for Protected Area Development
4. Environmental Education and Training
5. Community Development

Activities involving Resource Inventories include the collection of existing information, resource and ecosystem mapping, preliminary surveys of regional ecosystems, and inventories of resident and migratory birds in coastal wetlands and lagoons and in the Miskito Cays. Activities involving Species and Ecosystem Studies include study of international resource piracy, exploitation of marine turtles, sea-grass ecology, avian species studies in coastal wetlands and lagoons, and Miskito Cays reef studies. Activities involving Technical Assistance for Protected Area Development include management planning, guard training and hiring, and international networking and expansion of MCR activities.

Activities involving Environmental Education and Training include community workshops, Miskito community leader visit to Tortuguero National Park, resource manager training at Tortuguero, Costa Rica, community education programs, and translation of environmental education and resource management materials into Miskito. Activities involving Community Development include diver health and medicine, an assessment of the potential for ecotourism, a fishermen's cooperative, economic diversification, and a packing and freezing plant feasibility study.

B. Miskito area socio-cultural context

1. Subsistence patterns

The Miskito are a coastal people well-known as fishermen, boat people, and turtle hunters. A significant portion of their diet comes from the sea. They complement their marine diet with cassava (yuca), sweet potatoes, and rice, which they grow in small plantations using slash and burn agricultural techniques. Both cassava and rice are planted in

the same time period, March through May, and often on the same plots. Rice is planted on the lower, wetter areas where water may stand in the field, although the rice is a dryland variety, and cassava in areas without standing water. Rice is harvested at about five months (September-October) during a two-week period, while cassava harvest begins in September and will continue until the following month of July. This means that only in August is cassava unavailable for harvest.

Farm land is individually owned and passed down through the maternal line, which is associated with matrilineal clans. This means that women own the land, which they work in conjunction with their husbands who marry into their families and who come to live with them in their villages after marriage. The slash and burn cycle of about 20 years is an indication of poor soil. Each family has about 20 plots of land with each particular plot used for just one year, since the lack of nutrients makes it useless for planting two years in a row. The trees and brush are cut down, with part of the resulting slash burned and the rest used as fencing to keep out cows and deer. Following the year's harvest, the field is abandoned to be reused about 20 years later when the trees and brush have once again covered the plot.

Deer have become an increasing problem for the cassava and rice farmers. The traditional solution to the deer problem was to shoot them, which both saved the plantations from depredations and also provided a welcome source of meat, but the Sandinista government rounded up all firearms in the villages during the civil war, and most villagers have not been able to reacquire them.

Other elements of the general diet include fruit and domestic animal products. Coconuts are available year around, and seasonally available fruits include large quantities of mango, nance, and cashew fruit. Most fruit trees are found on family house plots, which are large (about one hectare), and the trees and their fruits are individually owned, although in mango season the quantity of fruit is so great that people are generous.

The domesticated animals include pigs, chickens, horses, and cows. The number of chickens in any one household is not great, and egg production is fairly low. Chickens are eaten, according to one informant, when fishing goes poorly, but the fact that chicken is eaten fairly rarely (and fish so often) also makes eating chicken a particularly attractive alternative. No particular care is taken in raising chickens, and the varieties found are native local types which are hardy and resistant, though not highly productive of meat or eggs.

Cows are currently rare in the Miskito area, due to the ravages of the recent civil war. Miskitos value cattle primarily for their milk, although they will slaughter a cow for meat during the Christmas season, which is the principal festival period and one in which one can expect anyone resident or working outside the community to return for the Christmas celebrations. Before the civil war, an average number of cattle per household was about five, although an informant from Ahuas Tara said that his father once had as many as 500.

Pigs are raised like chickens, without any particular care, and they are generally allowed to roam the village eating whatever scraps or fallen fruit they can find. Pigs are occasionally slaughtered, but pork is not very highly prized as meat, and animals are often

sold for cash to the Mestizos in Puerto Cabezas. Many homes have very small domestic gardens fenced against the depredations of the pigs. The fenced area may also contain the household well.

Ideally, men go fishing twice a week, Monday or Tuesday to catch fish for the middle of the week and Thursday or Friday to catch fish for the weekend. The richness of the north Atlantic coast of Nicaragua means that the variety of fish is enormous, and the Miskito language contains some 150 marine fish terms. Common classes of fish are snook (*kalua*), robalo (*mupe*), catfish (*laha*), jack (*krawe*), snapper, mackerel, shrimp (*wase*), spiny lobster (*wastara*), and green sea turtle (*lasisi*). Fishing boats are not large. In the Tuapi community there are two thirty-foot boats used by four fishermen at a time, and six twelve-footers used by two fishermen. While some boats may have motors, the high cost of fuel makes them uneconomical except for commercial fishing, and even the smaller boats make use of sails.

There is some specialization among the villages as regards marine resource exploitation. The Miskitos of Sandy Bay, for example, are the closest to the off-shore cays and are those best known for lobster diving and sea turtle hunting. They practice both free diving and scuba diving, the latter most often for commercial purposes.

Miskito resource use, both terrestrial and marine, has traditionally been subsistence level and generally provides an adequate level of caloric intake, but it has not hitherto provided any generous level of cash income. Miskitos have thus combined their subsistence resource use with migrant labor to supplement the subsistence base with cash income. As far back as the previous century, Miskitos traveled as far as Belize in search of wage-paying jobs in the lumber and chicle-extraction industries, most often working for British companies. More recently, they have worked in the mines at Siuna, Bonanza, and Rosita; in the Nicaraguan timber industry; and in fish processing up and down the Atlantic coast. (It should be added that the Garifuna as well practice migrant labor on a similar scale.)

Now as previously, the favored time for seeking work as a migrant laborer is the six month period from June to December coinciding with the rainy season, returning before Christmas and the principal festive season. This may mean that villages in this period contain few productive adult men, those remaining being the elderly, the women, and young children. As women are responsible for taking care of fields and with cassava available throughout most of the year, the absence of men does not create an unbearable hardship.

2. Local society and government

Each village has an unstructured village council made up of all the adults in the community, men and women alike. Among their tasks is the election of the village headman (Miskito: *wihita*), although a better translation might be "judge," and there is some evidence that there was some English-Jamaican influence in the development of this personage as a Miskito institution. The *wihita*'s tasks are to enforce village sanitation, see that the roads are maintained, resolve scandals resulting from drinking and fighting (for which he has a few "deputized" policemen on call) or from land disputes, and crime control, usually petty theft. One informant stated that theft was becoming a problem because of lack

of economic resources among the villagers; he blamed the lack of a "company," meaning some large foreign company which would provide jobs.

The wihta coordinates with larger government entities through visits to the Government House and to the police in Puerto Cabezas. Wihtas may be changed as often as the community desires, but most wihtas spend several years in the post. A Miskito from Ahuas Tara north of Puerto Cabezas stated that there had been just four wihtas in the community in the last 20 years.

Community meetings take place once every one or two weeks to take up any topic at all. They can be called by anyone at any time, although the favored time for meetings is the weekend, preferably Sundays after church, and the setting is usually informal and outdoors. Women participate fully in these meetings. This investigator and others attended two such community meetings in different communities called at our request to discuss the MCR project.

The community meetings are carried out in a democratic and egalitarian spirit which reflects traditional and contemporary Miskito social life. There is little evidence of economic or social stratification in Miskito villages, and accumulation of material wealth is not considered important or desirable, nor does it mean that relatively better off Miskitos have more prestige or influence in community affairs.

3. Recent socio-political events

The Miskitos had much in common with the Mestizo lower classes in the rest of the country at the time of the Sandinista revolution in 1979. Whether as subsistence and petty commodity producers or as wage-laborers, the Miskito occupied the lowest strata of the regional social and economic hierarchy, and they made strong political demands at the time of the revolution to redress the material aspects of these inequalities. But in the years following the revolution, convergence between the FSLN and the demands of the Miskitos failed to materialize.

One reason had to do with the differences in perception of foreign and particularly United States resource extraction companies in Nicaragua and especially in the Miskito area. Mestizos on the Pacific slope linked these companies to their resentment of Somoza, who was unabashedly pro-American, while for the Miskitos, these companies allowed them to supplement their subsistence activities with needed cash income, much of it on a seasonal or part-time basis. This had a particular appeal to the Miskito, who have a strong sense of ethnic identity and attachment to their communities and kin, which they were able to maintain even if they are not physically present on a year-around basis.

At the same time, the Miskitos were as resentful of Mestizos in general as they were of Somoza, whom they rarely saw, since the Miskitos were clearly subordinate to both the Mestizos and the Creoles. Charles Hale (Ethnic Groups and the Nation State, Stockholm, 1987, p.123) produced an example of the ethnic hierarchy in the Kukra Hill sugar mill, show below:

	Miskito	Creoles	Mestizos	Totals
Administration	0%	10%	15%	38
Skilled labor	5%	20%	29%	78
Unskilled labor	15%	69%	27%	149
Field labor	80%	0%	30%	413
N =	386	114	178	678

A third reason had to do with the collective memory of a time when the Miskito ruled over the other two groups, when the Miskito king was "recognized" by the British who supplied the Miskito with arms and who purchased slaves from them. So while a certain amount of assimilation to the dominant Creole and Mestizo cultures had begun to occur before 1979, this ethnic memory also produced solidarity movements, the most notable being ALPROMISU (Alianza para el Progreso de Miskito y Sumu).

ALPROMISU was a broadly conceived organization intended to defend Miskito rights to political representation, land, more middle class jobs in towns, better health care, and so on. The Somoza government responded to ALPROMISU with an effective combination of repression and co-optation. It jailed a few Miskito organizers during the 1970's, but also offered to fund ALPROMISU and assigned seats in the National Assembly to two Miskito associated with the organization.

The impulse to revive ALPROMISU came from a group of Costeño university students in Managua, among them Miskito such as Steadman Fagoth, Brooklyn Rivera, Hazel Lau, and Alfonso Smith, all of whom criticized ALPROMISU for having ties with Somoza and an excessively moderate program. They formed MISURASATA to replace ALPROMISU in 1979, generally supported the FSLN, and talked of extending the revolutionary struggle to the Atlantic coast. However, structural problems kept the Miskito students and the FSLN apart, problems which emerge from a comparison of the two groups in terms of ideology and practical politics.

The Miskito students confronted their first choice before the fall of Somoza when they were forced to choose between joining the struggle against Somoza in the Pacific and organizing politically among their own people. While the FSLN called on the Miskitos to join the movement on the Pacific, the latter began to travel more and more to their communities on the Atlantic, making the conscious decision that they were needed more by their own people than by the FSLN.

A second problem lay in the ideological distance between the Miskito leaders and the main FSLN program. While the FSLN was focused on freeing the nation as a whole from subordination to Somoza and to perceived U.S. imperialism, the Miskito organizer's program focused on ending ethnic discrimination and achieving economic and political power for the Miskito people. Even if the Miskito student organizers were sympathetic to the FSLN's anti-imperialist nationalism (as they claim to have been), their efforts to gain Miskito popular support on the Coast lacked this emphasis. Their constituency did not respond to the language or the political symbols of Nicaraguan (Mestizo) nationalism. Moreover, few

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Miskito had a negative association with U.S. imperialism, and a positive feeling for white North Americans was and is common in Miskito popular perception, much to the dismay of the FSLN commanders.

A third problem was that the FSLN had never included an analysis of ethnic oppression in their equation or a vision of how struggles for ethnic and class-based demands could be creatively combined, which has been a problem for Marxist movements generally. Neglect of the ethnic question was a reflection of ethnocentrism, and more important, resulted from a lack of involvement with the Miskito during the liberation struggle. Given these tensions, it is not surprising that Miskito political organization led to ideological conflict and institutional struggle with the State from the start.

In November, 1979, following the fall of Somoza, ALPROMISU held its fifth annual congress to define its relationship with the revolutionary government. Daniel Ortega attended the meeting and argued that the Miskito had no need to preserve ALPROMISU, because Miskito interests could be adequately represented through participation in mass-based organizations from the Pacific, further evidence of ethnocentrism. The organization changed its name to MISURASATA (Miskito, Sumu, Rama, and Sandinista United), elected a new young leadership, and began organizing vigorously in every Miskito community, building on existing communal political structures and on the deeply ingrained Protestant religious practice characteristic of Miskito communities. They received an avalanche of popular support, and the excitement went so far in some cases as to reverse the patterns of assimilation to the dominant cultures.

A destructive combination of ideological and institutional struggle ensued in the arena of ethnic demands, with MISURASATA pressing for greater concessions and the State generally giving in. An important example of this occurred with the literacy campaign, where after three months of dialogue, the State approved the literacy program in indigenous languages. MISURASATA leaders, spurred on by their growing social base and political power, began to make it clear that they would not stop short of achieving uncontested political authority in Miskito territory. This put MISURASATA in direct conflict with nearly every organizational entity on the Coast associated with the Revolutionary State - from the Ministry of Health to Sandinista political organizations to the FSLN itself.

The growing confidence and stridency of the Miskitos against the Sandinistas, coupled with the perception of the latter that the Miskitos were either predisposed to, or already involved in, an alliance with the U.S. in an anti-Sandinista counter-revolution, quickly led to serious incidents and eventually to guerrilla war by 1981. In spite of Sandinista efforts by 1985 to resolve their differences with the Miskito by (1) promoting Miskito leadership and political expression, (2) entering into dialogue with MISURASATA, (3) modifying military policy especially in regard to previous evacuations of and military presence in Miskito communities, and (4) declaring intentions to recognize the rights of autonomy for the Atlantic Coast, the guerrilla war between the Sandinistas and the Miskitos lasted until 1988. Due to their knowledge of the terrain, the Miskitos usually fought the more numerous and better armed Sandinista army to a standstill, a fact which contributes today to a continuing sense of Miskito ethnic pride.

The present situation is one in which the former province of Zelaya has been divided into two autonomous zones, one for the north (Región Autónoma del Atlántico Norte - RAAN) and one for the south (RAAS). But it is still difficult to determine just how autonomous these regions will be. For example, the RAAN gave out a fishing concession to an American company which local residents rejected, and the concession was rescinded by the central government. Nonetheless, officers of the RAAN are local residents elected locally, which at a minimum provides the illusion of regional and ethnic autonomy.

In addition, numerous former Miskito guerrillas have been named to important posts in the central, non-Sandinista government. Perhaps the most important of these is Brooklyn Rivera, one of the two most notable leaders of the Miskito movement, who is head of INDERA, the Atlantic Regional Development Institute for the RAAN and RAAS in the central government. The small size of Nicaragua, and particularly of the Miskito region, means that little occurs without the knowledge of and, to some degree, good will of these Miskito political leaders. Rivera, for example, is well-acquainted with most of the officers in the Mikupia organization.

C. Participation: the role of Mikupia

1. Description

Mikupia is a local NGO based in Puerto Cabezas whose members are all members of the Miskito ethnic group. The beginnings of the group date to the mid-1980's when numerous Miskitos were in exile in Costa Rica and talked among themselves about the kind of country they hoped to have when the civil conflict was over. At this time, they came into contact with Dr. Bernard Nietschmann, a geographer from the University of California, Berkeley, who influenced them to think about conservation issues and particularly about the protection of their marine natural resources.

The more recent history of the group began when Nietschmann connected individuals he had met in Costa Rica with international conservation NGO's interested in working on the preservation of the marine resources off the Miskito coast. In October of 1990, representatives of IRENA, World Wildlife Fund, Caribbean Conservation Corporation, and Wildlife Conservation International (among others) met with Miskito individuals in Puerto Cabezas to tour a proposed protected area and to agree in general terms on a conservation strategy.

A very high level of Miskito participation in this project was decided on from the beginning, and steps were taken to ensure this participation. The Miskitos who had been present at the previous meeting in October of 1990, contacted 23 communities from Cabo Gracias to Wounta, explained the proposed program, and asked each community to select four individuals as community representatives to participate in the project. In February, 1991, Nietschmann, Charles Luthin (CCC), and Armstrong Wiggins (a Miskito with the Indian Law Resource Center in Washington), led seminars in two coastal villages to explain

the objectives of the protected area and the potential benefits to the communities. Ninety community representatives and others were present at one seminar and fifty at the other.

Following the seminars, the representatives were to return to their respective communities to carry out a workshop similar to the one they had attended. Miskito organizers carried out follow-up activities, visiting the communities, talking with local people, and maintaining the enthusiasm of the representatives.

It is hard to say exactly when Mikupia began as an organization. The seeds were planted in Costa Rica, the visit in October of 1990 stimulated the Miskitos involved to look at advancing the organization, and the seminars continued to cement the resolve of the organizers to formalize the institution. At present, Mikupia is legally considered an NGO "in formation" (en formación). The legalization process (personería jurídica) is in the hands of a lawyer in Managua, Dr. Owen Hudson, a Creole from Bluefields who is presently Vice-Minister of INDERA. The group has elected officers who are at the same time unpaid employees of Mikupia. While they claim to work full-time with Mikupia, and it seems that many actually do, they are pressed for economic resources and will not be able to continue indefinitely at the present high level of activity if the present project is not approved.

The officers of Mikupia are:

Dennis Castro, President
Rudolph Spear, Vice President
Carlos Rodriguez, Secretary
Julian Smith, Treasurer
Jerry Willington, Field Director
Adistan Bons, Field Director
Oliver Thompson, Field Director
Reynaldo Francis, Field Director
Rony Pont, Public Relations (Managua)
Marcus Hoppington, Public Relations (Managua)
Cristobal Bodil, Driver-Boatman

In the meantime, Mikupia continues to operate. It has carried out a census of the 23 communities including name, age, sex, education, marital status, and occupation, and the data include family size and number of individuals per residence. Three communities have yet to be included: Cabo Gracias and Bizmuna at the extreme north of the area and Wounta at the southern edge. In the planning stages are a socio-economic baseline study and one defining the boundaries of the proposed protected area. It should be noted that the group does not have the background and resources to carry out a socio-economic baseline study without professional assistance.

2. Analysis

Mikupia is an NGO which, while it may strike a chord in the heart of the Miskito people, is an external creation which owes its existence to the consciousness-raising efforts of

Nietschmann and to the enthusiastic interest of the international NGO's in the Miskito coast and in the creation of a protected area. As such, it raises certain doubts: Is the interest of the Mikupia leaders genuine, or are they simply interested in well-paying, high prestige jobs working with the international NGO's? Do the Mikupia leaders have a hidden political agenda which is either at odds with the project or which might subvert it? Has the response of the communities themselves been genuinely positive, or are they, too, simply looking at the project as a possible source of income or resources, such as boats? This analysis will consider these questions and present recommendations for the NRM Project.

Genuine interest vs. individual benefit

A visit to the region, including rounds of discussion with Mikupia members, appears to indicate genuine interest in the project's objectives as opposed to individual economic self-interest. However, the salary breakdown for local personnel in the proposal to AID presents a problem in that it provides for a few very attractive salaries in contrast with other very modest ones, a situation which could be destructive to the project and which must be rectified.

The situation is as follows: The proposal to AID provided a salary breakdown for local hires, while the MacArthur proposal did not do so. The project provides for administrative personnel in the form of a project sub-director, plus one secretary, who will clearly need to be resident in Puerto Cabezas. In addition, and probably working in the same office space, there are two translators budgeted to translate necessary information into Miskito from Spanish and perhaps from English. Working in conjunction with the Puerto Cabezas office but with extensive time in the field are four individuals labeled coordinators, whose work will be primarily oriented toward the social and educational aspects of the project: workshops, community development, environmental education, and so on.

Two categories of field personnel will be primarily field oriented, divided into two groups: wardens and researchers (or specialists). The former will specialize in the monitoring of the Miskito Cays Reserve, including collection of information on both legal (local) and illegal (foreign resource piracy) use of the area. The specialists are those who will work with and under the supervision of foreign environmental and biological specialists regarding ecosystem mapping, surveys, and so on. While the exact number was not noted in the proposal to AID, the activities seemed as if they would require persons similar to the coordinators and were perhaps pegged at the same salary. If so, there would be nine of them.

The budget states explicitly that the sub-director would be 100% time and the secretary 50% time. No time percentages were available for the others. The budget itself states the following (US\$):

<u>Resources</u>	<u>Management</u>	<u>Project</u>	<u>US\$</u>
■	Project Sub-Director (100%)		20,000
■	Secretary (50%)		5,000
■	Workshop coordinators (4 people)		4,000
■	researchers		9,000
■	translators (2)		4,000
■	wardens (4)		14,000

		sub-total	56,000

If one takes these figures and calculates monthly income from the project, the income figures are the following:

■	Project Sub-Director (100%)	1,666/mo
■	Secretary (50%)	416/mo
■	Workshop coordinators (4 people)	83/mo X 4
■	researchers	83/mo X 9
■	translators (2)	166/mo X 2
■	wardens (4)	291/mo X 4

The average yearly salary is US\$ 2,666; the average monthly salary is US\$ 222.

The disparity in salaries is notable and should be a cause for concern. The sub-director is to be a local individual with no particular background and without a previously high salary history. There is no justification for his making 20 times that of the workshop coordinators with whom he will be working on a daily basis. Miskito culture shows very little socio-economic stratification, and community leaders are those with leadership and speaking ability as opposed to economic superiority.

It seems likely that the salaries were set by CCC without careful consideration for local reality. It is possible that salary differences were assumed, since such differences commonly exist in the culture of the United States and elsewhere. Indeed, the international salaries range in full-time equivalence from US\$87,750 (Nietschmann) to US\$31,260 (Luthin) to 29,250 (Project Director), and in this context, a US\$20,000 salary for a sub-director would have appeared reasonable.

The present analysis strongly recommends that local salaries for Mikupia personnel be revised and that all salaries be the same. Doing so will emphasize the commonality of purpose of the project and will serve as a stimulus to both the employees themselves as well as the people with whom they work and whom they serve that the project is a Miskito community project, not simply a job. These salaries should be sufficient to support an individual and his or her family adequately and should be comparable to what an individual might make working in low to middle-level jobs in private or public sectors of Nicaragua. For example, the post of librarian at the Atlantic Coast Research and Documentation Center was offered to a trained librarian (two and a half years university training) for \$100/month, which she turned down as too low. The average salary in this project is \$222/month, so a just salary should be somewhere in between the two. Or, to look at it another way, a

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primary school teacher in Managua makes \$50/month while a taxi driver makes \$250, although the latter also has expenses.

As mentioned above, some employees will be resident almost 100% of their time in their own local communities, while others will need to be resident in Puerto Cabezas and still others in Managua. The project should provide for a reasonable, well-thought-out per diem to compensate for those requiring residence outside their communities, but this per diem should be clearly understood to compensate, not reward, and emphasis should be placed on the fact that everyone makes the same basic salary. In addition, it may be necessary and recommendable to provide for certain "perks" for the sub-director and for Managua personnel, such as a small clothing allowance. Other kinds of perks are to be included as project expenses, such as use of a car and driver, boat and boatman, and similar project-oriented representational expenses, such as, in Managua, taxi fare.

It should be noted that not all the jobs will be full-time. Individuals who work on a part-time basis should receive the same salary pro-rated for the amount of time they actually work.

Political agendas

To some extent, it is not possible for any significant activity in the Miskito area to be entirely divorced from political concerns. Recent events, specifically the Sandinista Revolution, the civil war between the Sandinistas and the Miskitos, the coming to power in Managua of a coalition opposing the Sandinistas, the formation of an ethnically-based political party (Yamata), in the Miskito region to participate in those elections as part of the opposition, and the establishment of an autonomous regional government for the area including the Miskitos, have made politics important in the area as they never were before.

But, as is often the case, as the situation changes from one in which transcendental events are the norm to one of low profile mundane events and issues, interest in politics inevitably wanes for many. Mikupia's interest in politics and contacts with political leaders appear to be dominated by the special interest of Mikupia in the environment and, in particular, in the politics of resource use and abuse. Mikupia is concerned with national and regional (RAAN) politics in so far as they concern the issuing of licenses to exploit the marine resources that Mikupia intends to conserve.

For example, the RAAN conceded a license to a North American firm granting it exclusive rights to exploit marine resources (shrimp, lobster, fish) in exchange for which this firm would build and equip a television station and build a shopping center in Puerto Cabezas. Local leaders, including Mikupia, managed to overturn this by going over RAAN authority to the central government in Managua. In another case, the future of the publicly-owned fish and lobster fishing enterprise, INPESCA, is of concern to Mikupia, since INPESCA grants licenses at present. However, INPESCA appears likely to be converted into a private company as part of the central government's privatization campaign, which would affect licensing and the general relationship of a group like Mikupia to INPESCA.

A third example involves politics on an international scale. A major problem for the Miskito Cays Reserve is resource piracy by ships from other nations. As many as 20 nations have fished illegally in Nicaraguan waters. As many as 30 Honduran boats and 20 boats each from Jamaica and Colombia fish illegally in the proposed Reserve. Miskito residents in the community of Wawa told of a Soviet vessel which anchored offshore near Wawa, and when the boat left, there were few shrimp remaining for local fishermen. Mikupia plans to monitor the situation, identify the offending vessels, and put pressure on the governments of the vessels through their embassies, a basically political move. In addition, Mikupia has a warm relationship with the head of the RAAN police, Kenneth Bushey, a political appointee, but the relationship appears based on their desire to work with Bushey to send police from Puerto Cabezas to arrest illegal vessels fishing in Miskito waters.

In summary, there do not appear to be hidden political agendas, just open ones directly related to the environmental objectives of Mikupia which are consistent with those of the project itself.

Genuine community interest

Community interest appears genuine, and it has been created and kept alive by the continued activities of the Mikupia members who have visited the various communities and discussed the Mikupia agenda with local residents. The principal focus of Mikupia is, of course, the marine and wetlands conservation agenda, and this is of genuine concern for local residents who acquire a substantial portion of their diet as well as some income from fishing and shrimping. In addition, local Miskito residents are well aware of the effect of large, illegal fishing and shrimping operations on their own activities, and they feel that these resource pirates are stealing what is rightfully theirs, resources which they fought and some died for in the recent civil war.

There is no doubt that they support the Mikupia organization in working to save these resources for themselves, that they are aware that the resources are not limitless, and that they themselves must participate to maintain them as a resource for the future. Several individuals came forth in community meetings held while this investigator was in the field to talk about the importance of these resources and of their impatience to see something done to protect them.

But community interest is not limited to just the marine resources and the conservation aspects of this project. It also includes general socio-economic development. The traditional Miskito economy, as was mentioned above, blended local subsistence-level farming and fishing with wage labor outside the community, the latter including lumber mills, fishing boats, road maintenance, and other unskilled and semi-skilled labor. The Miskito economy as it stands today has been hurt in both aspects of this mixed economy. The subsistence base has been hurt by resource piracy but also by non-marine disruptions stemming from the civil conflict. Many farmers do not have enough rice and cassava seed to plant, so harvests will be small this year. Also, the Sandinista strategy of killing or stealing all cattle has hurt; it is estimated that only 20% of those who had cattle before have been able to reacquire them, and then not in the numbers they had previously.

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But they have been equally hurt by the inactivity caused by the war, the poor economic policies of the Sandinista government, and the economic blockades of the last decade, and wage-paying jobs are scarce. It is probable that this situation is only temporary, however, as foreign investment is returning to the country, including the RAAN area. For example, Taiwanese investors are planning a pulp mill on the Kukalaya river where the river crosses the Rosita-Puerto Cabezas highway, and a shipping facility would be required somewhere in the southern part of the MCR. American investors are looking into reopening the mines at Siuna, Rosita, and Bonanza not far from the pulp mill. In time, these operations and others will provide wages to complement the subsistence activities of the Miskito in their coastal communities.

But there is also the possibility of attempting to improve the situation locally so that young people would not be forced to leave their communities to look for work. The possibilities can be divided into two types: those which improve the subsistence level of the local domestic economy and those which provide wages through local entrepreneurial activities.

Improvements in the local subsistence economy are a felt need in the Miskito communities from commentaries at community meetings attended by this investigator in the field. The most immediate assistance they could receive would be cattle to replace those lost during the civil conflict. Other activities are those commonly associated with integrated rural development in other parts of the developing world not involving the sea. Composting could make their small plots more productive and perhaps make it possible to use an individual plot more than one year. They have communal lands where they would like to plant trees to supply housing lumber for local use in the future. They would like some way to take advantage of the enormous quantities of mangos available to them seasonally, perhaps to produce juice or preserves.

One area in which individuals in the area around Puerto Cabezas could profit would be in providing foodstuffs for the port city, including vegetables, chickens, eggs, and other basic foodstuffs. Restaurants and homes in Puerto Cabezas at present must buy most of these items after they have been flown in from Managua on Aeronica cargo flights. Not all such items would be feasible in the coastal climate, but there must be a few items that would be possible. What is required is careful analysis of local conditions and cautious pilot programs with sufficient technical assistance to ensure their success. It was of course not possible to make any clear determination as to how this local development should proceed, just that it should be attempted.

Another possibility to improve levels of income in the communities focuses on marine resources. The CCC proposal mentioned carrying out an assessment of packing and freezing plant potential to process fish, shrimp, and lobster for domestic and foreign export. Such a study should take into account the carrying capacity of the area and both tradition and market-sensitive harvest schedules. There are already two plants in Puerto Cabezas, neither running at capacity. One of these belongs to the above-mentioned INPESCA national fishing enterprise, probably to be privatized in the near future. Miskito fishermen and shrimpers complain of the low prices they receive for the product sold there.

Such ventures are risky, of course, but the rewards could be great. One of the reasons for the success of the Guatemalan Mayan NGO, the Proyecto Lingüístico Francisco Marroquín, which does development work in Mayan languages, is that it has a constant source of income from its highly successful Spanish language school. A fish processing plant could provide a similar source of income for Mikupia to extend its activities and to continue operation upon completion of this project. Or, it might be decided that such a venture would be preferable outside Mikupia in the context of a fisherman's cooperative, operating parallel to Mikupia.

In any event, the needs of the communities in Mikupia need to be addressed in some form in this component, but within the context of a Protected Areas and Buffer Zones effort.

3. Role of women

As one will note from the list of Mikupia's board of directors, there are no women present, in spite of the fact that women play an important traditional role in Miskito society. As was mentioned above, Miskito marital relations are matrilineal, where newly married couples move in with the bride's family instead of the groom's, a fact that establishes the predominance of the woman's family over that of the man. The anthropological literature indicates that matrilineal residence is found where the principal providers of caloric intake are women, usually because the gardens they tend are of greater importance to the local diet than the fishing or hunting expeditions of men, and such would seem to be the case among the Miskito.

How can the lack of women in Mikupia be explained? It appears likely that the origin of Mikupia among exiled young men in Costa Rica and among the guerrilla members of the Resistance, nearly always male, caused the group to re-form in Nicaragua as Mikupia by calling on those same young males involved in the early conversations. It is not that women have been systematically excluded from political organizations, since one of the principal Miskito leaders of MISURASATA was a woman, Hazel Lau.

Mikupia should be asked to rectify this situation by naming an equal number of women to its Board of Directors. These are the women who remained in the Miskito communities during the civil war and who suffered the attacks by the Sandinista army on the communities themselves, and they will provide valuable input to the organization in general and to this project in particular.

Specifically, women should be the focus of the community development effort, since they are traditionally the principal providers of non-marine elements of the Miskito diet. Needs assessment by the project must focus on the kinds of activities which women themselves identify as potentially productive and which complement their traditional activities.

D. Beneficiaries

1. Direct beneficiaries

The target population beneficiary group of this project includes the entire Miskito population living along the Atlantic coast beaches and lagoons, a population estimated at about 15,000 people, who acquire a part of their diet and income from marine resources: fishing, diving for lobster, and turtle hunting. An estimated 3,000 men are engaged in marine resource harvesting at least part-time. They will benefit by increased availability of marine resources as marine resource piracy is brought under control and wholesale harvesting by non-national fishing boats is halted. The Miskito fishermen and their families will eventually benefit from the establishment of a fishermen's cooperative to jointly market their products and from the creation of a fish processing plant to freeze and otherwise process their products for eventual export to internal and external markets.

Also benefitting the entire population, but directed in this case specifically at women, are the buffer zone activities in the Miskito communities to increase incomes and improve diets by initiating productive activities within the Miskito communities. An estimated 3,000 women will benefit from improvements in domestic garden production and in small farm animal production. These benefits will include both improved diet during the periods of migrant labor when males leave the community for six months at a time, but also the possibility of cash income through sales of garden products, eggs, chickens, and fruit to the larger towns like Puerto Cabezas, which currently send to Managua for these goods.

2. Indirect beneficiaries

One of the indirect beneficiaries of this project is Mikupia itself and, through Mikupia, the entire Miskito population, which needs organizations which are made of Miskitos, are directed by Miskitos, and which look out for Miskito interests. In spite of a past in which the Miskitos had a "king" and maintained a more complex social organization, the traditional Miskito society in recent years has been very localized. Each community has resolved its own affairs but has not had a vehicle for participation in the wider society of the North Atlantic Coast, much less Nicaragua as a whole. Mikupia will provide the Miskitos with one such organization in a centrally important area of local society and economy.

Another indirect beneficiary of this project is the country of Nicaragua as a whole. The control of resource piracy can only benefit the country as a whole. If concessions are granted to outside fishing boats, monitored and controlled by the Miskitos in Mikupia, the resulting revenues will help to finance the regional (RAAN) and/or central governments, always strapped for funds. If the resources are harvested and processed by the Miskitos themselves, the earnings in hard currency and export taxes again benefit the regional and/or central governments.

E. Impact

The activities in this project as regards the Miskito Cays Reserve in considering impact can be roughly divided into three areas: scientific studies of the local ecosystems,

activities designed to improve the socio-economic situation of the Miskitos, and the strengthening of Mikupia as a local representative organization.

1. Socio-economic

The scientific studies contemplated for this project involving studies of ecosystems (local and migratory birds, sea-grass ecology, reef studies, sea turtle ecology) are designed to be carried out in a collaborative arrangement between international specialists and local Miskito specialists. By hiring the Miskito specialists, the studies will provide a small economic benefit for those few Miskito specialists who are chosen to work on the project, but there will be no further immediate socio-economic benefit of these studies.

Other project activities, on the other hand, are designed specifically to have high socio-economic impact. Activities involving resource piracy, for example, are so designed, since the control of resource piracy should mean increased marine resources for exploitation by local fishermen, divers, and turtle hunters. Several assumptions are involved in considering this impact. First, the Miskitos must be able to monitor resource piracy effectively. They currently are very aware of fishing boats raiding marine resources. If they are able to increase their vigilance and to communicate sightings of resource pirate vessels, it will improve the possibility of controlling resource piracy.

Second, the Miskitos need to be able to count on effective cooperation on the part of enforcement authorities, such as the police in Puerto Cabezas, to use the information provided by Miskito monitoring to control the resource pirates. At present, Mikupia has excellent relations with the local law enforcement authorities, who have occasionally been able to arrest resource pirates, but their resources are limited in terms of manpower, patrol boats, and arms. Mikupia cannot take on a police function, but it might be able to assist the police by providing boat transportation for the police, if Mikupia has that resource.

Third, if control of resource piracy is successful, leaving greater marine resources for the Miskitos to manage and exploit themselves, they still need some way of converting this exploitation into a profitable and sustainable enterprise. This will require both the organization of the exploitation activities themselves, probably in some form of fishermen's cooperative, plus the development of a system of marketing their product. In the case of the latter, if local fish processing facilities are unattractive, either because they are inefficient or because they provide too little economic incentive for fishermen, then the development of a fish processing facility owned by the Miskitos themselves must be carried out.

Turning to the community development activities to be carried out primarily with the women on shore in the Miskito communities, impact will again depend on the validity of certain assumptions. First, Mikupia must change from a currently all-male organization to one in which women have equal representation in order to ensure that programming is equally representative of both women's and men's points of view. Income generation activities in the Miskito communities must involve the organization and involvement of women's groups in each community to make sure that these activities can be coherently integrated into the traditional activities of Miskito women.

Second, CCC must provide adequate technical assistance to further these activities. CCC, primarily a natural resources NGO, lacks a track record in carrying out community development activities of the nature of those proposed for this project. It must seek technical resources, probably outside its own organization, to provide the necessary assistance for this component of the project.

2. Institutional: Mikupia

This project should have a dramatic positive impact on Mikupia as an organization and as an institution representing Miskito interests. All of the project activities should contribute to this impact. It is Mikupia which will provide the Miskito specialists to work on the scientific studies, and Mikupia will gain stature throughout the Miskito area through its central role in the increased knowledge of the local environment and resources among selected members of the Miskito community. It is Mikupia, through its community outreach program, which will communicate increased and improved knowledge on the local ecosystem, the sea turtles, and on sustained natural resource management to the member communities on the North Atlantic Coast.

If the control of resource piracy is achieved, it is Mikupia which will be able to take much of the credit for doing so and thus improving the preservation and availability of marine resources for the Miskito people. If a fishermen's cooperative is launched and if a fish processing facility is developed, it is again Mikupia which will be credited with these achievements among the Miskito communities.

These institutional impacts are important in view of the paucity of supra-community organizations among the Miskitos. The only other organizations are either the now unnecessary Resistance organization and the nascent political organizations. A viable and dynamic regional organization like Mikupia which looks out for the interests of the Miskito people should eventually stimulate the formation of other, similar organizations focusing on representing the Miskitos in other aspects of life.

F. Issues and Recommendations

1. CCC as international NGO for this project

CCC has no demonstrable track record in community development projects, which raises doubts about its ability to work productively in activities which are not directly involved with marine resource conservation and management. The budget for the first year of activities to be funded by AID/Washington does not include international technical assistance to work in this area, nor are funds set aside for development of the fishermen's cooperative or fish processing facility.

Recommendation

CCC should budget sufficient technical assistance through the life of the project to develop these activities. The community development component technical assistance should involve an anthropologist or linguist with anthropological training, preferably a woman, with experience in rural community development. The technical assistance will require at least three months and preferably six months continuous residence in Miskito communities with shorter follow-up visits of two weeks to one month, the number and length of these visits to be determined after the initial period. Among the tasks of the anthropologist-linguist will be the carrying out of a socio-economic baseline survey of the Mikupia communities, plus case studies and standard anthropological participant-observation qualitative data collection. The output of this work will be a series of proposals to carry out socio-economic development activities, primarily by women, in the Miskito communities.

2. Mikupia's board of directors vs. Mikupia employees

There is an assumption in Mikupia at present that the Mikupia "officers" will in great part coincide with those employed by Mikupia, including the Sub-Director and Field Coordinators. This represents an unacceptable conflict of interest, since the board of directors would effectively be setting salaries and determining expenses for themselves as employees.

Recommendation

Mikupia must set a policy that board members may not be employees. If present Mikupia board members wish to be considered for jobs in this project, they must resign from the board. This policy should apply only to officers involved in policy making, of course, and not ordinary members of Mikupia. In fact, Mikupia should insist that its employees be members of Mikupia.

3. Salary structure

As mentioned above, the salary structure for Mikupia employees proposed by CCC in the proposal presented to AID/Washington is unsound. The Miskito culture is one with minor differences in material goods from one individual to another and one in which striving to achieve material superiority is not valued. Setting salaries for individuals with similar education and background, in spite of the differences in responsibilities, at strikingly different levels would cause resentment and rejection.

Recommendation

In the early stages of the project and under the guidance of CCC, Mikupia must determine what a modest, fair, and adequate salary should be and set that salary as a full-time equivalent for all employees throughout the organization. Mikupia should stress this equivalence with employees, non-employed members of Mikupia, and throughout the Mikupia area of influence in order to stress the service aspect of the NGO and its desire to improve the quality of life for all Miskitos. At the same time, Mikupia and CCC must recognize that employees in different areas of the organization will require varying amounts

of expense money. For example, Miskito specialist involved in scientific studies in and around their own communities will occasionally need to travel to the Mikupia offices at Puerto Cabezas, and they will need travel and per diem funds. Mikupia employees required to live full-time in Puerto Cabezas will require a living allowance to offset the extra expense of not living in their home communities. Miskito employees living in Managua will require a similar living allowance. Mikupia, with close supervision from CCC, must make such a study of living, travel, and per diem rates, so that no one is either favored or penalized by working at a particular job in the Mikupia organization and in this project. Once these rates are set, the figures should be communicated to the AID project officer and they should be included in project audits and evaluations.

4. Lobbying by Mikupia

The success of this project in recuperating control of the management of the marine resources of the North Atlantic coastal areas and the Miskito Cays depends to some extent on not having project policies and activities undercut by entities outside the area. Specifically, the control of resource piracy is of little help in the management of the area's resources if the central government concedes licenses to foreign fishing vessels to over-exploit the area. In addition, while police actions in conjunction with Mikupia monitors might be sufficient in controlling minor resource piracy, the police/Mikupia resources as regards boats and arms will be insignificant in the face of larger and faster vessels or ones too heavily armed to challenge.

Recommendation

Mikupia must have sufficient lobbying capacity in Managua to adequately represent its interests in Managua. Mikupia/Managua must acquire its own lawyers, probably not full-time, and its representatives must be able to present Mikupia's case with the central government and to monitor government policy involving resource exploitation in the North Atlantic Coast. In addition, these representatives must establish contacts with the various foreign missions in Managua and, in conjunction with the central government, pressure those missions from countries involved in resource piracy to control those vessels.

5. Mikupia's relationship with similar NGO's

Mikupia is a very recent organization, and its status as an ethnic NGO places it in a unique position in Nicaragua. Mikupia's problem is how to establish its identity with little previous experience and with no local role models to learn from. Other Nicaraguans but international consultants as well can provide little guidance in this respect.

Recommendation

Mikupia should establish contact with ethnic Indian NGO's in other parts of Central America. In particular, it should establish contact with the Proyecto Lingüístico Francisco Marroquín in Guatemala, an all-Mayan NGO which has operated successfully for two

decades, has worked in language-related development (an important aspect of Miskito culture), and has functioned as a role model for more recent Indian NGO's in Guatemala. Similarly, it should contact NGO's along the Atlantic seaboard of Costa Rica and Panama which share a similar general environment as the Miskito.

6. CCC/Mikupia's relationship with IRENA

This project makes almost no mention of IRENA, the natural resources institute of the central government, in spite of the fact that it was through IRENA's efforts that the area was declared a protected area and in spite of the existence of IRENA offices in Puerto Cabezas. While there is no doubt that IRENA will play a minor role in this project, IRENA should be considered an ally to be treated with respect and, as is the case with government agencies anywhere, a dangerous and unnecessary enemy if it feels that it is slighted or not taken into account.

Recommendation

The CCC/Mikupia project must actively find ways for IRENA to participate in this project. An IRENA representative should be invited to attend all policy meetings, decisions taken by the project should be communicated to IRENA and its opinions taken into account, and the project should ask that IRENA assign at least one person to work full-time with the project. IRENA may not be able to for lack of personnel, but the attempt should be made. CCC and Mikupia should then work with IRENA to establish a scope of work for this individual.

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IV. The Bosawas project

A. BR project background

1. BR project beginnings

The proposed Bosawas Reserve is over 650,000 hectares of mountainous upland rainforest ranging from 200 m to 1,000 m in elevation and containing both coniferous and deciduous forest communities. The core area is little altered or inventoried but is known to contain a wide variety of species, including jaguars, tapirs, harpy eagles, and other endangered species. At present the area is threatened by illicit logging and hunting. Spontaneous colonization is utilizing slash and burn agriculture to open previously forested land. IRENA has just two rangers and one vehicle for the entire area, although the Swedish development effort plans to fund a park director and a vehicle next year.

The Bosawas region has not yet been officially decreed a protected area. The proposed boundaries, at one time covering a much larger area, have been redefined to include a smaller, more manageable area than was originally proposed. IRENA has identified this area as a conservation priority, and the Central American Environmental Program (Programa Ambiental para Centro America - PACA), a regional initiative undertaken by CARE, The Nature Conservancy (TNC), and Conservation International (CI), has presented an unsolicited proposal to AID/Nicaragua entitled Bosawas Natural Resource Management Project. The PACA consortium initiative was launched with initial funding from the USAID/ROCAP "Regional Environmental and Natural Resource Management" Project (RENARM).

2. BR project components

The BR project will include two major technical components: Protected Area Management and Buffer Zone Development. The project will begin with a needs assessment working with local communities to involve them in project design. The needs assessment will provide an understanding of the social, economic, and ecological context of the project, including the social and economic needs and quality of life aspirations; implementing agencies and local organizations' ongoing activities and institutional capabilities in conservation and development; research needs, ongoing research efforts, and functioning of the national research network; and actions required to overcome shortfalls in the areas of conservation and research. The central activity of the needs assessment will be a baseline study with a special emphasis on the role of women and youth and taking into account ethnic differences.

The Protected Area Management component will include rapid ecological assessment of the Bosawas area, on-the-ground protection and management, the development of management and annual operating plans, applied research and environmental monitoring, local NGO leadership training, local NGO strategic planning and program development, and local NGO financial self-sufficiency. Among the expected outputs of these activities will be the collection and analysis of conservation information for the protected area, baseline

information on biotic resources and socio-economic conditions, the incorporation of buffer zone communities and those inside the protected area into the management design process, the hiring and training of rangers and community extensionists, and management and operating plans developed involving IRENA and local NGO(s).

The Buffer Zone Development component will include the development of sustainable resource use in buffer zones, sustainable agriculture and agroforestry, forest resource use development, and community-based environmental education and extension. Among the expected outputs of these activities will be the selection of at least five target communities plus promoters in the Bosawas buffer zone, sustainable agriculture and natural resource management techniques practiced in these five communities, 50% of the farmers in the project buffer zone exposed to non-formal extension and education services in environmental awareness and alternative agriculture, and the environmental and extension outreach of at least one local partner NGO is strengthened.

B. Bosawas socio-cultural context

The Bosawas poses problems for social analysis for several reasons. First, the reserve itself is virtually impenetrable by vehicle, except by helicopter, and the buffer zones are not easily accessible, requiring four-wheel drive vehicles and long drives, and even so, one can visit only a small part of the zone by road. The only feasible means of travel are by boat or on foot; mules and horses are difficult to use in all but a small portion of the Bosawas region. A second reason is that, in contrast with the Miskito Cays area, the Bosawas and buffer zone is far less homogenous culturally, socially, and economically. The predominating social group within the reserve itself is the Sumu Indian ethnic group, the southeastern buffer zone is dominated by the mines, and the southwestern buffer zone is being pressured by new settlement by recently disarmed Contras and/or Sandinista veterans.

1. The Rosita-Bonanza-Siuna mines

The buffer zone area on the southeastern quarter of the Bosawas is dominated by the mining operations in and around Bonanza, Rosita, and Siuna, which form a triangle in which the Bonanza-Siuna side parallels the Bosawas. The estimated populations of the three mining centers at present, taking into account both the town center and immediately surrounding areas, are: Bonanza (7,000-8,000), Siuna (8,000-10,000), Rosita (2,000-3,000). The mines are principally gold mines but also produce substantial amounts of silver, lead, copper, and zinc. The mines were nationalized by the Sandinistas following the overthrow of the Somoza regime, but there are strong indications that they will be included in the privatization actions being taken by the present government.

The mines before 1979 were each in different stages of operation. The Bonanza operation was running at capacity, Siuna had just a skeleton crew, and the Rosita copper mine was operating on just a salvage basis with more emphasis on gold and silver extraction from satellite mines at La Luna, Guapinol, Riscos de Oro, Blag, Nueva America, and La Primavera. Bonanza had about 700 full-time employees, Rosita had 400, and Siuna 200,

plus seasonal laborers numbering about 200 for Bonanza, 100 for Rosita, and none for Siuna. Seasonal laborers were usually employed on road maintenance and construction, timbering operations, and cutting back vegetation along roads, around buildings, and throughout the camps.

In addition to the direct mining camp employees, there were others employed (50 full-time, 150 when ships were in port) in the transport of ore-bearing rock and sand from the mines by truck to Limbaika on the Prinzapolka river (another 30 full-time employees) and from there by barge to Puerto Isabel, where it was loaded onto ocean-going vessels for processing in the United States. The port facility at Puerto Isabel was partially destroyed by the Contras during the civil war, and the destruction was completed by Hurricane Joan in 1988. The Limbaika facilities were likewise destroyed by the civil war, and the road between Bonanza and Rosita is at present impassable.

If the mines, which are operating at a reduced level at present, were reopened under private ownership, they could be expected to employ 780 people in the first year (Bonanza - 500, Siuna - 280) on a full-time basis plus 800-1,000 seasonal laborers. These numbers would climb to 2,600 full-time and an equal number of seasonal workers in five years through labor intensive mining strategies, then drop off to about 1,000 in each category by year seven as the mines became increasingly mechanized.

The mines require approximately 24,000 board feet of lumber per day for underground tunnel supports, primarily in sizes (inches) 8x8, 12x12, and 3x12. The 24,000 board feet is the equivalent of 800 tons per day, or 2.8 million tons per year. The mines have not used lumber from trees from the Bosawas area in the past and should have no reason to use it in the future, according to the former (and likely future) mining engineer of Bonanza. His only concern in this respect was that the Taiwanese sawmill planned for the intersection of the Kukalaya river and the Rosita-Puerto Cabezas road, which is to be granted a concession of 200,000 hectares, will not provide the mines with timber in the quantities or prices that will be required. The mines themselves would require 36,000 hectares to supply the mines, including cutting and replanting.

In addition to the Rosita-Bonanza-Siuna triangle, there are also mines at Murubilia on the extreme northeastern edge of the Bosawas and a few on the Coco river.

2. The Sumus: principal group inside the Bosawas

The Sumu people, whose total population probably does not exceed 7,000, are dispersed sparsely throughout the central and north Atlantic provinces of Nicaragua, as well as in bordering areas of Honduras, but their strongest concentrations are probably within the Bosawas in the central and northeast quadrants. Although the majority of the Sumus live in Nicaragua, there are also small communities resident in Honduras. The Sumu are members of the linguistic entity Misumalpan of the larger family Macro-chibcha. While there were numerous languages and/or dialects among the Sumus at one time, the processes of extinction and of absorption into other groups, primarily the Miskito, has reduced linguistic variation. Although early observers used various names to refer to the Sumu, sometime in the 19th

Century the Miskito word Smu or Sumu (meaning uncivilized Indian) became the generally accepted term for all non-Miskito Misumalpan peoples in the region.

From the time of contact with Europeans, Sumu society underwent constant depopulation, which can be attributed to three factors: disease, military subjugation, and assimilation. During the 17th Century the Miskitos acquired firearms and dominated neighboring groups, sacking Sumu communities and capturing the inhabitants as slaves. When the Miskito and Sumu were not at war, trading relations brought them into contact, and the interactions often resulted in the assimilation of Sumu into the dominant Miskito culture and language. In addition, the diseases introduced from outside had a more serious effect on the small Sumu bands, as an epidemic could either wipe out or render inoperative a band, causing extinction or forcing assimilation.

Today there are probably some 3,000 Sumu living within the borders of Bosawas, one group centered on the village of Musawas near Bonanza and the other in Jinotega in the northwest quadrant of the Bosawas.

While the strategy of the Miskitos was to take advantage of their contact with the Europeans, primarily the British, the rise of the Miskito meant increased pressure on the Sumus, and they reacted mostly by withdrawing further into the forests in the interior, avoiding contact with the Miskito and other outsiders and maintaining their traditional culture. Where the Miskito culture balanced the exploitation of marine resources with subsistence farming, the Sumus balanced low level slash and burn farming with hunting and fishing in the region's many rivers.

The Sumus were swiftly introduced to the problems of the 20th Century during the last decade by the guerrilla war against the Sandinista government. While the Sumus and Ramas had participated in name only in the formation of MISURASATA (in which the SU stands for Sumus and the RA for Ramas), the Sumus' location near the Honduras border, the sanctuary for the Contra resistance, almost guaranteed that they would be drawn into the conflict in some way. The Sumus took their cue from the Miskitos and joined the Resistance, and the principal Sumu community of Musawas was at one point bombed by the Sandinista Air Force.

3. New Contra settlements in the western Bosawas

Present situation

When the truce between the Nicaraguan army and the Contras was achieved after an eight-year civil war, one of the conditions was that the Contra soldiers would receive land, a promise which was repeated by the new President, Violeta Barrios de Chamorro. Among the areas mentioned was the area down river from San José de Bocay in the northern Jinotega province. As a result, the town of San José de Bocay has swelled in the last year or so, and according to the principal mediator between the Contras and the Ministry of the Interior, Juan Arauz (also known as Comandante Siete Leguas), there are currently some 1,480

demobilized Contras around San José de Bocay which, including their dependents, number around 6,000 people.

Settling the Contras has been a slow, difficult process. There is an office in charge of the process, the OAS (OEA/CIAV) office, manned by the above-mentioned Mr. Arauz, and there are warehouses to store foodstuffs, which are distributed at certain intervals to the demobilized troops. While some ex-Contras have become weary of waiting and have left to find their own way, many are patiently and not so patiently awaiting settlement by the government.

The government commission in charge of resettlement arrived at the first of June, 1991, in San José de Bocay. The commission is made of five individuals from the Agrarian Reform Institute (INRA), three economists and two agronomists, one a specialist in agriculture and one a livestock expert. According to commission members, they expect to resolve the situation and return to Managua in three months (September, 1991). In addition, the Ministry of Agriculture (MAG) recently sent an agronomist to join in efforts in the region, and IRENA will place an agroforester there in June (1991).

IRENA previously had a park ranger for the west side of the proposed reserve, the ubiquitous Mr. Arauz, from 1980 to 1984 when the civil war turned the entire area into a battlefield, and Mr. Arauz decided to side with the Contras. It is hoped that he will return to work with IRENA full-time eventually, and his near-legendary status among all in the area would provide IRENA with considerable weight and status in protecting the Bosawas.

Within the Bosawas itself, according to Mr. Arauz, there are some settlers, but they are few and have little effect on the forest. The soil appears to be fertile enough so that the slash and burn cycle of farming can be carried out with just two plots, one to work and one to leave fallow, alternating every year between the two. Difficulty of access has meant that these settlers almost never have a cow and rarely have pigs and chickens.

The INRA commission will work in conjunction with MAG and with IRENA, but it has the final word on where and how large the resettlement land grants are to be. The planned strategy of the INRA commission is to carry out an agricultural census from San José de Bocay down the Bocay river to the mouth of the Wina river and from the approximately 100 meter altitude at the river up to an altitude of 300 meters on both sides of the river. The area, blocked out on a map at the INRA commission's office, should contain approximately 50,000 manzanas of agricultural land for resettlement. While this number is only an estimate at present, it is expected that the land will be sufficient to settle 2,000 demobilized Contras with 25 manzanas each.

It seems clear that the 25 manzana figure was not determined according to what each farmer would need or be able to farm, which would appear to be about half that figure. INRA has apparently been carrying out agrarian reform and small farmer settlement programs since 1984 on 25 manzana plots, regardless of soil, climate, or other factors. Local farmers would expect to plant no more than three manzanas of corn, no more than two manzanas of beans, no more than one manzana of rice, two manzanas of bananas or

plantains, one manzana of cacao as a cash crop, and, if they have a pair of oxen and a milk cow, one manzana per animal of pasture, for a total of about half the area INRA has determined it will provide. While these farmers might leave half their 25 manzana plot fallow, it might also be possible for them to get by with a reduced amount of land using more intensified agricultural techniques.

The INRA plan involves a long narrow area stretching from San José de Bocay to the mouth of the Wina river, but half of this area, from the mouth of the Tapal river to the Wina river, is located within the proposed Bosawas reserve. All of this area saw considerable action during the civil war, and approximately 2,500 families were evacuated by the Sandinista army while others fled into exile in Honduras. Some of the area considered by INRA includes farms abandoned by these people, some of whom have returned, others may return and others will not. INRA will honor those who have title to their lands, as well as those who do not but who claim particular plots, but if lands have been resettled before these claims are made, alternative plans will be worked out.

Many of those expecting lands are not farmers but speculators interested in what they consider "spoils of war," and it is expected that many will sell or abandon their lands as soon as they have received title to them. Whether or not they are farmers, and if so, whether or not they are interested in working the land, there will undoubtedly be higher interest in those lands with access to road transportation than those which lack this access. The park lands are those down river with minimal access to services and transportation, and are also precisely those which will be of less interest to the demobilized Contras.

Analysis

The NRM Project has an opportunity to help make the Bosawas project a success. The key to protecting the Bosawas on the western edge around the Bocay river at this point in time is to remove the stimulus to enter the park area with the purpose of farming. The nature of the park boundaries, down river from the focus of Contra resettlement, makes the area within the park boundaries less attractive than the area outside the park. This project can make this area outside the park much more attractive and lessen the desire of those who would colonize within the park by providing a package of integrated rural development incentives to those outside the reserve and denying this package to those inside the reserve.

Dr. Jaime Incer, Minister of IRENA, concurs that the highest priority in protecting the Bosawas reserve from the incursions of loggers and small farmers is the Bocay region, placing it ahead of the southern and eastern edges of the reserve. Dr. Incer has communicated the concern of IRENA about Contra resettlement within the proposed reserve boundaries to Dr. Gustavo Tablada, Director of INRA, and to other high government officials, and the assignment of an IRENA forester at this time in San José de Bocay is a reflection of the importance IRENA places on initiating protective measures on this edge of the proposed reserve.

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C. Participation

1. Preliminary information from PACA

In preparation for submission of its unsolicited proposal on the Bosawas, PACA carried out a needs assessment of the buffer zone area located in and around Siuna, the mining town south and east of the proposed reserve. While identifying some 30 cooperatives in 15 communities in the Siuna area, it focused on probing the needs and attitudes of four or five of these cooperatives. Some of the cooperatives, such as those in the towns of Hormiguero and Rosa Grande, are located within the confines of the Bosawas, while others are in the proposed buffer zone.

The cooperatives average 30 members each, of whom 84.8% are men and the rest women; 11 of the cooperatives have no women members at all. The average holdings of the cooperatives is 697 manzanas [488 hectares], 15.5% of which is used for agriculture, both annual and permanent, 16.5% is used as pasture, 31.5% is in forest, and 36.8% is classified as "other." The 3,232 manzanas [2,262 ha] of agricultural land is divided into annual (89.9%) and the rest in permanent crops, while the pasture land is either improved (72.0%) or natural (28.0%). Holdings range from 175 to 3,150 manzanas per cooperative; individual cooperative members have an average of 3.6 manzanas of agricultural land, 3.8 manzanas of pasture, 7.3 manzanas of forest, and 8.5 manzanas of "other" land.

Both slash and burn as well as stationary yearly forms of agriculture are practiced in the area, more of the former in the northern Bosawas and buffer zone and more of the latter in the southern area around Siuna. Slash and burn plots are usually from one to five hectares in size, usually farmed for one year (two years at the most), and left fallow for two to five years.

2. The local NGO problem

The strategy selected for the NRM Project is to have the international NGO, in this case PACA, work with a local NGO to carry out the project. The characteristics of an ideal local NGO would include: solid backing from the local community, interest in implementing solutions to local development problems, experience in rural leadership and extension, and concern about environmental protection. No local NGO currently comes close to filling those requirements.

SISPBAKMAKAN

The only likely NGO candidate is one called SISPBAKMAKAN, but it would only be able to function where the Sumu Indians predominate in the buffer zone, meaning the area to the west and north of the mining town of Bonanza. SISPBAKMAKAN is a nascent organization of Sumus which claims to represent the entire Sumu nation, including many outside the proposed Bosawas reserve. It does not have legal standing (*personería jurídica*) as yet, it has no source of funding, and it has not carried out or even started development projects. It was born out of the experience of a few Sumus who participated in the

Resistance, who learned about contacting international aid organizations, and who wish to help their communities develop. Their requests for aid are based in part on claims that they have suffered during the recent civil war.

The problem with working with SISPBAKMAKAN as a local NGO in this project is that the Sumus are not the priority buffer zone problem; in fact, they are not a problem within the proposed reserve and the decree proposing the declaration of the Bosawas Reserve guarantees their rights to live within the reserve and to continue their traditional (i.e., non-destructive) use of the forest lands. A second problem is that the Sumus would not be able to represent non-Sumus as an organization, and non-Sumus make up the primary population which endangers the Reserve on its southeastern and southwestern borders. Third, the highest concentration of Sumus is found north and west of Bonanza, while the priority areas for buffer zone activities are south of Bonanza around Siuna, at the southern tip of the reserve near the Siuna-Waslala-Matagalpa road, and especially on the Bocay river.

Besides SISPBAKMAKAN, no other acceptable local NGO candidates were identified in the course of this Social Soundness Analysis, and it is thus recommended that PACA, as part of its initial activities, help local residents form one or more NGO's in the communities selected for project activities. Such a strategy may have positive as well as negative results. Possible negative repercussions include the creation of an NGO which will function only for the life of the project (while funds are available) but which will cease to function when the project ends. On the positive side, by helping the NGO from its inception, PACA may be able to guide and direct it toward a positive role within the community and to inculcate positive community development and natural resource conservation values.

A Bocay NGO: former Contras

The geographical location of the Bosawas reserve on the Honduran border, site of considerable activity during the recent civil war and now the focus of demobilized Contra settlement, means that perhaps the bulk of the people with which PACA will work are former Contras, and virtually 100% of the target population of beneficiaries in the Bocay area are demobilized Contras, the great majority Mestizos. In the Bocay area, the roots of local level participation can be found in the demobilized Contra organizations. The Contras are organized around the former Comandantes, who are responsible for dealing directly with the OEA/CIAV relief efforts. It is not clear whether individual farmers, when they receive their resettlement land, will continue to maintain ties with their former Comandantes, or whether groups under an individual Comandante will be settled in close proximity with each other, but it appears likely that this will be the case.

PACA's initial strategy in carrying out a needs assessment in the Bocay area will involve contacting and meeting with the former Contra leaders and with the individual demobilized Contras they represent. This contact should indicate to the PACA personnel the kind of NGO organizational strategy it should pursue to carry out the project. PACA should work closely with the IRENA personnel working in the region, as well as INRA personnel involved in the resettlement of the Contras.

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A Siuna NGO: local cooperatives

If the decision is taken to carry out buffer zone activities on the Siuna (southeastern) side of the Bosawas reserve, PACA has two options in establishing a local NGO: work with the cooperatives or establish a new NGO. The latter option has the same advantages and disadvantages for Siuna as it would for the Bocay. The other option is to work with cooperatives such as those mentioned above, either individually or through an umbrella organization involving various cooperatives. The primary risk in working with these cooperatives is that the cooperatives may have agendas, hidden or otherwise, which would make working with PACA on buffer zone activities a difficult task. It may be that their organizational patterns cause them to be unwieldy in a project involving an international NGO like the PACA consortium.

This study recommends that PACA carry out preliminary studies in the Siuna area among the cooperatives to determine their viability as local NGO counterparts, and that it do so before making a commitment to working together on this project. PACA should then submit its recommendations to AID/Nicaragua for approval, and AID and PACA should jointly decide which strategy to follow in the Siuna area.

D. Beneficiaries

1. Direct beneficiaries

The bulk of the direct beneficiaries of this project will be those involved in the buffer zone activities. There are an estimated 6,000-8,000 project beneficiaries in the Bocay representing 1,500-2,000 small farmers and their families. The INRA resettlement plan is based on resettling 2,000 demobilized Contras, while the actual number of Contras as of June 10, 1991, was 1,480 who with their families total just over 6,000 people. From these figures it appears that the average family size among the demobilized Contras is just four persons, less than the expected average of five for small farmers in Central America. If PACA works in the Siuna area with the cooperatives, the number of beneficiaries can be estimated at 4,500, based on the 900 farmer members of the cooperatives plus an average family of five.

2. Indirect beneficiaries

The Sumus and others living inside the Bosawas reserve can be considered indirect beneficiaries of the buffer zone activities. While they will not participate themselves in the buffer zone activities, the role these activities play in keeping new colonization from destroying their resource base ultimately benefits them. It is estimated that 3,000 Sumus live inside the Bosawas reserve, and while no figures exist for non-Sumus in the area exist, Juan Arauz estimates that no more than perhaps another 3,000 Mestizos and Miskitos are resident in the rest of the area.

Other indirect beneficiaries include the predominantly Miskito population resident on the Coco River, the boundary between Nicaragua and Honduras. The protection of the Bosawas forest will have an effect in both controlling and maintaining the river itself through protection of one of its principal source areas and in maintaining the riverine biodiversity, which is an important resource for the Miskito riverine culture and diet.

E. Impact

While the goal of this project is the protection of proposed Bosawas Reserve and the forest resources found there, the project will also have considerable social impact due to the buffer zone activities. The introduction of alternative improved agricultural techniques, improved seed and farm animals, soil conservation techniques, integrated pest management, and other benefits of agriculture extension usually has an impact on rural communities in the Third World, but in the case of this project, the impact should be more pronounced.

Impact should be greatest in the Bocay region. Most rural development programs work with small farmers who have lived for some extended period of time, whether a few years or centuries, on the land where development activities will take place. In the case of Bocay, it should be stressed that the demobilized Contra small farmers, at the time of this report, still do not know exactly where their farms will be. Many have never farmed in the Bocay area and do not know the particular traditions of farming in relation with these soils, temperatures, rain patterns, and other factors influencing agricultural production. They are in an ideal position to take advantage of the technical assistance this project can provide.

But impact in the Bocay region goes beyond agriculture. Perhaps the most important impact will be socio-political, and it relates to the whole context of the Resistance and the civil war in Nicaragua. The Contras, perhaps at the highest levels but also at the level of the foot soldier now demobilized in Bocay, feel that they won the civil war. The victory was not a strictly military one involving an invasion and eventually seizing power by force of arms, but the perception of the Contras that they forced the Sandinista government to accept elections in which openly pro-Contra candidates campaigned, that they forced the previous government to accept international scrutiny of the elections to prevent possible fraud, and that the Sandinistas lost the election -- all of these perceptions give the demobilized Contras the feeling that in the final analysis, they won the war.

Having won the war, the Contras feel that they deserve something akin to the spoils of war, some reward for having fought the good fight and for having made the sacrifices that they made. The reward for middle class Contras may be having businesses returned to them, and the reward for politicians may be positions of political power or in government, but the reward sought by the lowest level, for the foot soldiers, is title to good land to farm. They feel that they deserve it, that they earned it, and they expect to receive it.

While the government has promised to provide this land, the process has proved to be slower and more uncertain than expected. The demobilized Contras were promised land in the San José de Bocay area, an office was set up to take care of them while resettlement was planned and implemented, and they have had to settle down around San José, living on

rations donated by international relief agencies and wondering whether the promise of land was going to become a reality. As time passed, frustration grew, and the fact that somehow the Sandinista army was still intact and present as a force, although without representing a palpable threat to them, added to their irritation. The Sandinista army was even present in Bocay in the form of army engineers, who extended the road from San José de Bocay to the future center of Contra settlement, Ayapal. The irony of the Sandinista army constructing a road which would eventually serve the interests of the former Contras was not appreciated by the latter.

Events in June of 1991 illustrate the frustration of the former Contras and the delicate dynamics of the situation in Bocay. During the previous several months, rumors circulated that groups of former Contras had taken up arms again and returned to the mountains as guerrillas under the name of "Re-Contras." Newspaper accounts varied concerning their numbers, ranging from low estimates of a dozen or so to into the hundreds. They have occasionally set up check points to stop vehicles: two members of this Project Paper team were stopped by five such Recontras carrying AK-47's, a Brazilian-made FAL, and a grenade launcher. On June 11, the warehouses in San José de Bocay where supplies for the former Contras were stored were looted, the attack apparently initiated by the Recontras.

The stated reason for the rise of the Recontras is the Sandinista army, which the Recontras want to see disarmed as they themselves have been disarmed, but given the fact that the Sandinista army has shown considerable restraint and has pledged not to harry the Recontras, this reason is likely not the real one, although it may be used as a rallying cry. The real reason is more probably the glacial pace of resettlement and the uncertainty the former Contras feel in beginning a new life in the Bocay area.

The buffer zone activities of this project could have considerable impact in reducing tensions in the area. These activities will be perceived as finally providing the attention the Contras desire and need to make their new lives in the resettled area a success. The activities will turn the attention of the former Contras toward the myriad activities they need to perform to turn their newly-acquired lands into successful agricultural enterprises. Extensionists will help them adjust to the new area, providing advice on which crops are best in the area, what kinds of harvests they can expect, and how much of each crop they should plant to satisfy their own needs as well as to acquire cash income. The local NGO(s) will provide them with a focal point to express their needs, describe their problems, and organize the necessary assistance.

F. Issues and Recommendations

1. Buffer zone geographical coverage: Siuna or Bocay?

The size of the Bosawas region makes it impracticable to work in the entire buffer zone. In addition, the northwestern border is the Coco river, which is also the border between Nicaragua and Honduras. The northeastern border along the Waspuk river is not considered to be threatened by population pressures. This leaves the southwestern border in

the area of the Bocay river and the southeastern in the Siuna area. The question then arises: should the project select one or another of these two areas, or should it attempt to work in both?

Recommendation

PACA should tentatively plan on working on both areas, but its first priority should be the Bocay region, for the following reasons: The project has the opportunity to contribute significantly to slowing penetration of the Bosawas via the Bocay by demobilized Contra soldiers by offering buffer zone activities to those former Contras who accept resettlement outside the Bosawas. Pressure should be less on the Siuna side, because (1) the mines should soon reopen under private ownership, providing employment opportunities to individuals who might otherwise push into the Bosawas forest, and (2) because some demobilized Contras formerly in the Siuna area are moving to the Bocay region seeking land. Both areas should be included, however, due to the unstable political situation in the Bocay region.

PACA should set up a forward project office in Waslala, which will provide equally close access to both regions, and local level project offices in Siuna and San José de Bocay. It should process its needs assessment data on Siuna and set up a tentative plan of action, but the bulk of its initial efforts should be in Bocay. If the results of initial studies are that it is feasible to work in both areas, PACA should place a higher priority on the Bocay area with perhaps 75% of its total effort.

2. PACA's relationship with IRENA

This project makes almost no mention of IRENA, the natural resources institute of the central government, in spite of the fact that it was through IRENA's efforts that the area was declared a protected area and in spite of the existence of IRENA personnel in Siuna and San José de Bocay. While there is no doubt that IRENA will play a minor role in the buffer zone activities of this project, IRENA should be considered an ally to be treated with respect and, as is the case with government agencies anywhere, a dangerous and unnecessary enemy if it feels that it is slighted or not taken into account. It is worth mentioning that IRENA's recent previous experience working with CARE, one of the PACA Consortium's members, was not productive according to IRENA officials, and they are not enthusiastic about renewing that relationship.

Recommendation

The Bosawas project must actively find ways for IRENA to participate in this project. PACA should invite an IRENA representative to attend all policy meetings, decisions taken by the project should be communicated to IRENA and its opinions taken into account, and the project should ask that IRENA assign at least one person to work full-time with the project. IRENA may not be able to for lack of personnel, but the attempt should be made. PACA should then work with IRENA to establish a scope of work for this individual.

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3. Working with Contras in Bocay

The success of this project in the Bocay region will depend on how well PACA can work with the demobilized Contras, since all of the buffer zone beneficiaries will be former Contras. They continue to maintain their relationships with high former Contra officials in Managua, they are still organized for purposes of resettlement under the same former "Comandantes," and they continue to have a fierce loyalty to all who were associated with the Contra Resistance.

Recommendation

PACA must begin its activities in the Bocay region by contacting OEA/CIAV for orientation on its resettlement activities and the organization of the former Contras at present and by contacting INRA about its settlement plans. It must then establish contact with the former Contras beginning with the high officials in Managua and then in San José de Bocay through Mr. Arauz. In planning the establishment of a local NGO, PACA should encourage the former Contras to take the lead in suggesting the form this new NGO should take, and it should work closely and carefully with this new organization to establish the PACA-NGO relationship as one of collaboration and to make clear that PACA is not simply part of the relief effort providing free sustenance to the former Contras but rather wishes to work with the former Contras to help them develop their newly acquired lands.

As in the case of Mikupia, board members of the new organization should not be at the same time employees. Individuals employed by the project should whenever possible be former Contras themselves and in any case not Sandinistas. Many of the former Contras in the Bocay area have backgrounds -- school teachers, small businessmen, former government officials -- which would allow them to make a significant contribution to the organization, both as board members but especially as employees.

4. The Siuna NGO

It is unclear just with what group or groups the project will be able to work in Siuna. The cooperatives mentioned above represent a logical possibility, but it may be that they have political agendas which are incompatible with this project. This possibility cannot be decided without further study.

Recommendation

PACA must initiate activities by making contact with the cooperatives operating in the Siuna area and determining, in conjunction with the AID project officer, whether the cooperatives qualify for participation. If they do not qualify, PACA must investigate the area to determine whether or not there are other groups with the appropriate characteristics for participation in this project. If it appears difficult to identify such groups, AID should consider authorizing PACA to limit its focus to the western zone at Bocay or in studying possible collaboration with SISPBKMAKAN, the nascent Sumu NGO representing population not in the buffer zone but resident inside the Bosawas reserve.

5. Extension activities in the buffer zone

The heavy extension component in the project should include the selection, perhaps by the farmers themselves in a particular area, of candidates to be the local area's para-technician extensionist or promoter. These promoters should be hired on a half-time basis with a minimal salary, and their continuance in the job should be subject to review by the community on a yearly basis, and if the community for some reason wishes to replace them with another member of the community, it may do so. Each promoter should represent no more than 50 small farmers, so that the project would involve 30-40 promoters, supervised by perhaps 2-4 trained agronomists or technicians with experience in working with small farmers. The agronomists' job should be equal parts training and extension, bringing in the promoters for occasional 2-3 day workshops and training sessions on selected topics and to receive feedback on activities in the field. They should also rotate through the area visiting the individual promoters and working with them with local farmers.

The promoters will also receive training sessions on natural resource protection and sustainable use, which will be an important point of contact between the protected areas component managed by The Nature Conservancy, IRENA, and the buffer zone activities. These sessions should also include training in soil conservation activities to help protect the water and soil resources used by the farmers.

6. Women

PACA's unsolicited proposal to AID/Nicaragua focuses on the gathering of gender disaggregated baseline data in preparing to work in the field and in gender-sensitive approaches to the collection of these data. The key issues considered in the PACA approach are:

- Women's roles in farming where men leave the farm to seek income in other (often urban) activities, or as men abandon women with a small parcel of land to which the women have no legal rights for their support and that of their children;
- The role of crop production and other productive activities in the household subsistence and cash economy;
- Farm and non-farm employment opportunities for men and women;
- Cultural perceptions of women's roles and activities;
- The access of women, in the absence of a husband, to credit, cash, land, and extension assistance;
- Small-scale marketing and income-generating activities;
- Interdependence and time-discretion of sex and age-specific tasks carried out by women and men;

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- **Activities, resources, incentives, and preferences of different household members.**

Recommendation

PACA must actively pursue strategies which allow it to use the data collected to formulate activities which benefit women. One obvious strategy is to form women's groups, clubs, and associations to provide a forum for continued discussion of these issues and to function as a conduit for programs which involve women in productive activities.

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V. The Chacocente project

A. Chacocente project background

1. Chacocente project beginnings

Chacocente is a tropical dry forest and marine refuge of 4,800 hectares with a beach front of 11 kilometers on the Pacific coast in the department of Carazo but bordering on the department of Rivas in the municipality of Santa Teresa. It is accessible by two roads which meet eight kilometers from the reserve. The road directly from the departmental capital of Rivas is about 50 kilometers, an excellent dirt road for 13 kilometers to Tola and a passable road the rest of the way, although 4-wheel drive may be required.

Chacocente has two aspects which have made it particularly attractive as a protected area. First, the tropical dry forest found there is the largest and least disturbed of any still existing on the Pacific slope. Second, the beach is one of the principal nesting areas for two species of sea turtles (*Lepidochelys olivacea*, called *paslama* in Spanish, and *Dermochelys coriacea*, known as *tora* in Spanish) on the Pacific Coast of Central America. The area has urgent need for protection both to protect the remaining forest resources and biodiversity from destruction by loggers and firewood collectors and to protect the existence of the sea turtles, whose eggs are highly prized by Nicaraguans as a delicacy.

In 1977, the first study was made which led to the area's being considered a potential wildlife refuge. The recent history of the area explains how the Chacocente forest was not logged over, cut down, and turned into cattle grazing land. The majority of the forest was owned before the 1979 Revolution by Cornelio Hueck, who was president of Congress under Somoza and thus a very powerful man. Through his influence, he managed to get electricity up to his cattle ranch at Salinas, eight kilometers from the present Refuge. For whatever reason, Hueck decided to keep the forest untouched, and he stationed a Guardia Nacional to keep out those who would either log it or take out firewood. So while the forest has been intervened in the past, and in spite of there being some people resident during Hueck's time and at present, the forest Reserve is a fairly intact example of tropical dry forest.

With the fall of Somoza and the departure of Hueck, most of the area passed into the hands of the state, and in 1980, IRENA through its department of wildlife refuge began the first studies of the sea turtles. In 1982, a biological station was constructed to control the use of both the forest and turtles, and on August 11, 1983, the Chacocente Refuge was established by government decree to be managed by IRENA. The Refuge at present is managed by a biologist, a site administrator, a chief ranger, and five rangers, the latter with little formal training. In addition to the IRENA presence, the School of Forest Sciences of the National Agrarian University, with funding from the Swedish government, is carrying out field studies involving 20 students, various faculty, and technical assistance from CATIE in Costa Rica. IRENA has carried out a variety of initial studies on the forest, faunal, hydrological, and socio-economic situation in and around the Refuge, as well as pilot activities focused on socio-economic aspects and control of turtle egg exploitation.

2. Chacocente project components

In contrast with the first two proposed protected areas, where unsolicited proposals to AID by international NGO's form the basis of project activities, no NGO proposal has been submitted as of this writing. It is possible, however, to outline what components such a project should contain.

The Chacocente Refuge requires assistance primarily in relation to the buffer zone surrounding it. The activities involved in this assistance should include the carrying out and updating of socio-economic baseline studies of Refuge and buffer zone residents, the organization of local residents into associations or cooperatives based on sustainable use of Refuge resources, the identification of socio-economic programs for Refuge and buffer zone residents which will lessen pressure on the Refuge resources themselves, and the pilot testing and later implementation of such programs.

B. Chacocente socio-cultural context

The Refuge area at Chacocente contains approximately 300 people in 40 families, and another 2,300 people in 310 families have been identified as occupying the buffer zone surrounding the Refuge. Veracruz de Acayo, La Palma, Las Nilas, La Chota, La Poma, and El Abejonal are the small communities resident within the Refuge. There is little outmigration from the community. In a study of 358 families in the overall area, 28.5% purchased their parcels of land, 37.4% have their land on loan or rented, and 22.9% inherited it. An interesting note is that 43% of housing does not belong to the residents but is on loan, although the data do not indicate from whom the housing has been loaned. Population growth has exercised pressure on the forest resources of the Refuge to acquire small plots of land to farm. All but 14.2% of the families have been in the Chacocente area for at least five years and half have been there 25 years or more.

As regards education, 35.6% are literate, 46.4% are illiterate, and the remaining 18% are preschool children. There are four schools in the area in the communities of Pinuela, Astillero, Poma, and Pita which provide primary education for the surrounding communities. There is a government health post in Las Canas de Garcia where a doctor and nurse see an estimated 160 people per week. Both educational and health facilities suffer from a lack of supplies. Only 21.5% of homes have latrines for the disposition of excretes. Water is a problem: 36.6% get their water from rivers and creeks, 30.4% from springs, and 33.0% use wells, either individual or communal. Electricity was strung up to the San Martin hacienda near Salinas through Hueck's influence, but the Refuge and buffer zone have no electricity except for the small generator at the IRENA station.

As regards subsistence activities, 312 families live primarily from agriculture and cattle raising, 27 primarily from fishing, and the remaining 19 from other occupations, such as construction, tailoring, carpentry, and others. Information on actual income was unavailable, since the figures in IRENA's studies are given in devalued Cordobas. When

crop yields are low and fishing is poor, there is more intense pressure on turtle egg collection than usual.

Just 459 hectares of the 7,800 hectares that make up the Refuge and buffer zone were dedicated to agriculture in a 1987 study, but that figure does not take into account the fact that local farmers use slash and burn agricultural techniques, which means that a larger proportion of lands may be temporarily in fallow. Parcels are planted for one or two years, then left to rest for three to 10 years. Farmers plant primarily basic grains for subsistence purposes, such as corn, beans, sorghum, and rice. Soil conservation techniques are not used on hillsides, with consequent erosion.

In addition to the forest resources, Chacocente is famous as a beach where sea turtles lay their eggs. From June to January thousands of female sea turtles return to the beach where they themselves hatched to lay eggs about every three years. They occasionally come in an isolated fashion, just two or three a night, or they may come by the hundreds on the same night to lay 50 to 100 eggs in each spot. According to data collected between 1980 and 1983 by IRENA, a total of 25,400 female turtles arrived in the massive arrivals of August-September. The total number of eggs deposited between July and December was 2,650,000. This writer spent the night of May 27-28 at Chacocente, and three turtles arrived during the night.

Turtle eggs are considered a delicacy by Nicaraguans, and this has caused large numbers of egg hunters to frequent the Chacocente beach during the egg-laying season. In 1989, when there was no control over egg collecting, about 1,200 people were said to have collected eggs, although the number of collectors was estimated as high as 3,000 in 1980-1983. Most of the egg hunters come from the communities surrounding the Refuge, but others from farther away, some setting up temporary shacks and staying for a week or more. In the past, the beach was turned into a small temporary market place, and outsiders traded clothing, food, and liquor right on the beach for turtle eggs.

In the past, women and children dominated egg hunting, and the technique was simple: follow a turtle to her predestined nesting place, wait until she had deposited her eggs and left, and then unearth the eggs. More recently, young men have tended to dominate, and their tactics have become more aggressive: they intercept the turtles and take possession of them while they are still in the surf, carry them out of the water and leave a family member there as guard, and return for more turtles.

To facilitate collection, brutal methods are sometimes used. By carrying the turtle out of the surf and not allowing her to proceed to her genetically pre-selected nesting spot, the egg hunters disorient the turtles, who often attempt to return to the surf when set down in the hopes they will immediately deposit their eggs. The egg hunters then try to force the turtle to deposit her eggs then and there. They blink flashlights in her eyes, they place mounds of sand in front of her head, they turn the turtle around by pulling on one of the front flippers. They have even gone so far as to hold the turtles up and shake the eggs loose rather than wait for the turtle to lay her eggs herself, and some have even reached into the turtle to extract the eggs manually.

The returns on a good night of egg hunting can be enormous in relation to what local people normally earn. Two egg hunters interviewed on the beach on May 27 stated that some were able to collect as many as 100 or 200 dozen eggs, worth C\$200-400 (about \$40-80 at 1991 exchange rates). Given the present basic wage of C\$6-7 per day, the prospect of earning 10 to 20 times the daily wage in one night is attractive.

But earnings are not equally distributed. In the study of August-September, 1982, 60% of the egg hunters on a given night on the beach left empty handed and received no earnings. The 40% who were successful received just 27.3% of the final value of the eggs, while 5-7 intermediaries eventually received 72.7% of the market value. At that time, intermediaries purchased the eggs at C\$5.50 (5.5 Cordobas) per dozen and sold them for C\$20.00 (US\$ equivalents for September, 1982, not available).

C. Participation

1. IRENA's role in local participation

Local participation has been achieved in the development of the Chacocente Protected Area in two ways: through the broad spectrum of activities carried out by IRENA as a local entity, and through the focus by IRENA on the socio-economic situation in Chacocente and in the buffer zone surrounding it. IRENA has carried out a series of socio-economic studies approximately one every two years since 1981, even before the Refuge was declared. The most recent of these studies was carried out in April of 1991.

An earlier 1981 study is especially useful in identifying the problems of turtle egg exploitation related to specific aspects of the socio-economic context. The following chart illustrates these problems:

Table F-2: Diagnostic of socio-economic factors relating to Chacocente turtle egg exploitation

Factor	Study results	Pos/ neg	Effects of factor on program to conserve resources
Education	78.6% signed up for literacy classes	-	Difficulty in assimilating conservation messages
Family size	71.4% more than 5	-	Greater pressure on resources to be exploited (i.e. eggs)
Egg hunter's average age	30.6% under age 30	+	Higher acceptance of program of sustained resource exploitation
Egg hunter's occupation	52% agriculture	+	Possibility of non-egg activities relieving pressure on resource
Belongs to some organization	83% not organized	-	Increased difficulty in message & program implementation

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Possesses radio	62% possess radio	+	Possibility of message diffusion by radio
Reads newspaper	81% do not read	-	Reduced possibility of conservation message diffusion
Number of years collecting eggs	50% less than 5 yrs	+	Relatively little time in massive commercial exploitation

The IRENA socio-economic data have never been properly processed and analyzed, nor have they been used to make successive comparisons of the improvement or deterioration of the socio-economic situation of the local Refuge and buffer zone residents. Part of the problem can be traced to lack of computer facilities at IRENA, another part is due to the lack of activities designed to relieve pressure in the Refuge and buffer zone on the turtle egg resource. It is obviously not possible to measure program impact where no program has existed.

The socio-economic information at IRENA should be collected and processed to provide a data base to measure the impact of future programming in the area by this project. As far as the programming itself goes, especially regarding the control of turtle egg collection, plans developed by IRENA during the previous decade but not acted on should be restudied and implemented.

2. Role of women

It appears that during the relatively prosperous economic periods in Chacocente, women and children have been the principal collectors of turtle eggs, but when times are difficult, men have shouldered their way into egg collecting and pushed women out. Men are better able to wade into the surf and "claim" a beach-bound turtle, while women must wait until the number of turtles is so great that they cannot all be claimed in order to get their turn. Also, women in need spend an entire night on the beach during the off-season in the hopes that one or two turtles will arrive, as was the case in May with two women interviewed at Chacocente before the season had really begun.

The organization of the project must attempt to return women from the Chacocente buffer zone to their primary role in egg collection as part of the planned exploitation of the turtle egg resources. This means organizing both men and women to agree to a sustained use of these resources by local residents, who will understand the importance of managing natural resources so that their children and grandchildren will have access to them. The division of labor at Chacocente should have men occupying the role of beach monitors and rangers to control egg collection in specific sections of beach at specific times by specific persons, while the egg collection and the accompanying economic benefits are reserved for women.

To carry out the resource management plan involving the turtle eggs, women must be equally represented on the organizational bodies set up by the project for this purpose. Women will require special training in relevant aspects of sea turtle biology and reproduction

so that an optimum harvest of the turtle egg resource can be collected with minimum damage to the viability of eggs not collected and the maintenance of the sea turtle species.

D. Beneficiaries

The direct beneficiaries of this project are the approximately 3,000 people living in, and in the immediate vicinity of, the Chacocente Refuge. The project should follow the lead of earlier plans by IRENA and limit the exploitation of turtle eggs to members of the families resident in Chacocente and in the buffer zone to assure that they will truly benefit from the project's activities.

If the communities can be assured of the full benefits of the egg exploitation without the intrusion of individuals outside the area, the community energies can be harnessed in such a way as to make the egg exploitation both profitable for themselves as well as sustainable for future generations.

All families wishing to participate in the egg exploitation must sign up before the massive turtle arrivals, for example, during the month of April or May. They are issued a carnet or license which permits them to participate in the egg exploitation and which, through numbered identification, will allow IRENA to closely monitor the exploitation and to call on licensees to assist in the monitoring process.

This monitoring process might be carried out by some members of a family, such as the men, during a night when women members of the family are collecting eggs, or families could alternate nights of monitoring with nights of collecting. The monitoring process should include the enforcement of certain recommended practices. For example, dogs should be not permitted on the beach since they destroy egg nests and hatching turtles; no vehicles or horses on the beach; turtles are not to be mistreated but allowed to make nests and lay eggs naturally; no cutting of Refuge timber to construct huts; all trash must be collected and removed; no alcoholic beverages. In addition, having local men patrol and monitor in conjunction with a few armed police will help maintain the Refuge resources for those in the buffer zone.

Local beneficiaries can also benefit through participation in scientific studies. This might include the removal of eggs from the area of highest concentration to areas with fewer arrivals, since a massive later arrival can destroy the eggs of an earlier arrival. Children can be hired to count the numbers of hatched turtles or help call attention of specialists to peculiarities, such as different species. Monitors should be present in study areas where egg collection is temporarily prohibited for the sake of special studies.

Having the family as the beneficiary unit may help to assure each family with an equitable share of the resources without being physically present every night. IRENA studies pointed out that some farmers have neglected their agricultural activities in favor of egg collection. If some family members were assured of collection opportunities, others could remain in the home. IRENA should also monitor the number of eggs collected per family

and establish a nightly limit to allow all members of the community the opportunity of benefitting.

All of the above activities will assure that the 3,000 members of the Chacocente buffer zone will benefit from the protected area activities, while at the same time assuring the survival and reproduction of sea turtles.

E. Impact

The possible impact of this project depends on several assumptions. First, it is assumed that the primary impact on the buffer zone population will come from sustainable resource management involving the turtle eggs, as opposed to other rural development activities. Therefore, the primary focus as regards buffer zone activities should be the exploitation of turtle eggs and only secondarily should focus on other activities.

The second assumption has to do primarily with economics. First, we can assume that some 2,400,000 million eggs, or 200,000 dozens eggs, are deposited on the Chacocente beach every year between the months of June and January. If we assume that egg collectors gather just half of those eggs, then the economic resource represented by the eggs is 100,000 dozen turtle eggs. Another assumption involves price, which is difficult to calculate since last year's prices were in a currency that was strongly devalued, but it seems reasonable at this point to set the value on the beach of one dozen eggs at about US\$ 1 per dozen, which means that the total net worth on the beach of the 100,000 eggs is US\$ 100,000.

If there are 350 families collecting eggs, then the average profit from collecting eggs is about US\$ 285 per family for the entire season, which is not much money but attractive enough as a complement to the other agricultural activities of the resident population. However, the 1983 IRENA study demonstrated that middlemen boost the price by four times when they resell their eggs in Managua, either for consumption in Managua or for export to El Salvador. Therefore, if the Chacocente egg collectors could manage to not only collect the eggs but also market them directly in Managua, they might be able to make not US\$ 285 per family but US\$ 1,140. This is a substantial quantity of money which could have a strong impact on the local population.

For this project to have an important positive impact on the local population, therefore, this project needs to take a further step to set up a turtle egg marketing cooperative to bring the eggs to market. The principal material requirement for such a cooperative will be a four-wheel drive pickup to transport the eggs from Chacocente to Managua. Obviously, such a vehicle can also be used to bring good back to the buffer zone and at a lower price than local residents are now paying.

Cooperatives of this sort have inherent weaknesses that the project must address. The people in the Chacocente buffer zone have never dealt with this type of organization, one which manages large quantities of their own funds, and they will certainly have doubts about how it is managed. Intensive training is required of both the cooperative's officers as regards accounting, cooperative organization, leadership, and communications, and training

will also be required among the member population to instruct them in what kinds of reports they should expect, what kinds of communications they will receive from the cooperative's officers, what kinds of questions they should ask in general meetings, and a host of other similar questions. Cooperatives most often fail through lack of communication, so special effort must be made to open channels of communication between members and officers and to keep them open.

F. Issues

1. Institutional relationships: IRENA, WWF, and local NGO

In contrast with the other project described above where IRENA plays and has played a minor role, IRENA should play a major role in the Chacocente project. WWF has supported IRENA in the Chacocente project but not on the scale contemplated here. It is expected that WWF will provide a much greater level of support and will have a much higher level of participation if this project is funded, and WWF must bring to the project its previous experience in working with buffer zone activities in other settings and countries. However, it is nonetheless expected that IRENA will play an important role in helping to determine project strategy. The fact that a viable local NGO does not yet exist is a further problem: what sort of relationships should the three entities have among themselves?

Recommendation

WWF should take the lead in establishing the local NGO, probably a cooperative, with IRENA playing an important but behind the scenes advisory role so as not to endanger its on-going role in the community. WWF will need to provide clear leadership, especially at the beginning of the project, through outside technical assistance and through the hiring and training of a Nicaraguan cooperative extensionist with a non-Sandinista orientation. This individual will be charged with training in cooperative organization, putting the cooperative on a business-like basis, investigating the turtle egg market, and in carrying out community workshops in how to be productive members of a cooperative. Secondly, this extensionist will work in general community development and take an interest in the organizational aspects of turtle egg collection, working with the local residents in determining how their interests in exploiting the egg resources can be made compatible with scientific studies and with maintaining the turtle eggs as a sustainable resource.

IRENA's role will be to provide advice and counsel to the WWF extensionist, to suggest on the basis of its experience and data the possible options in turtle egg collection, providing local institutional backing for the use of police and authority for monitoring and controlling egg collection, based on decisions taken in conjunction with the NGO/cooperative. IRENA will not be required to participate in the organizational activities of the NGO, an area where it lacks experience in any case.

2. Reserving turtle egg collection for local residents

The massive arrivals of female turtles to lay eggs on the Chacocente beach as for year attracted on only local residents but individuals from as far away as Granada and Diriamba, in addition to middlemen intent on marketing the eggs in Managua and other large cities. This project contemplates reserving the Chacocente egg collection for those resident in the Chacocente Refuge and in the buffer zone. The question arises: is it possible, feasible, or desirable to limit others from egg collection and reserve the beach for the Chacocente buffer zone residents?

Recommendation

First, it should be noted that IRENA recommended that only local residents should be allowed to collect eggs as far back as 1983. There are a number of reasons why this strategy should be followed in this project. First, limiting egg collection to the local population means that the egg production can be channeled through the NGO/cooperative for marketing in Managua, which means that those who collect eggs will receive a much higher return for their efforts than ever before. Those who will protest this action are the middlemen, probably only five to seven individuals who have made large profits from this activity if past years.

Limiting egg collection to locals is feasible through a combination of factors. First, IRENA has the authority to determine how the turtle egg resources will be exploited, and this authority was demonstrated in 1990 when a total prohibition was instituted and enforced by national police. Second, local residents will be willing to collaborate with the national police if it is in their interest to do so, and it will be in their interest if such collaboration protects the egg resources for themselves and their families. Third, the mechanism is simple: egg collectors must carry a carnet or license at all times to collect eggs. The NGO/cooperative provides IRENA with a list of names or families resident in the area, and IRENA issues these licenses. There may be special cases where individuals resident outside the area have been collecting eggs on a sustainable basis for years, are well known by local residents, and might be recommended for a license, possibly paying a fee to IRENA or to the NGO/cooperative.

Limiting egg collection is desirable because it provides a framework for doing so on a rational, sustainable basis. It provides WWF with a closed group with which to work in educating the populace on the biology of sea turtles, on what they do during their long periods at sea, on why they arrive in such numbers at such a small stretch of beach, and on how they can be protected so that future generations can enjoy them and, of course, exploit the eggs they lay.

Attachment 1.

**Selected International Cooperation Projects in Natural Resources
(Active in 1990-1991)**

National Conservation and Development Strategy

Spanish Title: Estrategia Nacional de Conservación y Desarrollo

Donor(s): SIDA

Tropical Forestry Action Plan and Land Use Study

Spanish Title: Plan de Acción Forestal y Ordenamiento Territorial

Donor(s): SIDA

Forestry Seed Bank and Genetic Improvement Project

Spanish Title: Banco de Semillas y Mejoramiento Genético

Donor(s): DANIDA

Wood Technology Project

Spanish Title: Tecnología de la Madera

Donor(s): SIDA

Northeast Forestry Project

Spanish Title: Proyecto Forestal del Noreste

Donor(s): FAO

Jalapa Valley Community Plantations Project

Spanish Title: Proyecto del Valle de Jalapa

Donor(s): Holland

Heros and Martyrs of Veracruz Watershed Protection Project

Spanish Title: Proyecto Héroes y Mártires de Veracruz

Donor(s): FAO and Holland

Pikin Guerrero Watershed and Fuelwood Project

Spanish Title: Proyecto Pikin Guerrero

Donor(s): IUCN

Mangroves Research and Protection Project

Spanish Title: Proyecto de Manglares

Donor(s): CATIE

Agroforestry Project

Spanish Title: Proyecto Agroforestal

Donor(s): CATIE and SAREC (Sweden)

Neem Plantation Project

Spanish Title: Proyecto "Neem" *Azadirachta indica*

Donor(s): SOFAMA

Region IV Erosion Control Project

Spanish Title: Proyecto Control de Erosión IV Región

Donor(s): Multiple European Donors

Southern Basin of Lake Managua Applied Research Project

Spanish Title: Proyecto de Investigación Aplicada de la Cuenca Sur del Lago Managua

Donor(s): ORSTOM (France)

Community-based Natural Resource Conservation and Management Project for the Cordillera de los Maribios

Spanish Title: Proyecto de Conservación y Manejo de Recursos Naturales con la Participación Comunitaria en la Vertiente Occidental de la Cordillera de los Maribios

Donor(s): FAO

El Pital Agroforestry Project

Spanish Title: Proyecto Agroforestal "El Pital"

Donor(s): CARE

Southeast "Rio San Juan Watershed" Integrated Development Project

Spanish Title: Proyecto Sureste, Cuenca del Río San Juan (Si-A-Paz)

Donor(s): SIDA

Acronyms

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CARE	Cooperative for American Relief Everywhere
CATIE	Center for Tropical Agriculture Research and Training (Costa Rica)
DANIDA	Danish International Development Authority
FAO	Food and Agriculture Organization (United Nations)
FINNIDA	Finnish International Development Authority
NORAD	Norwegian International Development Authority
ORSTOM	Office for Overseas Science and Technology Research (France)
SAREC	Swedish Academy of Research
Si-A-Paz	International System of Protected Areas for Peace
SIDA	Swedish International Development Agency
SOFAMA	
IUCN	International Union for Conservation of Nature and Natural Resources

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Attachment 2.

**Selected IRENA Cooperative Projects in Natural Resources
in Combination with other Nicaraguan Government Agencies**

(Projects Active in 1992-1997)

Integrated Development Plan for Lake Managua and Lake Nicaragua Watersheds
Spanish Title: Plan de Desarrollo Integral de la Cuenca de los Lagos
Cooperators: IRENA-MITRANS-INE-ECODE-MAG

Planning and Management of the Southern Watershed and Recuperation of Lake Managua
Spanish Title: Ordenamiento y Manejo de la Cuenca Sur y Recuperación del Lago de Managua
Cooperators: IRENA-ALMA-INAA-MAG-INRA-MITRANS

Pollution and Sediment Control for Lake Nicaragua
Spanish Title: Control de la Contaminación y Sedimentación del Lago de Nicaragua
Cooperators: IRENA-Municipal Governments-MAG-MITRANS

Development of the Cocibolca-San Juan Ecotourism Corridor
Spanish Title: Desarrollo del Corredor Eco-Turístico Cocibolca-San Juan
Cooperators: IRENA-INTURISMO

Asososca, Tiscapa, Masaya, and Apoyo Lakes Recovery Project
Spanish Title: Recuperación de las Lagunas de Asososca, Tiscapa, Masaya, y Apoyo
Cooperators: IRENA-INAA-INTURISMO-INRA

Soil and Erosion Control on the Volcanic Plain
Spanish Title: Manejo de Suelos y Control de Erosión en las Planicies Volcánicas
Cooperators: IRENA-MAG-INRA

Estuary, Mangrove, and Littoral Zone Management for Production
Spanish Title: Manejo Productivo de Esteros, Manglares, y Litorales
Cooperators: IRENA-MAG-MITRANS

Control of Pollution by Pesticides, Fertilizers, and Agro-industrial Wastes
Spanish Title: Control de la Contaminación por Pesticidas y Fertilizantes y Desechos Agroindustriales
Cooperators: IRENA-MAG-ECODE

Restoration and Management of Fuelwood Forests in Los Zarzales-Sébaco-Tecolostote
Spanish Title: Restauración y Manejo Productivo del Bosque Leñoso Los Zarzales-Sébaco-Tecolostote
Cooperators: IRENA-MAG-INRA-INE

Management and Reforestation of the Pine Forests in Nueva Segovia
Spanish Title: Manejo y Reforestación de Pinares en Nueva Segovia

Cooperators: IRENA-MAG-INRA-Municipal Governments

Watershed Management of Municipal Water Supplies

Spanish Title: Manejo de las Cuencas Abastecedoras de Aguas Municipales

Cooperators: IRENA-INAA-MAG-INRA

Management of Bosawás, Wawashan, and Siapaz Forest Reserves

Spanish Title: Manejo de las Reservas Forestales de Bosawás, Wawashan, y Siapaz

Cooperators: IRENA-INE-INRA

Reforestation and Development of the Pine Forests of the Northeast

Spanish Title: Reforestación y Aprovechamiento de los Pinares del Noreste

Cooperators: INRENA-Indigenous Communities-RAAN-MITRANS

Fisheries Management of the Coastal Lagoons and Cays

Spanish Title: Manejo de Lagunas Costeras y Cayos para la Producción Pesquera

Cooperators: INRENA-Indigenous Communities-RAAN-RAAS

Management of the Forest Damaged by Hurrican Joan

Spanish Title: Manejo del Bosque Afectado por Huracán Joan

Cooperators: IRENA-RAAS

Establishment of Development Poles and Stabilization of the Agricultural and Forestry Frontier

Spanish Title: Establecimiento de Polos de Desarrollo y Estabilización de la Frontera Agro-Forestal

Cooperators: IRENA-MAG-INRA-REPATR-MITRANS

Agroforestry Land Use Survey of Nicaragua

Spanish Title: Levantamiento del Catsatro Agroforestal de Nicaragua

Cooperators: IRENA-INETER-MAG-INRA

Municipal Waste and Environmental Sanitation Program

Spanish Title: Programa Municipal de Basuras y Sanidad Ambiental

Cooperators: IRENA-Municipal Governments-INAA-MINSA

Development of the National Parks and Protected Areas System

Spanish Title: Desarrollo del Sistema de Areas Protegidas y Parques Nacionales

Cooperators: IRENA-INTURISMO-MITRANS-INRA-MAG

National Reforestation Campaign

Spanish Title: Gran Campaña Nacional de Reforestación

Cooperators: IRENA-MAG-INRA-MED-Municipal Governments-INE

Creation of 36 District Offices for Resource and Environmental Regulation and Control

Spanish Title: Creación de 36 Distritos Ecológicos para Regulación y Control de Recursos y Ambientes Territoriales

Cooperators: IRENA

Attachment 3.
AID/Nicaragua Natural Resources Management Project
Non-Governmental Organizations
Selected Environment and Development NGO's in Nicaragua

NGO and Director	Address	Program
Asociación de Biólogos y Ecólogos de Nicaragua (ABEN) Juan José Montiel	Del Centro de Ciencias Comerciales 1 c. al lago, 1 c abajo Casa 774 Apartado 2431 Managua 74563	<u>Environment</u> Protected areas, sustainable development, EIS/EIA (National)
Asociación de Investigación, Educación, y Protección del Medio Ambiente (ASINEPMA) Francisco Javier Bone Pantoja	Reparto Pancasán VI Etapa Casa 98 Managua 71736	<u>Environment</u> (Region III)
Asociación Nicaragüense de Ecología Tropical (ANET) Octavio Saldaña Tapia	Km 28 1/2 Carretera a Masaya Reparto Los Chilamates Casa 22 Apartado 4815 Masaya 2113	<u>Environment</u> Environmental Education, Revista Nicaragüense de Ecología Tropical (Region IV)
Asociación para el Desarrollo de Rfo San Juan Alejandro Guevara S.	San Carlos, Zona Especial III	<u>Development</u> Agric and Cattle Technologies, Conservation (Special Region III)
Centro Alexander Von Humboldt para la Promoción del Desarrollo del Territorio y la Gestion de Ambiente Javier Mejía Baltodano	De la Estatua de Montoya 1 c al sur, contiguo a Carnilandia Managua 664-927 FAX: same	<u>Consulting/Advising</u> Physical Planning, Environment, Technology, Policy Assistance for RAAN, Project in Las Minas (RAAN), bimonthly "Centro Humboldt" (National)
Centro de Desarrollo y Promoción de Tecnologías Apropriadas (ECOTEXTURA) Octavio Tapia Rodriguez	Del Calzado El Taller 7 1/2 c al sur Reparto Pancasán Casa 222 Apartado 300 Managua 75523, 40238	<u>Environment</u> Housing, Artisans, Fishers MAN, CRIES, Solidaridad de Bélgica (National)

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Centro de Gestion Ambiental Jorge Jenkins Molieri	Reparto Pancasán IV Etapa, Casa 58 Managua 73518	<u>Environment</u> Sustainable Development, Planning, Pilot Projects (Region III)
Centro de Investigación de la Costa Atlántica (CIDCA) Galfo Gurdían	Del Restaurante China Palace 2 c al sur, 2 c arriba Reparto Pancasán V Etapa Casa 40 Apartado A-189 Managua 75358, 70983 FAX:673-006	<u>Research</u> Documentation Center (RAAN, RAAS)
Centro de Unidad Costeña (CUC) Roberto Wilson, Hazel Law	Puerto Cabezas 42890	<u>Ethnic</u> Autonomy, Consolidation, Peace, Revista "Wan Lukanka" Kisam, AIDSESP (Perú) (RAAN, RAAS)
Centro de la Promoción, la Investigación, y el Desarrollo Rural y Social (CIPRES) Orlando Núñez	Portón Principal de la UCA 1 c arriba, 2 c al lago Contiguo a la UNI Apartado 3683 Managua 672-989 FAX:72-989	<u>Research</u> Centro de Información y Documentación, Revista Avispa, Revista del Campo Holland, NORAD, NOVIB, CRIC, Fundación Ebert (National)
MISKRIWAP - Centro de Investigación y Desarrollo de las Culturas Indígenas Evelino Scott Lackwood	Casa Cural Puerto Cabezas	<u>Ethnic</u> Cultural Traditions, Indigenous Languages and Literature (RAAN)
Colectivo Habitat Fátima Vanegas Zúñiga	Escuela de Ecología de la UCA Apartado 69 Managua	<u>Environment</u> Students of Ecology, Professional Development of Members, Environmental Education, Revista "Habitat" (Region III)
Federación de Organismos No- Gubernamentales de Nicaragua (ONG-Nicaragua) Edwin Maradiaga Lacayo	De la CST 5 c al sur, 1 1/2 c abajo Apartado 4614 Managua 22079, 26635 FAX:664-878	<u>Development</u> (National)

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Fundación para la Autonomía y Desarrollo de la Costa Atlántica de Nicaragua (FADCANIC) Ray Hooker Taylor	Avenida Cabezas, Barrio Central Bluefields (082)386	<u>Development</u> Workshops, Seminars, Scientific Symposia, Bilingual Education (RAAS, RAAN)
Instituto de Investigación, Capacitación, y Asesoría Económica (INICAE) Hugo Mejía Briceño	Reparto Villa Fontana Casa 12 Apartado 5104 Managua 71179	<u>Advising/Consulting</u> NGO Studies, Professional Seminars (Regions III and IV)
Miskito Asla Takanka Nicaragua Ra (MISATAN) Fornes Rabonias Demetrio	Frente a la Casa de Gobierno Puerto Cabezas	<u>Ethnic</u> Miskito Autonomy (RAAN)
Movimiento Ambientalista de Nicaragua (MAN) Lorenzo Cardenal Sevilla	De la Distribuidora Vicky 1 c al sur, 1 c arriba Altamira D'Este Casa 229 Apartado A-99 Managua 75419	<u>Environment</u> Gaceta Ambientalista, Revista Ecológica, "Mujer y Medio Ambiente" Program, Environmental Education (National)
Movimiento Nicaragüense Destino y Esperanza de la Tierra (MONIDET) Jairo Rodríguez Blandino	De la Distribuidora Vicky 1 c al sur, 1 c arriba Altamira D'Este Casa 229 Managua 75419	<u>Environment</u> Public Awareness, "Eco" bulletin, Red de Acción de Mujeres por el Ambiente - RAMA (Regions I and II)
Oficina de Promoción Humanitaria y Desarrollo de la Costa Atlántica (OPHDESCA) Dorotea Wilson	Frente al Restaurante Mahogany Puerto Cabezas 73663, 73860	<u>Regional</u> Projects in Waspam and Rio Coco, Support to Sumu Communities, Training for Wives of Miners (Oxfam, CAV, CEPAD, INIES, and others) (RAAN)
Sukawala Aurelia Paterson	Rosita RAAN	<u>Ethnic</u> Sumu Unity and Community Development, Las Minas Project (RAAN)

Source:

Anón.

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Other Notes: Underline indicates program area, (Parenthesis) indicates regional focus.