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UNCLASSIFIED

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

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HONDURAS

PROJECT PAPER

NATURAL RESOURCES MANAGEMENT

AID/LAC/P-053

Project Number: 522-0168
Loan Number: 522-T-041

UNCLASSIFIED

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

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

DOCUMENT CODE: 3

2. COUNTRY ENTITY: HONDURAS

3. PROJECT NUMBER: 522-0168

4. BUREAU/OFFICE: LAC — 05

5. PROJECT TITLE (maximum 40 characters): NATURAL RESOURCES MANAGEMENT

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 09 DD 30 YY 85

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

A. Initial FY 80 B. Quarter 3 C. Final FY 84

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

A. FUNDING SOURCE	FIRST FY 80 B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total	2500	3250	5750	4651	10,344	14,995
(Grant)	(750)		(750)	(2111)	(632)	(2,743)
(Loan)	(1750)	(3250)	(5000)	(2540)	(9,712)	(12,252)
Other U.S. 1.						
Other U.S. 2.						
Host Country	-0-	1313	1313	16	6,951	6,967
Other Donor(s)						
TOTALS	2500	4563	7063	4667	17,297	21,962

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) FN	B200	090	090	-0-	-0-	750	5000	2,743	12,252
(2)									
(3)									
(4)									
TOTALS									

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 093, 066, 067, 091, 095, 031

11. SECONDARY PURPOSE CODE:

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

A. Code	BS	BF	ENV
B. Amount	64%	36%	100%

13. PROJECT PURPOSE (maximum 480 characters)

To strengthen institutional mechanisms through which the Government of Honduras manages the country's natural resources and to undertake an action program in a selected watershed to increase farmers income an to conserve the natural resources of soil and water through the introduction of modified agriculture and forestry practices.

14. SCHEDULED EVALUATIONS: Interim MM 08 YY 81 — MM 08 YY 83 — Final MM 09 YY 85

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

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

17. APPROVED BY

Signature: John R. Oleson

Title: John R. Oleson, Mission Director, USAID/HONDURAS

Date Signed: MM 05 DD 21 YY 80

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM 05 DD 29 YY 80

AID 1330-4 (8-79)

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

THE ADMINISTRATOR

AID/LAC/P-053

PROJECT AUTHORIZATION

Name of Country : Republic of Honduras

Name of Project : Natural Resources Management

Number of Project : 522-0168

Number of Loan : 522-T-041

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Natural Resource Management Project for the Republic of Honduras involving planned obligations of not to exceed $12,252,000 in loan funds and $2,743,000 in grant funds over a five year period from date of authorization, subject to the availability of funds in accordance with the A.I.D. OYB/allotment process, to help in financing foreign exchange and local currency costs for the Project.

2. The Project consists of the following elements: (1) Natural Resource and Land Use Policy and Planning; (2) Natural Resource Data Collection and Analysis and; (3) Watershed Management, intended to strengthen institutional mechanisms through which the Government of Honduras manages the country's natural resources, and to undertake an action program in selected watersheds to increase farmers' income and to conserve the natural resources of soil and water through the introduction of modified agricultural and forestry practices.

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

a. Interest Rate and Terms of Repayment

The Cooperating Country shall repay the Loan to A.I.D. in U.S. Dollars within forty (40) years from the date of first disbursement of the Loan, including a grace period of not to exceed ten (10) years. The Cooperating Country shall pay to A.I.D. in U.S. Dollars interest from the date of first disbursement of the Loan at the rate of (a) two percent (2%) per annum during the first ten (10) years, and (b) three percent (3%) per annum thereafter, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

b. Source and Origin of Goods and Services (Loan)

Goods and services, except for ocean shipping, financed by A.I.D. under the Project shall have their source and origin in the countries which are members

of the Central American Common Market and in countries included in A.I.D. Geographic Code 941 except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the Project shall, except as A.I.D. may otherwise agree in writing, be financed only on flag vessels of the United States or countries that are members of the Central American Common Market.

c. Source and Origin of Goods and Services (Grant)

Goods and services, except for ocean shipping, financed by A.I.D. under the Project shall have their source and origin in the Countries of the Central American Common Market or in the United States except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the Project shall, except as A.I.D. may otherwise agree in writing, be financed only on flag vessels of the United States.

d. Reimbursement of Expenses

Upon compliance with the relevant Conditions Precedent to Disbursement, A.I.D. may disburse Loan or Grant funds as reimbursement for eligible items incurred subsequent to the date of this authorization.

e. Conditions Precedent

(1) Prior to any disbursement, or the issuances of any commitment document under the Project Agreement, the Cooperating Country will furnish in form and substance satisfactory to A.I.D., evidence that the Natural Resources Executive Committee has been established officially to provide overall direction and guidance to the Project and that the Project Office has been established by the Ministry of Natural Resources.

(2) Prior to any disbursement or the issuance of any commitment document under the Project Agreement to finance sub-loans or sub-grant activities for tree propagation or planting under the Watershed Management element of the Project, the Cooperating Country will, except as otherwise agreed in writing, furnish in form and substance satisfactory to A.I.D., evidence that the appropriate regulations have been established to assure that responsibility for the management, control and disposition of all trees planted using Project monies, will be vested in the Project beneficiaries as long as the Project beneficiaries observe good natural resource management practices and adhere to the approved farm plan which was the basis for the provision of Project financing and materials.

(3) Prior to any disbursement or to the issuance of any commitment document under the Project Agreement to finance Watershed Management Credit Activities, the Cooperating Country will furnish in form and substance satisfactory to A.I.D., evidence that a Choluteca Watershed Management Fiduciary Credit Fund has been established, and that adequate procedures have been developed to supervise said Fund.

(4) Prior to any disbursement or the issuance of any commitment document under the Project Agreement to finance the construction, equip-

ping and supplying of the Community/Cooperative nurseries to be established under the Project, the Cooperating Country will furnish in form and substance satisfactory to A.I.D. a set of regulations and procedures to be followed in awarding such grants.

f. Covenants

The Cooperating Country will covenant as follows:

(1) that the Project Office in cooperation with the participating governmental institutions, will provide to A.I.D. by the first of each August, an annual, detailed implementation plan for the first and each subsequent year of the Project that provides a schedule for the procurement of Project inputs including technical assistance, training and commodities;

(2) that adequate budgetary support will be provided for expanded activities as required and as specified in the Project Agreement.

(3) to assure that the Watershed Management Credit Fund will be provided with the additional funds necessary to maintain, during the five years following the Project Assistance Completion Date (as defined in the Project Agreement), the level of grant and credit disbursements achieved during the last year of the Project;

(4) that on or before the beginning of the fourth Project year, responsibility and authority for natural resources management policy, planning and execution will be assigned a permanent institutional form; and

(5) that on or before the beginning of the fifth project year, permanent arrangements between the Ministry of Natural Resources, Forest Development Corporation (COHDEFOR), and other such appropriate organizations as it may designate will be established to continue the work of the Project in the Choluteca Watershed and to extend the work to other watersheds in Honduras, as appropriate.

Administrator

July 16, 80
Date

Clearances:

AAA/LAC:EWCoy — date 7/14/80
AA/PPC:AShakow — date 7/15/80
GC:NLHolmes — date

Drafted:GC/LAC:JLKo:klr:jio:6/18/80:x23272

NATURAL RESOURCES MANAGEMENT PROJECT

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SUPPLEMENTS:

1. WATERSHED MANAGEMENT PLAN: CHOLUTECA WATERSHED
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GUIDE TO ACRONYMS

AID	Agency for International Development
AU	Animal Units
BANADESA	National Agricultural Development Bank
BANAFOM	National Development Bank
CATIE	Center for Tropical Agriculture Research and Education
CIC	Consortium for International Development
COCO	Coordinating Committee
COHBANA	Honduran Banana Corporation
COHDEFOR	Honduran Forest Development Corporation
CONCORDE	Development Coordination Council
CONSUPLANE	Superior Economic Planning Council
CPA	Agricultural Planning Commission
DCH	Department of Climatology and Hydrology
DIFOCOOP	Cooperative Development Directorate
ESNACIFOR	National Forestry Sciences School
FAO	United Nations Food and Agricultural Organization
GOH	Government of Honduras
IHCAFE	Honduran Coffee Institute
IHMA	Honduran Agricultural Marketing Institute
INA	National Agrarian Institute
IRR	Internal Rate of Return
LUCTC	Land Use Classification Technical Committee

MOE	Ministry of Economy
MNR	Ministry of Natural Resources
OET	Office of Environment and Technology
PCN	Nati nal Cadaster Program
PPA	Agriculture Production Program
PRODERO	Regional Development Project of the West
ROCAP	Regional Office for Central American Programs
SANAA	National Water and Sewer Service
UNESCO	United Nations Educational, Scientific and Cultural Organization
WRU	Water Resources Unit
WMU	Watershed Management Unit

THE NATURAL RESOURCES MANAGMENT PROJECT

Figure 1.1 THE FIVE SELECTED SUBWATERSHEDS OF THE CHOLUTECA WATERSHED

I. SUMMARY AND RECOMMENDATIONS

A. Findings and Recommendations

Representatives of the Honduran Forestry Development Corporation (COHDEFOR), National Cadaster Program (PCN), Superior Planning Council (CONSUPLANE) and the Ministry of Natural Resources (MNR) have worked closely with Mission staff on all aspects of the Project's design. There are, accordingly, no major issues which will not be adequately addressed in the Conditions Precedent to Disbursement of the Project Agreement. USAID Honduras recommends, therefore, authorization of a loan of $17,252,000 and a grant of $2,743,000 to assist in financing the Natural Resources Management Project.

B. Description of the Project

1. Background

Honduras is faced with an escalating rate of deterioration in its natural resource base. A number of key watersheds are already largely deforested with ominous implications for the future. The consequences are many: increased flooding, soil erosion and loss of soil fertility and water holding capacity, and loss of productive forests. This deterioration must be contained and government natural resource management institutions strengthened if Honduras is not to suffer irreversible environmental damage and decreased agricultural production.

2. Project Summary

The purpose of this Project is to strengthen institutional mechanisms through which the Government of Honduras manages the country's natural resources, and to undertake an action program in the Choluteca Watershed to increase farmers' income and to conserve soil and water resources.

The Project will improve the natural resource data base, policy, planning, management and implementation of projects which will strengthen current and future programs to improve utilization and conservation of Honduras' land, water, soils and forest resources. The Watershed Management program, the largest element of the Project, will build the GOH manpower and organization base to deliver improved conservation and agricultural technologies to hillside farmers. It will result in halting or reversing severe erosion in one-half of the farm lands at risk in the Choluteca Basin.

a. Natural Resources Policy, Planning and Data Collection ($5.6 million)

Natural resource policy and planning, as well as the hydrological, climatological and other natural resources data collection and analysis capacity of the Government will be improved and

strengthened through the provision of training, technical assistance, equipment, and other support. The activities in this area are designed to build a basis for comprehensive and multiple purpose resource planning to take place. At the end of the Project a natural resources policy structure will be formalized, policies on land and water use will be promulgated, over one-half of the national lands will be classified on the basis of their potential use and the natural resources data agencies will have doubled both their capacity and their data base.

b. Watershed Management ($15.2 million)

Environmentally damaging hillside farming patterns in five sub-watershed areas of the Choluteca River Basin watershed area will be halted or substantially reversed through the introduction of conservation practices, improved water management techniques, permanent and semi-permanent crops, changed cropping systems and patterns, and the reforestation of denuded and eroded areas. This effort will be directed to improving the income of the small hillside farmer within a framework of improved environmental practices.

The watershed management activities will take place in the Choluteca Basin, which is the largest and one of the most critically deteriorated watersheds in Honduras. It was selected because of the number of poor farmers resident in the area and the substantial level of deterioration. Training, technical assistance, equipment and other support will be provided to establish a new organization to carry out this large impact program. At the end of the Project approximately 7000 small farmers will have improved incomes and over 36,000 hectares of deteriorating land will have been beneficially affected. This represents 33% of the total endangered lands of the watershed and 50% of the small hillside farm lands. At the end of the Project, the experience gained will enable the GOH to extend improved watershed management techniques to the rest of the Choluteca Watershed and to other endangered watersheds.

The three principal GOH agencies to be involved in this Project are: The Ministry of Natural Resources (MNR), which is primarily concerned with agricultural programs; the Honduran Forestry Development Corporation (COHDEFOR), which has the responsibility for managing the country's forests and watersheds; and the National Cadaster Program (PCN), which is concerned with land titling and the collection and analysis of land use and natural resource data.

NATURAL RESOURCES MANAGEMENT PROJECT
(US$000)

INPUTS	OUTPUTS			
	Policy and Planning	Natural Reource Data and Analysis	Choluteca Watershed Management Program	TOTAL
Operating Costs				
Personnel	490.0	2,269.1	4,035.6	6,794.7
Training	30.0	317.9	129.2	477.1
Technical Assistance	471.0	627.0	1,426.0	2,524.0
Vehichles & Equipment	47.0	2,310.0	613.0	2,970.0
Other	40.2	119.1	464.2	623.5
SUBTOTAL	1,078.2	5,643.1	6,668.0	13,389.3
Choluteca Watershed Grants & Loans	-	-	8,572.0	8,572.0
GRAND TOTAL	1,078.2	5,643.1	15,240.0	21,961.3

II. PROJECT BACKGROUND

A. Problem Setting

Honduras, compared to other Central American nations, is relatively rich in natural resources : land, forests and water. Its population is 3.5 million, and at least one fourth of its 112,000 sq. km. is largely uninhabited. Of the 11.2 million ha. of land, 1.8 million are cultivated, 2.4 million are classified as grassland and cultivable, and 7.0 million ha. are in forest. Thus, approximately 63% of the land is considered forest land of which 60% is still in pine and tropical hardwood forests. Of the 17% of the lands classified as agricultural much is in alluvial valleys and coastal plains.

Rapid population growth in the past several decades has put great pressure on watersheds resulting in increased deforestation, erosion and soil depletion. Environmental damage has been particularly acute in three major watersheds: the Chamelecon in the west and north, the Ulua in the north and the Choluteca in the central and south. In these watersheds, the combination of the irrational exploitation of the forests and the movement of campesinos and cattle onto the hillsides has caused extreme damage and has resulted in increased flooding, a rapid reduction in soil fertility, heavy sediment loads in the rivers, reduced water flows in the dry season, reduced water retention and increased silting of dams. The campesinos faced with a deteriorating resource base and decreased agricultural production have shortened their fallow periods, extended their slash and burn practices up the hillsides and transformed previously unused steep slopes and shallow soils into corn patches thus exacerbating the situation and accelerating soil depletion and erosion. (See Annex L for a more complete description).

The magnitude of the total loss to the economy can only be illustrated. Some of the obvious effects are the increasing occurrences of washed-out bridges and roads, damaged irrigation systems, reduced life of reservoirs and silt in the water systems. More dramatic on a national scale are the more than 2 million hectares of pine land that no longer have trees. Theoretically, if there were a market, and if we were to take the least value use of pine (fuelwood) at $56 per cubic meter, and apply it to the annual incremental growth of one hectare of pine (7 cubic meters), then the annual loss to the economy would be $112 million. Perhaps less dramatic but equally disastrous is the loss of soil fertility. The farmers who live on the hillsides in the Choluteca Watershed estimate that over their lifetime corn yields have decreased upwards of 25%.

Government action, in the face of this deteriorating resource base, has been largely inadequate. The land use policies and other natural resource utilization policies and laws that exist have not led to effective land use nor to improved practices or programs. The emphasis has been on environmental exploitation rather than on environmental

protection despite a growing awareness that a rational and coordinated natural resource management approach is essential. Government institutions and agencies responsible for managing soil, water, forest and land resources lack the full capability and structure to plan, coordinate and implement natural resource programs. Donor efforts in recent years have begun to be more focussed on natural resource problems and improved planning for some aspects of natural resource management. As a result, the Government of Honduras (GOH) has improved its management and protection of some of the forested areas. Improved planning and coordination particularly in the agricultural sector is noticeable, and national parks and protected zones are being established. A greater emphasis on reforestation, environmental protection and improvement of watersheds is a more recent phenomenon.

B. Problem Statement

The attempts of the GOH to come to grips with its natural resources problems have been hampered and in some cases exacerbated by the lack of appropriate land use policies, effective natural resource policies and planning forums; institutional weaknesses of the agencies concerned with natural resource data collection and planning; and the conflicting interests of those agencies. The problem then is to find an effective means to build a rational set of workable policies and strategies and improved institutional and data bases to manage deteriorating natural resources and in particular the key resources of soil and water needed for improved agriculture performance. Although a policy base and improved data and analysis capacity on a national basis can be built in the near future, effective action programs in this area are probably not possible to achieve on a national scale in the short run. Therefore, it is important to begin efforts immediately in a manageable segment of the country.

In the Choluteca River Basin in the central and southern part of Honduras, environmental degradation is well advanced. Over 750,000 people inhabit the Choluteca Watershed area. About 550,000 of these reside within the five sub-watershed areas where this Project will be located. Agriculture is the mainstay of the economy of this region as it is nationally. The Watershed contains approximately one fourth of the national population and over 20,000 small farms families. The small hillside farmer has been forced by population pressures and low productivity to farm ever steeper slopes and to clear and cultivate higher up the hillsides. Thus erosion has increased and productivity substantially decreased. Fuelwood cutting to support a heavy urban population in Tegucigalpa, a large portion of whom fit into the poverty level, also puts great pressures on the watershed. The deleterious farming practices must be stopped and new resource management techniques and practices adopted if this deterioration is to be contained.

C. Project Development

The current Project is a result of several years of thought and discussion as how best to address the problem of better use and conservation of the most critical natural resources of Honduras. The

original Project Identification Document (PID) approved in FY1978 focussed on the better on-farm use of water resources and emphasized feasibility studies and a number of pilot water projects. In July 1978, that design was altered to include human resource development, information gathering and institutional strengthening for the whole sector in order to address land use policy questions. An "Aide Memoire" outlined for the GOH the Mission's concerns about those policies, and indicated that the Mission could not proceed in preparing a project without progress on reforming those policies. GOH progress on the policy front has been slow but constant. An interagency working group was established under the auspices of the ministerial level Agricultural Policy Commission (CPA), and steps have been taken as described elsewhere in this paper.

In response to those steps and to the need for an accelerated action program in Honduras a second PID was prepared and approved by the DAEC in September, 1979. This PID formed the basis for the development of this Project as it is now written. However, during the course of intensive review the design of the Project has been varied in several respects. The Project has a larger Watershed Management impact element with a strategy focussed on improved income of small farmers. Trail protection and mini-irrigation teams will not be explicit elements of the Project and ground water studies and improved management of small and medium irrigation projects have been eliminated. (See Annex L 1."Project Development" for a more complete description of changes and rationale.)

D. GOH Strategy and Committment

The Government of Honduras, (through the ministerial level Agricultural Policy Commission [CPA]), has become increasingly concerned over the ineffective management of the country's water and land resources as food demands grow and as the country's forested areas are destroyed due to population pressures and destructive cultivation practices. A proposed National Program for Environmental Protection and Improvement has been drafted; a new draft water law creating a National Water Council to determine policy and set standards is under consideration; the National Cadaster Program (PCN) has expanded its efforts to include watersheds and forested areas, and has been given permanent legal status; the GOH is considering the establishment of 15 wildland areas which would be designated principally for preservation of tropical wildlife and environments; and a number of new and ongoing programs are being modified to include watershed management components. GOH concern and committment has been demonstrated further by: the significant amount of resources which the Honduran Forestry Development Corporation (COHDEFOR) supplies to forest management and protection (it is undertaking a $7.5 million Project with a loan from the International Development Bank for reforestation activities in the El Cajon watershed);the support and counterpart contributions given to UN Food and Agriculture Organization (FAO) in watershed management activities; the reforestation efforts being undertaken under the Regional Development Project of the West (PRODERO) in the western part of the country; and its plans to issue a law to promote private reforestation activities.

However, all of these activities do not yet make up a full strategy. In fact, except for forest management many of the activities described could be attributed to interests of the donors. Still, after a year of discussion, the expressed willingness of the GOH to enter this Project represents two important commitments: (i) to begin to design policies and to formulate appropriate strategies to deal with the problems and (ii) to begin to implement a specific strategy for improved management of a major watershed.

E. AID's Strategy

AID's country strategy is to improve the efficient use of productive resources of the rural poor, primarily land and labor, with the objective of increasing employment and income. A complement to this strategy is to encourage the optimum use of natural resources so as to enhance their productive life while contributing both to national productivity and to improved life-support systems for the rural poor.

This strategy is based on the 1978 Agricultural Sector Assessment which identified the major constraints to agricultural growth and equity for the rural poor majority whose livelihood is agriculturally based. The Agricultural Sector II program, as the major vehicle for this strategy, focusses heavily on strengthening the sector institutions which are responsible for the delivery of services to the small farmer sector. The Assessment clearly recognized the negative natural resource impact of small farmers who are on hillsides with an eroding soil base; the negative impact that hillside subsistence farming and cattle ranching also has on the forests and; the inability of the GOH to maximize the use of the forests as a source of employment for poor farmers, two thirds of whom live on the watersheds and the margins of forests. However, it was expected that the earlier Water Resources Project which was then in its design stage would begin to develop the approach and methodology for water and soil conservation for hillside farmers. It was therefore not included as an explicit element of the Agricultural Sector II Program.

The Mission's current approach is to complete as well as to complement the agricultural sector strategy as now being implemented by Agricultural Sector II Program by attacking the destructive natural resource impact of hillside farming on the watersheds and the underuse of the forest resource as a means for generating alternate employment for the landless and near landless. The current Project is directed at the hillside farmer; another Project in development for 1981 will deal with the forests. Another, but no less important aspect of the Mission's strategy is to address the problem of providing the landless and near landless with improved access to land. The approach to this problem vis-a-vis the GOH agrarian reform program is still in its early conceptual stages.

F. Project Financing Strategy

An AID grant in the amount of $2,743,000 and loan of $12,252,000 is proposed. The grant

is proposed to pay for foreign technical assistance and to staff a Project Coordinator Office.

Based on past experience, the GOH is hesitant to use its own or loan funds to pay for the U.S. quality technical assistance that is needed because of the high cost i.e., $80,000 per ma year. Using grant funds provides sufficient leverage to assure contracting of high caliber advisors. The Project Coordinator is included for grant financing because he/she also will assist the Mission in maintaining contact with and monitoring the GOH in its conduct of the Project.

Honduras is the second poorest country in Latin America. Its balance of payments position has suffered from recent drastic oil price increases. It is trying to make a leap from almost total dependence on oil for energy by financing the construction of the El Cajon Hydroelectric Dam. As a result the GOH is faced with a very tight cash flow position over the next several years and a debt burden which will be substantial when the Project loan begins to mature. The $4.2 million in grant funds will not make a large impact on the total GOH debt but, the GOH must and is carefully scrutinizing all loans and counterpart requirements regardless of the importance or priority of the projects. Although recognizing the need for forward looking, long term investments, the GOH is concerned about short term returns to the economy.

The Project activities including the sub-loans are not recuperable by the GOH as all repayments will flow back to the Project credit fund. The benefits which the sub-loans and sub-grants will help to bring about will have relatively small income impacts during the life of the Project and few returns to the society in the form of taxes and increases in the national accounts. The largest part of the Project attacks the most deteriorated watershed in Honduras, the Choluteca. This watershed is an area of social unrest, lying between El Salvador and Nicaragua. It is a source for a substantial out-migration to Tegucigalpa and other urban areas because of increased rural population pressures and the deteriorating soil resources for farming. In order for national objectives as well as Project objectives to be achieved, the scale of the work has to be sufficient to make a macro-impact on both the deteriorating natural resources and employment conditions; to give some hope to Hondurans that they can contain the loss of their resource base and provide some possibilities for the rural poor to remain and work in their farm communities. The long gestation period for these benefits argues for reducing as much of the debt to be incurred by Honduras as is possible.

Given the fact that the Project represents the first large scale operational attack on the most important causes of degraded watersheds and forests, i.e., slash and burn agriculture and traditional cattle grazing, it seems appropriate for the USG to encourage the GOH to undertake this admittedly ambitious program by grant financing as much of the costs as possible for which there are no immediate returns.

G. Other Donor Programs

Other donor programs in natural resources and watershed management, some of which are mentioned in D above, are by and large aspects of larger rural development programs or activities in response to specific needs such as protection of the El Cajon watershed or, like the FAO Watershed Project, experimental in nature. The Choluteca Watershed Management element of the Project has already taken advantage of the experience of the FAO project and the other donor rural development projects, and the El Cajon project will be monitored so as to gain from its experience. All of the current donor programs are useful, complementary and reinforcing to AID's approach, but they do not represent a strategy. (A more complete profile of other donor programs is in Annex L).

III. PROJECT DESCRIPTION

A. Project Strategy

The effective management of the natural resources to achieve national economic and social goals requires carefully designed policies, improved knowledge of the resource base, improved land use classification and planning mechanisms and integrated programs which center on the economic and food needs of the campesino's as well as the conservation and improved utilization of his natural resource base.

The Project's strategy consists of three elements. The first is to establish an effective forum within the Government of Honduras (GOH) to give direction to the natural resource effort; to bring together the various agencies involved in natural resource programs; to study and synthesize existing land use and natural resource laws and policies into a comprehensive and effective package; to propose new and needed laws and policies; and to direct or oversee the strengthening of the key institutions in the natural resource area.

The second element is to build a land use classification system and to increase significantly the capability of the GOH in natural resources data collection and analysis.

The third element is to start activities to improve a watershed in order to give practical expression to the overall policy, to test approaches before moving to a full national effort and to achieve practical impact on the watershed problem in the near future.

The watershed management component will focus on activities to reduce slash and burn hillside farming practices, encourage conservation and introduce improved utilization of existing land and water resources. This element will support increased income for the small farmer within a framework of improved environmental protection and conservation, since without increases in income the farmer is not likely to continue the new practices. The Choluteca Watershed, one of the most critically deteriorated in Honduras was selected as the focus of this work on the basis of: the number of target group farmers included in the watershed area, 20,000; the level of its deterioration; the variety of ecological zones it includes; and the utility of the results and experience for other watersheds in Honduras.

B. Goals and Purposes

The goals of the Project are (i) to improve the employment and income of poor farm families living in the watersheds through rational and more productive use of land; and (ii) to improve the management and use of land, forests and other renewable natural resources in Honduras since the long term productivity of the land depends on how the natural resource base is managed and protected.

The major Project purposes are: (i) to strengthen the institutional capabilities of the GOH to develop and implement policies, mechanisms and programs for management of Honduras' renewable natural resources with special emphasis on soil and water, and (ii) to establish an integrated watershed management program in the Choluteca River Basin which focuses on bringing improved agriculture, agroforestry, forestry and soil conservation technologies to bear in the practice of the hillside farmer and on increasing his income.

At the end of the Project the GOH will have a new and interrelated set of policies for natural resource/environmental management and an established institutional framework for implementing them. Its natural resources data collecting agencies will be substantially augmented and it will have extended its efforts and information to include all of the valleys and most of the forested areas in all but the eastern part of Honduras. About 7,000 hillside farmers or one half of those in the Project area of the Choluteca Watershed will have modified significantly their slash and burn and grazing practices, and will have increased their income an average of 14% per year for the first five years of the Project. A substantial change to a major segment of the Watershed will take place during the five year Project. Of the total area of the watershed which is devoted to hillside farming and grazing (109,000 ha.) the Project will affect approximately 36,000 ha. This represents 33% of the total area and 50% of the area in small farms. At the end of the Project the existence of approximately 13,000 ha. of new trees, 5,000 ha. of improved pastures and 18,000 ha. of small farmer milpa patches with soil conservation works and improved cultivation methods should reduce soil loss and improve land productivity.

C. Outputs and Inputs

1) Natural Resources Policy and Planning

The Project will assist the Government of Honduras (GOH) to rationalize the existing land use policies into a comprehensive policy which will include the development and implementation of a land classification and zoning system. National policies and priorities for the management and utilization of renewable natural resources will be developed. Initial efforts will be on programs dealing with the two critical areas of watersheds and forests. Appropriate permanent organizational and implementation mechanisms will be developed to conduct analyses and reviews of policy and programs, to assist in interinstitutional coordination, and develop cooperative action programs and evaluation programs.

The GOH has expanded the mandate of the Agricultural Policy Commission (CPA) to include natural resources and land use policy. When it deals with natural resources issues, the CPA will add the General Manager of the Honduran Forestry Development Corporation (COHDEFOR) to its membership which now includes the Ministers of Natural Resources, Economy and Finance as well as the directors of the National Agrarian Institute and of National Planning. The CPA's initial priorities will be to oversee the establishment of a system of land use classification, to take decisions on land zoning, and to review proposed new development projects from the point of view of their appropriate use of land and other natural resources. The CPA also will develop and propose new laws and regulations designed to codify and rationalize existing natural resource legislation, and develop institutional mechanisms to carry out these new policies. A Land Use Classification Technical Committee is to be established under the direction of the CPA (See Annex L).

At the end of the first Project year, a land use classification system and necessary institutional mechanisms will be fully operational. At the end of the Project the GOH will have classified one half of the national lands and will have installed an operative system for use of this information in the design of programs and projects. At the end of the third Project year the GOH will have developed a coherent set of land use and natural resources management policies and regulations as well as a legally constituted framework for developing and establishing policies and their implementation.

Long and short term technical assistance will be provided to the CPA in the areas of natural resources and environmental policy, land classification, ecology and environmental engineering. The Project will add a forestry and watershed policy analyst and a long term land classification specialist to assist the CPA. The land use specialist will assist the Land Use Classification Technical Committee in developing operational procedures and provide direct assistance to the land use section of the National Cadaster Program which will collect and analyze the necessary data for presentation to the technical committee. Funds also will be provided under this component for administrative management and support to the Project by the Ministry of Natural Resources (MNR) Coordination Office and for one Project Coordinator and one secretary.

The total estimated cost of this component is $1,078,300 of which loan and grant funds will finance $815,700 and GOH counterpart will finance $262,600.

2) Natural Resources Data Collection and Analysis

The availability of climatic, hydrologic, topographic, sedimentation, soils, geologic and other basic data is essential to natural resource conservation and development planning. In Honduras, insufficient data are available for this purpose. The capacity of all GOH agencies for data collection and surveys is far below current requirements. Thus, it is necessary to improve the quantity and quality of the data collected by existing agencies, and to unify and coordinate their resource data analysis capacity to strengthen the basis of policy formation to plan development and to select and design priority projects.

The National Cadaster Program (PCN) and the Ministry of Natural Resources (MNR) will be supported through the Project in bolstering their natural resources data gathering, analysis and dissemination capacities. The PCN was established under the AID funded National Cadaster Program (522-T-014) to delineate and provide property and natural resource mapping for half of the area of Honduras. The PCN will be strengthened in its Natural Resources Department, Delineation Department and its Systems and Programming Department. The MNR will be strengthened in its Department of Climatology and Hydrology (DCH). These and other GOH institutions will participate in coordination and data standards committees to assure a uniform quality of data and appropriate access by the users.

i) Natural Resources Data Processing

The PCN computerized data processing system will be expanded in terms of manpower and equipment to (1) accelerate the rate of data and mapping compilation to be able to complete the remainder of the country and extend work into the forest areas, (2) maintain existing and future cadastral and natural resource surveys, (3) provide access to more data users and (4) facilitate the institutional users natural resource analysis capabilities.

The Project costs for this element are $638,300. AID loan funds will pay foreign exchange costs for computer equipment, service contracts, computer software and technical assistance. Some funds will be used to finance local costs for additional personnel and operations during 1980 and 1981. AID inputs for the five year period will be $409,200. GOH counterpart will fund the balance of personnel and operating costs for a total of $229,100.

ii) Soil Surveys and Laboratory

Soils surveys, supported by laboratory analysis, are essential tools to plan natural resource management activities; provide the principal information for determining and mapping land use capability; and provide

information for irrigation project planning. Soil surveys and soil classification by the PCN are hampered by a lack of trained personnel and by insufficient laboratory expertise.

The soil laboratory's output, the soil survey field work and the preparation of maps and reports will be augmented substantially during the first year of the Project. By the end of the fourth year the expansion of the soil survey teams will be complete. This will double the PCN's capacity for the preparation of reconnaissance and semi-detailed soil surveys.

The Project cost for the Soils Survey element is $892,200. AID loan funds will pay for foreign exchange costs for laboratory and field equipment, technical assistance and short-term training. The total AID input for the five year period will be $329,500. GOH counterpart funds of $562,700 will pay for the personnel, support and operating costs.

iii) Hydrology and Climatology Services

The Department of Hydrology and Climatology (DHC) within the MNR's Water Resources Direction (DRH) is the agency with the most comprehensive and broadly defined interest and responsibilities in collecting and analyzing hydrology and climatology data. It currently maintains a network of 49 hydrological stations and 102 meteorological stations. The usefulness of the network is limited because of problems in station location, station maintenance, lack of qualified station observers and budget constraints limiting new station construction.

The Project will strengthen the role and capability of the DHC. The major output will be improved data from the existing stations and from the 65 additional meteorological stations and 38 additional hydrological stations which will be installed with Project funds. The expansion of the stations and improvement of this effort will be complete during the third year of the Project. The DHC's data analysis capability will be strengthened by linkage with the PCN computer during the second year of the Project, by long term training opportunities in hydrometeorology and by technical assistance in data analysis and station operation.

The Project costs for this element are $983,000. AID loan funds will pay for foreign exchange for laboratory and field equipment, technical assistance, vehicles and training. Some salaries for personnel during the first year of the Project will be funded by AID. AID inputs for the five year period will be $559,900. GOH counterpart funds will pay for the balance of personnel, support, and operating costs.

iv) Ecology and Forest Classification

One of the basic requirements for natural resources management and planning is a knowledge of ecological life zones and forest types. This provides land use planners and natural resource managers with knowledge of the relationships that exist among the biotic, hydroclimatologic and soil environments within the life zones.

The PCN has an ongoing program in life zone mapping and forest classification under its Ecology and Forest Classification Department. However, the work has fallen behind because of insufficient personnel and technical support. The Project will accelerate life zone mapping in the remainder of the country, and complete all areas during the fifth year. It will provide for the continuation of forest classification into the western and eastern regions, and into Olancho. These areas will be completed by the end of the Project.

The Project costs for the Ecology and Forest Classification element total $276,500. AID loan funds of $78,400 will be used to provide technical assistance in life zone mapping, field equipment, and personnel during 1980. The GOH contribution of $198,100 will pay for the balance of personnel, support and operating costs.

v) Forest Delineation

The progress of forestry has been hindered by a lack of knowledge about the productive capacity of deforested lands and the identification of the tenancy of forest lands. The PCN recently has begun to do delineation (establish ownership boundaries) of forest lands. It is important that this work be accelerated to keep pace with forest development, forest exploitation and forest protection. The Project will provide funds to double the rate at which forest lands are currently being delineated. The priority regions where forest land tenure will be determined are Olancho, and the Comayagua and Yoro areas where large forest industrialization investments are being made.

The Project costs of this element are $339,000. AID loan funds of $41,100 will provide for ten new delineation teams and field equipment during the early period of the Project. These teams will supplement the ten existing delineation teams. GOH contributions of $297,900 will pay for the balance of the personnel, support, and operating costs.

vi) Actual/Potential Land Use Classification

A key element in the Project will be the application of natural resource data/information to the evaluation of the use of rural lands. Without a clear idea of both the capability of the land and its potential use, development planning, agrarian reform actions, agriculture and agro-industry projects will have a weak basis for decision making. This not only could jeopardize investments and government efforts but also could lead to serious social problems such as resettling beneficiaries of the agrarian reform on a poor soil base or allocating land for reforestation which is more appropriate for farming.

The PCN has an ongoing, but small, land use program. This Project will expand the program to include a land use classification element. The PCN Land Use Department will organize, evaluate, and recommend land use classification to the Land Use Planning Technical Committee. That committee will forward recommendations for potential land use to the Agricultural Policy Commision for final decision.

The Project costs for the Actual/Potential Land Use Classification sub-activity are $514,500. AID loan funds will provide for equipment and supplies, long term training for land use planning, and additional personnel during the early period of the Project. AID loan funds will total $90,900. GOH contributions of $423,600 will pay for the balance of personnel, support, and operating costs.

vii) Cadaster and General Project Support

The Project provides general support that is important to several activity categories. For clarity in presentation this support has been categorized apart rather than proportionately included in the specific sub-activities. It includes aerial photography, orthophoto mapping, and cartographic technical assistance. These activities are essential for the accelerated completion of the cadastral surveys and natural resource inventories on the remaining 50% of the country, including the western region (Intibuca, La Paz, Lempira, Ocotepeque, Copan and parts of Santa Barbara) and in the east (El Paraiso and parts of Colon and Olancho). The mapping of these areas will provide a basis for land use classification. The aerial photography and orthophoto mapping are used by field teams to delineate property boundaries and map natural resources units.

Technical assistance will be provided to support aerial photography work, orthophotography and delineation of property boundaries onto orthophotos as well as mapping by computerized inter-active graphics techniques. These methods and technologies are relatively new to Honduras and will require continuation of highly skilled technical personnel to assure the needed precision of the output as well as the increased production required by the Project. Vehicles will be provided for additional field delineation teams and as replacements for those worn out during the initial Project and for additional soil survey teams and other Project elements.

For 40 new and replacement vehicles, orthophoto mapping, additional aerial photography and technical assistance, AID loan funds will provide $1,780,000. GOH contributions will pay for vehicle maintenance and contingencies for a total of $189,500. Total sub-activity cost is $1,969,500.

3) <u>Choluteca Watershed Management Program</u>

The Choluteca Watershed Management part of the Project approaches the watershed problem from the point of view of the small farmers; their farm size, slope of the land, farm methods, economic constraints and their deleterious effects on the soil on the hillsides. The smaller the farm and the greater the slope of the land, the greater are the negative impacts on the soil and vegetation. The Project will provide four improved technologies which fit the farm size and slope characteristics as well as the subsistence corn production and income improvement needs of the various classes of farmers. Farmers on land up to 50 ha. on slopes of greater than 20% are the targets of the Project because they contribute most to soil erosion and loss of productivity and have the

least ability to extract themselves from their traditional practices because of their low income levels (from $50-300 per capita per annum). The Project is designed to improve the basic socio-economic conditions of farmers living in the Watershed while they adopt modified farming practices to protect the soil and improve soil productivity.

Project activities will be undertaken in five subwatersheds within the larger Choluteca River Watershed which were selected on the basis of their levels of deterioration, ecology differences and a high percentage of small hillside farmers. The activities will be: i) soil and water conservation combined with intensive agricultural practices on farms with slopes up to 30%; ii) agro-forestry activities and fuelwood production on farms with slopes of up to 50%; iii) reforestation activities on farms with slopes higher than 50%; iv) range management and pasture improvement activities on larger farms with slopes of 30 to 50% and; v) community nursery and tools projects. All of these activities are designed to produce short and long term beneficial increases in income ranging on an average of about 14% per year for the first five years, for about 7,000 or (50%) of the small farmer families (about 40,000 persons) living in the Project area. They also will produce beneficial conservation impacts such as increased land productivity and soil protection on 36,000 hectares of land, and provide the experience which is required for a national level comprehensive watershed management program.

This part of the Project will be implemented under the policy guidance of the Agricultural Policy C nmission. A newly established Natural Resources Executive Committee (MRN, CONSUPLANE, INA and COHDEFOR) will provide executive direction to the Project through a Project Office established to manage the Project. (See Institutionbal Analysis below).

Under the direction of the Project Office activities in the watershed will be executed by one Watershed Management Unit (WMU) for each of the five subwatersheds. Each WMU will have four teams formed by an agronomist, a silviculturalist, a social promoter, a cooperative expert and a cooperative accountant. In addition, the teams will have the support of land support specialists who will assist farmers who do not have final titles in solving these problems and of paraprofessional agents who will serve as liaison persons between the WMU's and the community organizations and individual participants in the program. Up to 264 local community organizations with an average of 25 farmer participants each will be formed in the five year period. Grants will be made to each community organization for the establishment of community owned nurseries which will produce the seedlings required for the agro-forestry, fuelwood and reforestation activities. Grants also will be made to the community organizations for basic tools required to build soil conservation structures by its members. Community participation in the design of Project activities and self-management are important objectives of the program.

A detailed description of each of the specific practices in the Project follows.1/

i) Soil Conservation and Intensive Agricultural Practices

Soil and water conservation and intensive agricultural practices will involve a number of specific erosion and water control measures in combination with improved agricultural production practices designed to increase the productivity of the soil and the income levels of the farmers; control or prevent soil erosion particularly in cultivated hillsides and in pasture lands; and promote more efficient use of available water resources throughout the year.

The specific activities contemplated under this part of the Project include the construction or planting of live barriers, retention walls or hillside ditches in combination with improved cultivation and cropping practices such as contour planting, intercropping and improved plant spacing and the provision of fertilizer and other agricultural inputs for improving the productivity of the soil. These practices will be applied primarily to small farms up to 20 ha. on slopes of 15-30%.

Fertilizer subsidies or loans will be given in direct proportion to the amount of soil conservation work to be performed. The smallest farmer (less than 5 ha.) will receive a fertilizer grant (average $90 per hectare) as an incentive to stop his slash and burn rotation methods and to stabilize corn production on a single parcel and as a form of payment for installing retention walls and other soil conservation techniques. The 5 to 20 ha. farmers will be offered loans for fertilizers and to plant firewood and tree crops on land no longer needed to be left fallow for a subsequent year's corn crop. The subsidized loan (average of $350 per hectare) will be needed to maintain the farmer's current cash income and increase it gradually during the second through the fifth year. Although improvement of the farmers' income will be gradual, the income returns from tree crops are expected to be sufficient to continue new practices after the Project period.

Approximately 5,500 small farmers will apply these treatments to 18,000 hectares for a total Project cost of $2,833,600. AID funds will finance $2,019,200 and the GOH $814,400. (For purposes of illustration both AID and GOH contributions have been calculated by prorating total institutional and support costs for sub-loans and grants for each of the Project activities/practices to be introduced (See Exhibit 11 in Annex J).

1/ For more details on these activities see Annex L; for details on the physical conditions of the subwatersheds and the Watershed Management Plan see Supplement 1 (Available in LAC/DR and upon request from USAID/Honduras, OET).

ii) Agro-Forestry and Fuelwood Production Activities

Under this activity the Project will provide financial incentives to the farmers to dedicate a part of their land to agro-forestry activities or fuelwood production, using one or several of the fast growing species which are adaptable to the area (See Technical Analysis). Besides providing an additional source of income to the farmer six to eight years after planting, agro-forestry and reforestation provide one of the best means to protect the soil against erosion, to stabilize the water supply and to reduce sediment yields. The farmers will be planting fast growing species either in land currently in fallow or at wide spacings between traditional or new crops. These activities will be applied to small farms (up to 20 ha.) and medium farms (20-30 ha.) on slopes up to 50%.

The loans for agro-forestry and fuelwood will be given for an 18 year period at 8% interest. There will be eight years grace and 10 years to repay principal plus accrued interest. Approximately $3 million will be for sub-loans to farmers for this activity. The income effects on the approximately 2,700 farmers with 5 - 20 ha. of land who introduce both soil conservation and agro-forestry measures will be gradual at first building up to a 48% increase over current income in year five and reaching up to 70% once the trees acquire a significant market value (years six to eight).

The total area to be covered with agro-forestry or fuelwood production activities is 8,360 hectares. The direct and indirect total cost will be $5,202,300. Of that, $3,707,000 will be funded by AID and $1,495,300 by GOH counterpart.

iii) Reforestation activities

In lands with slopes of more than 50% where soils are so poor that little possibility exists for agro-forestry or fuelwood production with rapid growing species, reforestation with native pine trees will be promoted. The main objective of the activity is to reforest the area to provide the ecological protection which has been lost throughout several decades of exploitation of timber and slash and burn agriculture.

In the areas where the rapid growing species are unsuitable for reforestation a different financial incentive system will have to be applied. For example, in the case of pine, which takes about 40 years to reach maturity the incentive will consist in covering the cost of labor inputs and seedlings as a 15 year loan to the farmer with a five year grace period at 8% interest. If the farmer is taking good care of the seedlings as determined by the Watershed Management teams, the GOH will repay the loan to the Watershed Management Credit Fund beginning in year six and for the subsequent years that it takes for the loan to be fully paid. Approximately 4,233 ha. have been classified as falling under the reforestation category. It is expected that reforestation activities will be part of a package which includes soil conservation and agro-forestry that would be most suited for farms of 5 - 20 ha. Therefore, these beneficiaries can not be separated from the participants of soil conservation and agro-forestry activities already stated above.

Under the current laws, the exclusive rights to manage and cut the natural forests are vested in COHDEFOR. However, there is some doubt as to COHDEFOR's authority with respect to artificially planted forests and perhaps fuelwood and other trees. Thus prior to disbursement of funds for reforestation, the GOH will clarify the question or issue directives to vest exclusive ownership and management rights to trees planted under this Project in the beneficiaries (see conditions precedent).

Total Project costs for this activity including sub-loans of $1,481,400 are $2,634,100 of which AID will provide $1,877,000 and GOH $757,100.

iv) Range Management and Pasture Improvement

Over 300 farmers in the five subwatersheds will apply pasture improvement and range management practices to about 5,000 ha. in the five year period of the Project. With the assistance of range and pasture management specialists better management practices will be promoted for jaragua grass, which is used extensively in the region, as well as the substitution of stoloniferous grasses such as Bracchiaria spp. for this grass and other stump-grasses. The objective is to increase the herd-carrying capacity of the land, to augment the productivity of the cattle and to protect the land against soil erosion and further degradation. These improvement practices normally will be applied to medium size farms (20-50 ha.) on slopes ranging from 30-50%.

The financial incentive to the cattle grower to adopt these practices will consist of free technical help and loans at 12% interest for 15 years with five years of grace. The credit will be used for the establishment of new pastures, for fence repairs, or for the adoption of other improved range management practices.

Total cost for this activity has been estimated at $2,693,500. AID funds will finance $1,919,400; and GOH counterpart, the remaining $774,100.

v) Community Nurseries and Tool Grants

In order to involve the communities directly in the Project activities and to facilitate the implementation of loan and production activities in the five selected subwatersheds, the establishment of community organizations, community groups or cooperatives will be promoted by the watershed management teams. The groups will participate in the design of the farm planning effort and the selection of appropriate technologies; will organize themselves to collaborate with the technical teams; and will provide a legal basis for approval, execution and management of Project loans and grants. The total number of community organizations to be established increases from 26 for the first year to 53 the third year and to 79 in the fifth year. At the end of the Project, up to 264 units will have been established. In order to stimulate the production of seedlings at the community level, direct grants will be made to each cooperative unit for the establishment of a nursery. The grants will cover the infrastructural costs of nurseries, the materials and supplies and other initial costs of establishment.

Total grants under this part of the Project will amount to $1,055,500 for the five-year period, and will benefit up to 264 community organizations each with 25 farm-families. This makes a total number of 6,600 farm-families or close to 40,000 persons as direct beneficiaries of this activity. AID loan funds will be used to finance the community nurseries. In addition tools will be granted to each community organization to facilitate Project activities at the field level. The total cost of this activity is estimated at $1,876,500 of which AID funds will cover $1,337,200 and GOH counterpart $539,300.

vi) Watershed Management Credit Fund and Grant Activities

The Project will establish a Choluteca Watershed Credit Fund in the National Agricultural Bank (BANADESA) to provide a source of loans for participating farmers to undertake the Project activities. The loans will be made through the community organizations to be established under the Project to benefit individual farmers. The credit will be offered for purchase of fertilizers as an incentive for applying soil and water conservation treatments, and may be combined with additional credit for introducing agro-forestry, fuelwood production, reforestation or range management and pasture improvement practices. Decisions on which elements to be offered to farmers will be made on the basis of farm plans jointly developed by the Watershed Management Teams and the farmers. Loan requests as well as grants for fertilizers will also be based on the individual farm plans. The farm plans will be consolidated by the community organization along with the schedule of loans and grants, approved by the community unit, and forwarded to the Project Office. The Project Office will, after technical and financial analysis, approve the community's request and forward the loan schedule to the BANADESA.

The Watershed Management Credit Fund will be established as a fiduciary fund. The BANADESA will administer the loan disbursements and repayments, but the Project Office will manage the loan program substantively as it will the grants for fertilizer and nurseries. Authorities, responsibilities, criteria and procedures with respect to loan approvals and administration for both the Project Office and the Bank will be approved by the GOH and AID prior to any disbursements from this Fund. Similarly, procedures and rules for fertilizer and nursery grants will be approved and installed prior to any such disbursements. (Procedures are contained in Annex K).

vii) Total Costs of the Choluteca Watershed Management Program

The total cost of the Watershed Program will be $15,240,000. AID will fund $10,859,800: $1,420,000 in grant funding for technical assistance and contract studies and $8,572,000

in loan funding for the Choluteca Management Credit Fund. The remaining $867,800 from AID funds will be used to cover basic institutional costs for the last quarter of 1980 and for the year 1981. GOH counterpart of $4,380,100 will fund all personnel-related costs after 1981, plus all supporting costs: rent and utilities, gasoline, vehicle and equipment maintenance, travel and per diem and miscellaneous expenses.

IV. PROJECT ANALYSES

A. Technical Analysis Summary

1. Project Organization Alternatives

The GOH has analyzed different proposals to deal with issues related to environmental protection and improvement. From this analysis it has been concluded that for the present, policy formulation and coordination can best be accomplished through the Agricultural Policy Commission (CPA) which includes the Minister of Natural Resources, the Director of INA, the Executive Secretary of CONSUPLANE and the Ministers of Economy and Finance.

The GOH also concluded that before proceeding to the creation of a new institution to deal with issues related to the management of natural resources and watersheds for the country as a whole, additional analyses and deliberations as well as a better understanding of the consequences of any actions in these fields will be required. The Choluteca Watershed Development Program envisaged in this Project will be a means of acquiring some of the necessary experience in the field.

2. Technical Discussion of Project Components

The natural resource conservation technologies chosen to be implemented in the Choluteca Watershed are simple technologies, in most cases adaptations of technologies already tested in Honduras or in environments similar to Honduras such as Costa Rica, El Salvador and Panama. The five subwatersheds selected for the Project offer a different set of ecological conditions where different technologies can be applied, and where a wide variety of crops and forest species can be grown. The chosen technologies can be applied in the areas with slight modifications to allow for ecological variations. The experience which will be derived will permit the extension of these technologies to much larger areas of degraded land and endangered forests. These technologies are technically feasible, since all of them are in use in the areas of the Project although in limited scope. Their expanded application should confirm their economic and social feasibility, thus facilitating rapid adoption by the small and medium sized farmer on an even wider scale.

The target group selected as direct beneficiaries of the Project is formed by all the farms established within the subwatersheds on slopes of greater than 20% with an area of less than 50 hectares of land. It is in this farm size category where the majority of the deleterious slash and burn and grazing practices take place; the income-levels of these farmers are extremely low; and potential for substantial improvements exist. The technologies have been chosen to deal with the particular problems posed by the slope characteristics of the farms as well as by the objective of increasing farm incomes.

Practical experience in the Choluteca Watershed, as well as the socio-economic and physical surveys made for purposes of this Project, have reduced the wide spectrum of possible technologies to the four which have been described above.

Exhibit 1-A in Annex L summarizes the extension of land in hectares by size of farm to which the different Project activities are to be applied. The total area of the Project in farms under 50 ha. is 71,120 ha. Approximately 50% or 36,000 ha. will be treated with one or a combination of several of the activities described above. Due to slope and soil characteristics in the five selected subwatersheds, approximately 17,887 ha. will receive some kind of soil and water conservation treatment and improved agricultural practices; 8,360 ha. will be planted with fuelwood plantations or with one of several schemes for agro-forestry cultivation; 4,233 ha. will be reforested with timber species, and about 5,050 ha. will be treated with pasture improvement and range management techniques.

a) Soil and water conservation and improved agricultural practices

The basic technology to be applied in lands with slopes of up to 30%, consists of the construction/planting of live barriers with native grasses known to grow well in the region, like "zacate-limon", guinea or Jaragua grass, "pinuela" or similar species. A variation of this practice will consist of the construction of rock retention walls. Live barriers or retention walls are simple technologies, widely known and easily adopted by the farmers in the region. In lands with slopes from 30% to 50%, live barriers might not be sufficient to cope with soil erosion. In these lands, the construction of contour ditches (hillside ditches) using labor-intensive technologies will be supported.

Soil conservation practices alone, however, will only address one of the problems of the watersheds. Improved agricultural practices will also be necessary to make the soil-conservation measures economically viable from the point of view of the farmer. Thus, fertilizer, improved seeds, pest control and other agronomic practices suitable to the crops grown in the region (maize, sorghum and beans) will be provided. The improved agricultural practices will be promoted through educational campaigns, demonstration plots and with the use of paraprofessional technicians who will be trained specifically for the Project.

Honduras has had enough experience with soil conservation practices as well as with improved agricultural practices to conclude that the simple techniques chosen are technically feasible.

b) Agro-forestry practices and fuelwood production

The promotion of agro-forestry practices and the production of fuelwood are an essential component of the strategy to rationalize land use in the watershed. In addition to ecological protection these practices will provide a productive economic alternative

over both the medium and long term for the target farmers. It will help to reduce the current trend toward the establishment of pastures in steeply sloped hillsides and the expansion of forest cover will help protect the watershed.

The critical factor determining the internal rate of return from forest plantation is the species that is selected. Depending on the specific ecological conditions, areas will be planted with one or several of the native species with which COHDEFOR and private institutions in Honduras have already had some experience (See Annex N for list of species). Also depending on community preferences and the ecological conditions, fruit and other trees will be promoted: coffee, oranges, grapefruits, avocados, mangos, or cashew nuts.

No major technical problems are anticipated in the selection and planting of tree species for agro-forestry or fuelwood production since most already grow in the Project area. Some experimental plots, established either in the nurseries or on participating farmer's land will test species and varieties new to the zone. The National Forestry School (ESNACIFOR) and the Center for Tropical Agriculture (CATIE) will be contracted to provide technical assistance in selection of new varieties based on soil, climate, hydrology and slope conditions. The results of the ROCAP fuelwood project which is being carried out partly by CATIE will be utilized. Negotiations are underway to have CATIE do some variety testing in the Choluteca Watershed. Results are also available from experimentation with Eucalyptus and Leucaena in Honduras. These two varieties will be tested in the Project areas because of their superior rapid growth characteristics. Technical information also is available for some of the native species which grow within the Choluteca Watershed.

For fuelwood production as well as for charcoal production, Gliricidia, Leucaena, and Eucalyptus can be used with success. These species can have an estimated growth from a low of 7.0 m3 per hectare per year for poor soils to about 15 m3 per hectare per year for better soils which, as is shown in the Economic Analysis, are acceptable ranges of growth for adequate economic returns to the farmer.

Traditional slash and burn farmers will be encouraged to plant seedlings of fast growing native species at widely spaced intervals (7 x 7 meters) on their corn, sorghum, or other crop plots. Variations of the system will involve the planting of new crops (coffee, yucca, corn or beans) with tree seedlings and the planting of permanent tree or bush crops under the shade of commercially exploitable trees such as Leucaena or Gliricidia. The farmers will be provided with materials (seedlings, fertilizers) as well as technical assistance. They also will be paid for their labor input for planting seedlings and for weeding and pruning in subsequent years. The advantages of this system are that the farmer will receive a food crop and some income while he waits for the trees to grow; and the annual crop will reduce the problem of weeds and grasses. It will also achieve breaking of the pattern of planting jaragua grass after

cultivating corn for a year or two. The new system will not require radical changes in technology by traditional farmers, but from it they will obtain additional income by participating in a minor modification of their traditional activity.

The introduction of this agro-forestry system will provide substantial savings in relation to plantation forestry, since clearing and weeding, which represent a substantial labor cost, are done by the farmer in any case, and the only addition to labor cost is tree planting. Finally, this activity will provide significant protection against erosion in the watershed.

c) Reforestation activities

Reforestation with rapid growing species will be done by the participating farmers in areas of land with slopes greater than 50% which are currently in natural pastures. Only where the fast-growing species are not adaptable will reforestation be done with native pines, with which COHDEFOR has had ample experience. It will take about 40 years to produce high quality timber on this type land. By the 15th year the first precommercial thinnings will yield 12-15 m3/ha of fuelwood or poles. By year 25, the second commercial thinning will yield 80.0 to 100.0 m3/ha of poles and construction timber. By year 40, the final cutting will produce 120 to 135 m3/ha of high quality timber. Techniques for pine reforestation are well known in Honduras, thus no technical problems are anticipated.

d) Pasture improvement and range management practices

A large percentage of the farms within the Choluteca Watershed are planted with natural grass or with jaragua grass (Hyparrhenia rufa), a grass characterized by a low protein content. Jaragua is a bunch-type grass which grows in clumps and spreads by seeding rather than shooting out runners, like stoloniferous grasses. If not adequately managed, as is the case with farmers in the watershed, jaragua not only does not provide enough nutrients to the soil, but also does not protect against soil erosion in steeply sloped lands. Because of its characteristics even during the rainy season a pasture of jaragua grass has 40% to 50% of its surface exposed to erosion. The Project contemplates a better management of existing jaragua pastures or the introduction of stoloniferous grasses (primarily Bracchiarea) to replace native bunch grasses. The MNR has had experience with several grass species which will be included in the Project. The grasses will be obtained from the Pan American Agricultural School, Costa Rica or from other local cattle growers who use improved grasses.

Participating farmers will be given free technical assistance and the Watershed Management Unit (WMU) team cattle management specialist will teach them pasture rotation methodology, the use of mineral supplements, dry season supplemental feeding (corn, sorghum), sanitation

measures and other pasture and herd management techniques, which will permit the carrying capacity of the farm to be increased. This should liberate some land thus allowing the farmer to plant some commercial forest species. The farmer will be encouraged to plant multiple use living fences, forage trees or shade trees for lumber or fuelwood value.

The Project will make loans available for 15 years at 12% interest, with a five-year grace period on principal during which interest will be paid.

e) Community nurseries projects

Each community organization to be established under the Project will be provided with grant funds to allow the community to have its own tree nursery. Each will have a total capacity of between 90,000 to 100,000 plants per year, and will be used both as a source of seedlings for the agro-forestry, fuelwood and reforestation activities, as well as a source of income for the community organization. The nurseries will be established in accordance with the plans developed by the Watershed Management Unit, so as to have a clear schedule of activities, from nursery establishment to final planting on the farms. One nursery supervisor will be appointed by the community organization to supervise and coordinate all nursery operations.

The experience acquired in Honduras with tree nurseries is extensive. COHDEFOR, either directly or through local participating farmers has experience with different kinds of organizations and technical plans including very small hillside nurseries.

B. Financial Plan Summary

1. Financial Plan

The Financial Plan contains a Summary Cost Estimate by Source of Funding (Exhibit IV-1), a costing of Project Outputs/Inputs (Exhibit IV-2), and a Disbursement Schedule by Calendar Year (Exhibit IV-4). Total cost of the Project will be $21.9 million, approximately 68.3% of which will be funded by AID. The GOH's contribution ($6.9 million) far exceeds the minimum host country contribution of 25% required by Section 110 of the Foreign Assistance Act.

The Policy and Planning component will require $1.0 million or 4.9% of the total cost of the Project; 84.0% of these costs will be AID funded. The Natural Resources Data Collection and Analysis component will absorb 25.7% of the total Project costs of which 58.8% will be AID funded. The Choluteca Watershed Management and Rehabilitation Program makes up 69.4% ($15.2 million) of the total Project costs; AID will fund 61.3% of the cost of this component.

The AID input will be $5.0 million each in FY 1980, FY 1982, and FY 1983. It is projected that 34.2% of the Loan and Grant funds will be obligated in 1980 and 1981, and that by the end of 1983 Loan and Grant disbursements will total 66.8% of the total AID input. Because of GOH budget approval procedures which are very slow and which might delay the initiation of Project activities, AID Loan funds will finance personnel costs for the last quarter of 1980 and for the calendar year of 1981, after which period the GOH will absorb all personnel related costs.

EXHIBIT IV - 1

Summary Cost Estimate by Source of Funding
(US$000)

Type of Expenditure	SOURCE OF FUNDS						
	AID Loan Funds			GOH			
	FX	LC	TOTAL	FX	LC	TOTAL	TOTAL
Operating Costs	2,539.5	1140.1	3,679.6	16.0	6,950.7	6,966.7	10,646.3
Personnel	-	631.7	631.7	-	4,047.9	4,047.9	4,679.6
Support Personnel	-	73.1	73.1	-	341.9	341.9	415.0
Benefits	-	104.3	104.3	-	658.7	658.7	763.0
Per Diem and Expenses	-	7.5	7.5	-	739.6	739.6	747.1
Contracts Studies and Services	-*	-*	-*	-	-	-	-
Materials, Equipment and Supplies	1,717.9	59.0	1,776.9	16.0	235.8	251.8	2,028.7
Technical Assistance	-*	-*	-*	-	6.0	6.0	6.0
Vehicles and Maintenance	608.0	-	608.0	-	310.3	310.3	918.3
Training and Seminars	206.6	255.5	462.1	-	15.0	15.0	477.1
Rent and Utilities	-	-	-	-	200.8	200.8	200.8
Miscelaneous	-	-	-	-	136.2	136.2	136.2
Contingencies and Inflation	7.0	9.0	16.0	-	258.5	258.5	274.5
Choluteca Watershed Management Credit Fund	-	8,572.0	8,572.0	-	-	-	8,572.0
Fertilizer Loans	-	1,102.7	1,102.7	-	-	-	1,102.7
Fertilizer Grants	-	491.2	491.2				491.2
Agro-Forestry and Fuelwood Loans	-	2,926.0	2,926.0	-	-	-	2,926.0
Reforestation Loans	-	1,481.5	1,481.5	-	-	-	1,481.5
Range Management and Pasture Improvement Loans	-	1,515.1	1,515.1	-	-	-	1,515.1
Communtity Nursery & Tool Grants	-	1,055.5	1,055.5				1,055.5
Subtotal Loan Funds	2,539.5	9,712.1	12,251.6	-	-	-	(12,251.6)
	AID Grant Funds						
Project Grants	2,111.0	632.0	2,743.0	-	-	-	2,743.0
Contract Studies and Services	177.0	415.0	592.0	-	-	-	592.0
Technical Assistance	1,926.0	-	1,926.0	-	-	-	1,926.0
AID Coordinating Office	8.0	217.0	225.0	-	-	-	225.0
GRAND TOTAL	4,650.5	10,344.1	14,994.6	16.0	6,950.7	6,966.7	21,961.3

* Included as AID grants.

EXHIBIT IV-2

NATURAL RESOURCES MANAGEMENT PROJECT
COSTING OF PROJECT OUTPUTS/INPUTS
(U.S.$000)

PROJECT INPUTS	PROJECT OUTPUTS			
	Policy and Planning	Natural Resource Data and Analysis	Choluteca Watershed Management Program	TOTAL
Operating Costs	1,078.2	5,643.1	6,668.7	13,389.3
Personnel	350.0	1,745.3	2,734.3	4,829.6
Support Personnel	80.0	88.5	286.5	455.0
Benefits	36.0	275.3	451.7	763.0
Per Diem & Expenses	24.0	160.0	563.1	747.1
Contracts/Studies & Services	315.0	177.0	100.0	592.0
Equipment and Supplies	31.0	1,744.5	268.2	2,043.7
Technical Assistance	156.0	450.0	1,326.0	1,932.0
Vehicle & Maintenance	16.0	565.5	344.8	926.3
Training and Seminars	30.0	317.9	129.2	477.1
Contingency and Inflation	40.2	119.1	127.2	286.5
Rent and Utilities	-	-	200.8	200.8
Miscelaneous	-	-	136.2	136.2
Choluteca Wateshed Management			8,572.0	8,572.0
Grants and Loans				
Fertilizer Grants	-	-	491.2	491.2
Community Nurseries and Tool Grants	-	-	1,055.5	1,055.5
Fertilizer Loans	-	-	1,102.7	1,102.7
Agro-Forestry and Fuelwood Loans	-	-	2,926.0	2,926.0
Reforestation Loans	-	-	1,481.5	1,481.5
Range Management and Pasture	-	-	-	-
Improvement Loans	-	-	1,515.1	1,515.1
GRAND TOTAL	1,303.0	5,643.1	15,240.0	21,961.3

EXIBIT IV-3

NATURAL RESOURCE MANAGEMENT PROJECT
DISBURSEMENT SCHEDULE BY CALENDAR YEAR
(U.S. $000)

Component	1980 1/ AID	1980 1/ GOH	1981 AID	1981 GOH	1982 AID	1982 GOH	1983 AID	1983 GOH	1984 AID	1984 GOH	1985 2/ AID	1985 2/ GOH	Totals AID	Totals GOH
Policy and Planning	31.5		318.7		188.0	62.7	123.0	65.7	87.0	67.3	67.5	67.2	815.7	262.[illegible]
Natural Res. Data and Analysis	1001.6		1552.8	78.0	675.8	565.0	58.6	605.2	17.6	609.8	13.2	465.9	3319.0	2324.[illegible]
Choluteca Watershed	179.7		1623.9	117.9	1895.3	675.1	2165.8	944.1	2309.6	1198.4	2685.5	1444.6	10,859.9	4380.1
GRAND TOTAL	1212.8	0	3495.4	195.9	2759.1	1302.8	2346.8	1614.8	2414.2	1875.3	2766.7	1977.7	14,994.6	6,966.[illegible]

1/ Last quarter of calendar year
2/ 3/4 of calendar year 1985

EXHIBIT IV-4
INPUTS BY INSTITUTION
(US $000)

	1980 AID	1980 GOH	1981 AID	1981 GOH	1982 AID	1982 GOH	1983 AID	1983 GOH	1984 AID	1984 GOH	1985 AID	1985 GOH	TOTALS AID	TOTALS GOH
Comision de Politica Agricola (Policy/ Planning)	26.5	-	300.7	-	170.0	62.7	105.0	65.3	69.0	67.3	54.5	67.2	725.7	262.5
National Cadaster Program (Data/ Analysis)	1001.6	-	1177.1	65.0	532.0	472.9	17.6	493.5	17.6	493.3	13.2	376.3	2759.1	1901.0
Ministry of Natural Resources	184.7	-	2017.6	130.9	2057.1	767.2	2224.2	1058.0	2327.6	1314.9	2698.5	1534.2	4509.8	423.[illegible]
(Data/ Analysis)		-	375.7	13.0	143.8	92.1	40.4	111.9	-	116.5	-	89.6	559.9	423.1
(Policy/ Planning	5.0	-	18.0		18.0		18.0		18.0		13.0		90.0	
Choluteca Watershed Management Program	179.7	-	1623.9	117.9	1895.3	675.1	2165.8	946.1	2309.6	1198.4	2685.5	1444.6	10859.9	4380.1
GRAND TOTAL	1212.8	0	3495.4	195.9	2759.1	1302.8	2346.8	1614.8	2414.2	1875.5	2766.7	1977.7	14994.6	6966.[illegible]

2. Financial Viability and Recurrent Budget Analysis

From the Analysis below it can be concluded that the Government of Honduras (GOH) will be able to increase its budget sufficiently to meet the Project's cash counterpart requirements, and also that the Project's recurrent costs are not of such a nature and magnitude that the GOH will not be able to continue the Project's activities without AID support. Exhibits M-2A; M-2B; M-2C, in Annex M (M-2) compare the GOH's new cash budgetary contributions to its total contributions over the life of the Project.

The Project will require an increase of 1/10 of 1% in the MNR budget in 1980. The maximum increases in the MNR budget will occur in 1984 and 1985, when it reaches 1.77%, hardly an unmanageable financial burden.

The Natural Resources and Data and Analysis element of the Project will require an increase of only 1/6 of 1% in National Planning Council's (CONSUPLANE) budget for 1980. Although in 1983 this increase will be 5.86%, in 1985 and subsequent years it will go down to 2.80% which is also a manageable figure for CONSUPLANE.

As shown in Exhibit 22 of Annex M additional funds amounting to $1.2 million will have to be provided annually by GOH beginning in 1986 and running through 1990 to keep the Project effort at the levels to be achieved in the years 1984/1985. This will represent 1.0% of the total capital investment budget of MNR projected for 1986 and only 0.68 % of the capital budget projected for 1990.

C) Economic Analysis Summary

1. Economic Justification

When looking at the total direct benefits of Project activities, a benefit/cost ratio of 1.11 results in a 15% opportunity cost of capital if the benefits from Project activities are extended over a 44 year period. If the period of benefits is reduced to 20 years, the benefit/cost ratio is 1.04. When the discount rate is reduced to 12.0%,the benefit/cost ratio increases to 1.31 for a 44 year period and to 1.17 for a 20 year period. Thus, the $22.0 million Project is justified in terms of the direct benefits to be obtained from Project activities alone.

The value of public benefits and other indirect benefits from the Project is not easily determined. It is extremely difficult to assign a value to such benefits as reduced sedimentation in the water supply, greater ground absorption of water and a more regular water supply, decreased flooding and soil erosion, increased technical training for natural resource management both in the public and the private sector, better laws and policies and in general, environmental improvements in the Project and surrounding areas. However, some quantitative estimates of public benefits have been made in Annex M in regards to a reduced rate of deforestation for fuelwood consumption and a reduced rate of soil erosion resulting from Project activities.

Agro-forestry and fuelwood production activities, by providing an alternate and closer source of fuelwood for farmers in the region, would contribute to reducing the high rate of forest degradation which occurs as a result of firewood cutting. For the 18 year cycle of agro-forestry and fuelwood production, approximately 20,000 ha. of forests will be indirectly protected. If this area had to be reforested, it would cost about $7.0 million, which could be counted as an additional benefit of the Project. Indeed, the long-run savings of undertaking resource conservation programs now rather then resource restoration programs in the future may be one of the Project's most important and general long-term benefits. This can be expressed in terms of benefits to the public from not having to reforest in the future, to avoid even greater social costs. The discounted value of benefits derived from forest protection, using a 15% opportunity cost of capital, is $1.4 million, and $1.6 million at 12.0%.

Soil erosion in the Choluteca watershed is estimated to occur at an average net rate of 20 tons of soil per hectare per year in agricultural land in the hillsides. At this rate, the most valuable layers of soil found in the first 3 cm. of depth, could be lost in 22 years if nothing were done to stop soil erosion. If nothing were done to protect the soil, in 22 years the value of soil lost could amount to $9.3 million, without considering any other social and economic costs which will undoubtedly result from the lost productivity of the soil. The discounted value of the benefits arising from soil protection amount to $2.0 million, using an opportunity cost of capital of 15%, and $2.5 million at 12.0%. (See Annex M for details).

In conclusion, when the quantifiable benefits, which only represent a partial figure of total benefits, are added, a total benefit/cost ratio of 1.21 results using a 15% discount rate and 1.40 at a 12% discount rate over a 22-year period.

Furthermore, some estimation of other benefits have also been made in Annex M in additional employment generated by Project activities. For a ten year period, about 2.1 million man/days of new employment will be generated, for a total additional labor income of about $3.4 million. Even though these benefits are accounted for in the analysis of private benefits from the Project, there is no doubt that the more intensive utilization of unemployed and underemployed labor in the agricultural sector will have direct public benefits, not only from additional income generated by farmers but also from the standpoint of reduced social pressures in the area of influence of the Project.

2. Economic and Financial Analysis of Project Activities

The private costs and benefits of all Project activities have been identified in detail in Annex M. The combined soil conservation works, fertilizer applications and agro-forestry and fuelwood production activities yield an internal rate of return (IRR) of 28.2% for farmers with under 5 ha. of land and of 15.8% for farmers with 5 to 20 ha. of land. Reforestation with pine also yields an internal rate of return of 19.5% for a typical 10 ha. farm. Range management and pasture

improvement activities could produce an IRR of 22.5%, for a typical farm of 20 to 50 ha. (average 35 ha).

The end result of these activities is an increase in the net benefits of farmers under five ha. of land from an actual average current income of $193 per year ($87/ha) to an average of $323 per year ($162/ha) beginning in the sixth year: i.e., an average annual increase of 13%. Farmers in the range of 5 to 20 ha. whose current annual average income is $681 per year ($72/ha) will increase their net benefits to about $1,156 per year ($122/ha) beginning in year six, for an average annual increase of 14%. And for cattle farms of 35 ha. net income will be increased from a very low $10/ha. for the traditional cattle farm to about $155/ha. at the end of a ten year period (about $120/ha at the end of six years). These figures indicate that beginning in year six, an increase in net income for the area of the Project of $1.6 million or an average net increase per farm of $242 will have been accomplished. The cash position of the farmer, which from his point of view might be more important, will be improved at an average annual rate of 15% for farmers under 5 ha. and an average of 19.2% for farmers from 5 to 20 ha.

Although income increases are pronounced in the period after the Project's implementation, there will be adequate financial incentives for the participating farmers during the Project period as well. Payment of labor inputs in cash (at $2.00 per day) as contemplated in this Project will be an attractive incentive for farmers to undertake the different Project activities since their labor decisions are based not so much on long term profitability (or Internal Rate of Return) considerations, as on short term cash flow conditions. The adequacy of this incentive is shown by experience obtained in the Choluteca area with the planting of cashew nuts and a specific program for soil conservation under which farmers were stimulated to plant trees in their plots and to do some soil conservation works (hillside ditches and terraces) by a food-for-work program (at $1.13 per day equivalent food ration).

3. Incentives for Project Activities

For soil and water conservation works, fertilizer subsidies will be given to farms under 5 ha. of land. The socio-economic characteristic of these farms, and the farmer's income situation make it imperative for this kind of farmer, first, to be provided with direct subsidies as a means to induce them to do the recommended conservation works on the land and second, to provide soft loans for agro-forestry and fuelwood production as a means to increase their income. (See Annex M for details on kinds of subsidies and eligibility criteria). The present value of the fertilizer subsidies to be given is $306,500 discounted at 15%. The discounted value of the subsidies given for fertilizer loans is $296,000 while the discounted value of subsidies for agro-forestry and fuelwood plantation loans is $794,700 (For methodology on calculations see Annex M).

The incentives for pasture improvement and range management practices will be loans for pasture improvement and fence repair, plus free technical assistance. Loans will be given on what are normally considered "commercial" terms to these farmers, so that no subsidies are granted under this part of the Project.

The reforestation incentives described in other parts of the paper are indispensable since the analyses of costs, returns and cash flows for the farm models made in Annex M reveal that normal credit programs to finance reforestation costs are not feasible mainly because of the size and timing of the stream of benefits and income foregone. The discounted value of the subsidies to be given for reforestation plantations is $871,900.

The discounted value of community nurseries and tool grants is $685,200. The basic rationale for these grants is that, given the limited income of farmers in the watershed, innovative measures such as this, where community organization, direction and promotion will be required, won't be easily forthcoming. Grants therefore are viewed as essential for the promotion of the kind of organization necessary to carry out Project activities.

In summary, the incentives described are essential to induce farmers to undertake the necessary conservation and protection measures included in the Project. The additional net income which will be generated is considered to be sufficient to make it attractive to the farmer to participate, in the light of similar experiences in the area. The total discounted value of the incentives is $2.9 million, using a discount rate of 15%. The quantifiable discounted value of public benefits, resulting from soil protection and reduced forest cutting, which only reflect a part of total public benefits, is about $3.3 million. Thus, using this rough index, a benefit/cost ratio of 1.14 results from these activities, making it sufficiently justified in economic and financial terms.

D. Social Analysis Summary 1/

1. Project Target Groups and Their Ecological Impact

In order to achieve its objectives, this Project must affect the farming practices of three target sub-groups. While these groups have significantly different characteristics, they are closely intertwined, and must be considered as integral elements of one complex socio-economic system in the Choluteca Watershed area.

The largest target group is that of the small traditional farmers who are engaged primarily in basic grains subsistence farming utilizing rudimentary technology. The literacy rate for adults in this area is 50.5%, slightly higher than the national average of 48% for small farmers and significantly higher than the overall literacy rate of 41% in rural areas. While quantitative data do not exist for health status in general, the nutritional status of inhabitants in the southern region is

1/ This summary social analysis is based on the conclusions contained in Annex O and on the study of attitudes toward erosion reported in Supplement #1 to this paper.

somewhat lower than in the country as a whole. In addition, within the rural section of the Choluteca Watershed current protein in-take represents 83% of needed values, and calorie in-take represents about 66%. Average per capita income for small farmers in the south is $100 per year. Average family size is six, usually with three economically active members per family. Farmers in this group have an average of 1.86 hectares of land. Many of them complement their income from basic grains with vegetable production, pine resin collection, or off-farm seasonal employment. Some of them rent land in order to provide the bare minimum which they cannot provide from their small plots. This group of farmers uses a farming technology which is detrimental in its ecological impact in three different ways. First, burning for the clearing of land, while it reduces the investment of labor, leads to a loss of soil cover and consequent sheet erosion during the first rains, before the planted crop takes root. Second, weeding is done by scraping the soil with a hoe, which loosens the soil and leads to further sheet erosion. Third, the wide spacing of planted crops contributes to further erosion. This spacing is dictated by the need to reduce plant competition for scarce soil nutrients in depleted lands.

The second group is that of medium sized and large farmers who combine production of basic grains and cattle ranching. Education and health status of these farmers is significantly higher. A study of educational levels done by the MOE and UNESCO in 1977 indicates that adult literacy rates are between 70-80% for agro-industrial farmers in this size range. Furthermore, nutrition status is significantly better; the Nutrition Assesment shows a clear improvement of nutrition status as farm size increases. Average per capita income is $259 per year. Technology used in farming these lands is usually more advanced. Use of fertilizer inputs and herbicides tends to reduce the problems caused by traditional planting and weeding practices. However, the area of land used for cattle grazing is greater than that in crops; and traditional cattle grazing techniques have a negative impact on the soil for two reasons. First, overgrazing in the dry season and burning to promote germination of grass leads to sheet erosion. Second, the lack of adequate paddock rotation and the existence of loose cattle lead to the formation of trails which form the basis for gulley erosion during the rainy season.

The third group of farmers is that of sharecroppers, some of whom are absolutely dependent on rented land for their livelihood and others who sharecrop land in addition to small plots of land which they own. Literacy rates are similar to those for small farmers, but nutrition status is probably somewhat lower due to the significantly lower amount of land which is farmed. Average per capita income for sharecroppers with 3 hectares or less is $75.00. Their farming practices are virtually indistinguishable from the traditional small farm sub-group, but they must be considered separately because of their migratory slash and burn practices which prohibit capital investments in the land.

2. Feasibility and Impact of Project Innovations

The Project will introduce four major innovations: (1) intensification of cultivation with better soil management techniques;

(2) improvement of range management techniques to replace practices that are destructive to the soil; (3) introduction of agro-forestry and fuelwood production; and (4) reforestation. These four areas of innovation pose progressively greater difficulties for the Project target groups.

As detailed in Annex O, the impact of the requirements in terms of labor and capital inputs is manageable in terms of current patterns of production. Underemployment of small farmers averages 100 man-days per year, including current on and off farm labor investment. However, the introduction of innovations will take place gradually over the time period of the Project, spreading out both the labor and the credit inputs.

Credit on the terms to be provided through the Project is much less expensive than credit which is currently available in the area. This should facilitate risk-taking by small farmers for whom the optimal use of scarce resources is crucial. Credit will provide cash income to poorer families, and offset the opportunity cost of labor investments required.

The intensification of cultivation and of range management techniques as explained in Annex D present minimal risks and clear economic benefits. Potential beneficiaries have enough information at hand to permit them to conclude that the benefits outweigh the costs and thus to adopt innovations. Where immediate economic returns are not clearly perceived, other benefits such as long range protection of the soil fertility and better retention of water will be clearly and forcefully presented by a vigorous and well-planned educational campaign. This applies to agro-forestry and reforestation activities particularly.

The first such incentive is an awareness of the deleterious effects of erosion. The study of attitudes conducted for this Project shows that farmers are aware of the harmful effects of erosion, although its causes are not clearly understood. The educational campaign based on the successful methodology of the Agricultural Production Program (PPA), will demonstrate the need to replace forest cover on land with steep slopes, thus providing one incentive for reforestation. The southern part of the Project region has been the target of the PPA, a private mass-media based educational campaign financed through CONCORDE which included 1,000 participant farmers in the south to transform agricultural production techniques. This program has met with success in the communities where it has been carried out. A second incentive is the economic benefit to be derived from sale of fuelwood. As detailed in the Economic Analysis, this incentive is significant. However, it will only be perceived by beneficiaries over a period of time, as the local and national demand for fuelwood grows as discussed in the Economic Analysis. A third incentive for reforestation and agro-forestry will come from reduced demand for steep slope land for farming which will result from the intensification of farming on more appropriate terrain. Since innovations will be introduced gradually farmers will probably be introducing crop and range intensification first, thus reducing the use of steeply sloping land in the first few years of the Project.

The Project proposes to introduce innovations to the target group through intensive local-level educational and social promotion efforts directed at organizing local community groups. The local groups will serve as a means for Project beneficiaries to utilize their potential in solving erosion-related problems and to administer Project-funded resources and inputs. On the basis of past experience in the Project area, where agricultural cooperatives were successfully organized by the PPA, this element of the Project is feasible. Local cooperatives are seen by small farmers as an alternative which provides credit at lower interest rates, inputs at reduced prices, and a means to exchange labor inputs among members. Once the community groups are organized, the Project will provide training which is essential to their success: principles of organization, accounting principles, and nursery production and maintenance.

Since the above innovations constitute permanent improvements on the land, security of tenure is a critical social factor in determining the feasibility of the Project. Approximately 75% of target farmers who own land do not have clear titles. Thus a major incentive to be provided by this Project in coordination with INA will be the titling of this land. A second type of farming where tenure is a factor is sharecropping on rented land. The problem is that sharecroppers have no incentive to invest in permanent improvements on land which is not theirs. An estimated 1,000 small farmers in the Project area fall in this category. The Project contemplates three alternative solutions for tenant sharecroppers: (i) encouraging owners to install improvements and provide long-term leases; (ii) providing alternative employment to sharecroppers in nurseries and other Project-generated rural employment opportunities, and (iii) resettling sharecroppers on national lands through INA's induced migration program. It is difficult to judge whether any or all of the above three alternatives will work. Therefore, careful attention will be paid to the issue in the first year of the Project, and flexibility will be maintained to adopt alternative strategies. However, if no alternative solutions are practical, the Project will incorporate more of the small farmers who own their land and still reach its target of 7,000.

3. Impact on Women and Population

If allocation of labor follows current agricultural patterns, the Project will generate a significant amount of employment for women. As detailed in the 1978 Agriculture Sector Assessment for Honduras, women are traditionally responsible for tree crops and family fuelwood production on the family farm. Approximately 32 person-days per small farm and 176 person-days per medium-sized farm will be generated for what is now female labor primarily. The Project's educational campaign will build on the current division of labor to encourage use of female labor in new agro-forestry and reforestation activities.

While concrete data do not exist for Honduras, the Project is proceeding on the hypothesis that increases in income lead to a reduced birth rate in the medium and long term, which is an additional benefit for women in the Project region. Specific emphasis will be placed in the educational campaign on the causal links between population pressure,

pressure on actual resources, use of inappropriate land for agriculture, and consequent degradation of the natural resource base. These linkages can be made by comparing the situation of the heavily overpopulated south with the eastern region of the country. The data to demonstrate them exists, but must be translated into concrete presentations through the educational campaign.

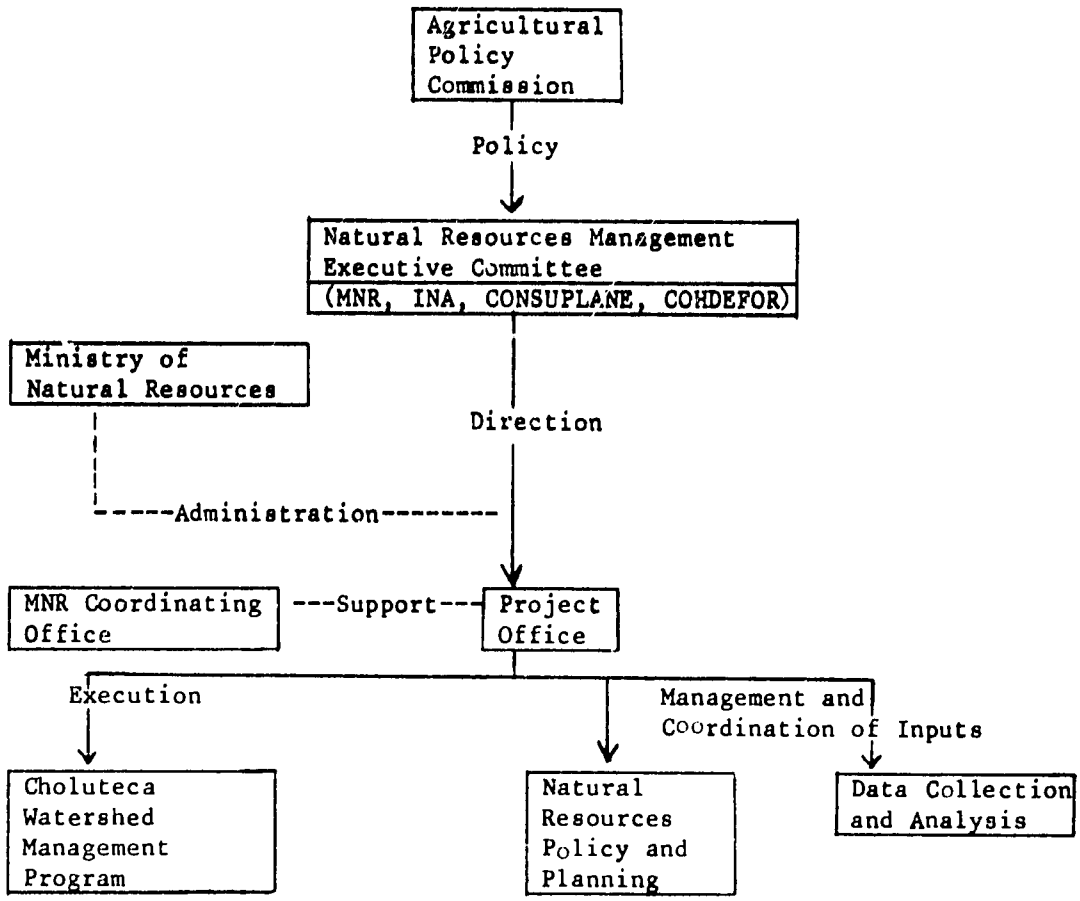
E) Project Organization and Institutional Analysis Summary

The complex nature of this Project which deals with improving natural resource policies and data collection efforts on a nation wide basis and also attempts to carry out a large implementation activity to rehabilitate the largest watershed in Honduras will require some sophisticated and complicated organizational mechanisms. Improving both the laws, policies and regulations governing the critical natural resources as well as restructuring government responsibilities and authorities will in itself require organizational compromises to assure full involvement of the concerned ministries. The Project Committee tested a variety of organizational alternatives, and decided that several innovative organizational features were needed to cope with these internal political problems as well as the complexity of the implementation tasks.

The Project management structure is based on the use of the Agricultural Policy Commission (CPA), a collective ministerial body headed by the Chief of State, to provide policy guidance for the Project. The continued existence of the CPA under the forthcoming civilian government is a matter of controversy in the GOH. It was established by memorandum by a former Chief of State, and it overlaps responsibilities and authorities of the involved ministers. However, except for the Cabinet of Ministers, it is the only executive body which appears able to deal with natural resources or agriculture policy and planning issues. The CPA or some other successor organization will be critical for carrying out the Policy and Planning component of the Project and for providing policy guidance for the Project activities. A Natural Resources Executive Committee will be established for the Project composed of the MNR, INA, CONSUPLANE and the General Manager of COHDEFOR. These four agencies are assigned the most important responsibilities in natural resources and will be most affected by any revisions in policy and authorities. The Executive Committee will provide executive direction to a newly organized Project Office which will have primary responsibility for management, coordination and implementation of the Project. The Project Office will be attached to the Ministry of Natural Resources for purposes of administrative management and funding.

The following schematic indicates the Project Organization Structure.

Overall Project Management Structure



Other implementating agencies are the National Cadaster Program and the Directorate of Water Resources of the MNR both of of whom will receive policy guidance from the CPA and executive direction from the "Executive Committee".

In addition to coordination of implementation activities and management of Project inputs to the above agencies, the Project Office will be directly responsible for implementing the Choluteca Watershed Management activity of the Project. It will be established with its own authority for funds management, contracting etc., as delegated from the Minister of Natural Resources; and it will contract and supervise its own staff which is needed to implement the watershed activity. The Project Office will be staffed with four senior management and financial

personnel, three senior technical personnel (including one Peace Corps volunteer) and eight support personnel. The five subwatershed area offices will be phased in over the five years for a total end of Project field staff of 135 (including 11 Peace Corps volunteers).

The Project organization structure was agreed upon because of several weaknesses in the current GOH capacity to undertake a project of this magnitude. The MNR and COHDEFOR which both have legal responsibilities for watershed management activities would normally be assigned executive control over this Project. However, the MNR extension service is inadequately staffed and trained to carry the additional burden required of a high impact, integrated team approach to improving the watershed. This service is one of the weak links in the MNR. It is to be developed with substantial assistance under the Agriculture Sector II Program, but is not expected to be at adequate strength levels until 1984. COHDEFOR, as a fairly new, dynamic institution appears to have reached its organizational capacity to absorb any new large scale efforts. Its chief responsibility for the management and protection of the remaining forest resource is still not fully under control. A recent assessment indicates that COHDEFOR needs to restructure its staff and organization to intensify its management of the forest resource. In short, these two key institutions will require several years before they will be prepared actively to participate in or play a large role in watershed management. The decision not to delay the watershed impact part of this program until such time as MNR and COHDEFOR would have the absorbtive capacity was based on the urgent need to take action to reduce the serious deterioration of the Choluteca Watershed and the equally urgent need to build a national level capability to improve the many other watersheds in Honduras which are being degraded and denuded.

The evaluations planned during the life of the Project will include assessments of the effectiveness of the Project structure chosen and periodic reviews of the capacity of the MNR and COHDEFOR to assume an increased role in watershed projects. By the end of the Project the GOH will have decided the permanent institutional form in which to assign natural resources policy and planning responsibility and in which to continue work in the Choluteca Watershed and how to extend the work to other watersheds in the country. The decision to institutionalize the work of the Project is important and will be the subject of a covenant. The human resources as well as the institutional experience and knowledge gained during the course of this Project will be available to continue future work, whatever institutional structure is chosen.

The several implementing institutions in this Project have the minimum critical institutional capability to participate effectively, to manage resources and to absorb and utilize effectively the strengthening activities which the Project will deliver (See Annex P - Project Organization and Institutional Analysis).

V. EVALUATION, IMPLEMENTATION REQUIREMENTS AND CONDITIONS PRECEDENT

A. Evaluation Arrangements

Two types of evaluations will be undertaken. Joint GOH/AID annual evaluations in the first, second and fourth years of the Project and impact Evaluations in the third and fifth years. (See Annex I for an amplified description of the evaluation plan).

B. Implementation Plan

The semi-autonomous Project Office established under the watershed management activity will be an important implementation feature of this Project. This office will manage and coordinate all Project inputs including those for the Policy and Planning and the Data Collection components, and it will implement all of the Choluteca Watershed Management activities.

This Project will utilize the services of the Program Administration and Coordination Unit located in the Ministry of Natural Resources. This unit, established under an earlier AID financed Project (Agriculture Sector I Program 522-0100), and modestly expanded under this Project, will be a principal contact point between AID and the GOH for implementation activities. In addition to its administrative responsibilities, the Unit will assist the Project Director in preparing detailed implementation and financial plans for the Project.

Early action on technical assistance, commodity procurement and training is essential if Project implementation is to be properly phased with the agricultural planting season and the advent of the rainy season. Accordingly, AID may disburse loan/grant funds for assistance, essential training and commodity procurement and eligible costs associated with the preliminary planning and organization of the Watershed Project field office, incurred subsequent to the date the Project Authorization is signed once the Conditions Precedent to Disbursement are satisfied. Contracts or agreements for such services or goods must be in accordance with AID regulations and procedures and be approved in advance by AID to be eligible for reimbursement. Detailed procedures covering reimbursement for Project Office and other costs shall be the subject of an Implementation Letter.

The schedule for the implementation of the major actions required during the first year of the Project's implementation is:

1) Project approved by AID/W; authorization first half of June, 1980; negotiating and signing of Project agreement in second half of June 1980.

2) Conditions Precedent to Initial Disbursement met July, 1980; conditions precedent to first disbursement met August 1980.

3) Technical Assistance (Watershed Management Teams) and data collection teams (climatological and hydrological) in place Jan/Feb., 1981; and Watershed Management activities initiated, cooperatives being formed, etc. Feb/Mar., 1981.

4) Climatic and hydrological stations established, training of paraprofessionals and community organization leaders initiated, and new computer equipment put into service Mar., 1981.

5) Field activities initiated; communities and nurseries organized; and aerial photography work completed by March/April 1981.

6) Annual evaluation conducted Aug.-Sept. 1981, environmental reviews conducted annually beginning in Oct. 1981; impact evaluation undertaken Sept. 1983.

C. Sub-Loan and Grant Procedures

The Sub-Loan and Grant procedures which will be used in implementing this Loan and Grant are spelled out in Annex K.

D. Disbursement Procedures

1) All AID funds will be channeled to implementing agencies through the Ministry of Finance and the MNR. AID and Counterpart funds will be identified in annual budgets which will specify uses for each implementing agency.

2) Implementation of this Project is grounded on the principle of periodic budgetary control. In addition to the annual global budgets, quarterly operating budgets which will specify those particular actions to be undertaken in the quarter will be prepared and submitted to AID for review and approval. The budgetary procedures employed by the GOH and AID will be similar to those used for the Agriculture Sector II program. They are familiar to the MNR, the Ministry of Finance and the Coordinating Unit, which will take the leadership in coordinating agency requirements and budget preparation. These procedures for handling/approval of the Quarterly Budgets which will be the subject of an Implementation Letter, should accelerate budgetary approvals, facilitate reimbursement and insure improved project management.

E. Contracting and Procurement Plans

Commodity procurement from Code 941 countries and Honduras is considered most advantageous given the variety of climatological, hydrological and other equipment and instruments that will need to be procured. Hand tools, such as shovels, picks, machetes, etc. and local labor necessary for clearing and conservation works will also be procured locally. Vehicles will be purchased in two lots, at the beginning of the Project and in 1983.

The commodity procurement process will need to be initiated by the participating agencies before the CP's are met in order to have essential equipment to begin implementation of the technical assistance on schedule. The use of the AID model contracts will be encouraged in

the procurement of technical assistance. Contracting and procurement actions include:

1) During June, July and August 1980

In June, preliminary work will be initiated by the GOH agencies involved in this Project. This will include; the preparation of specifications, identification of needs, development of procurement plans, etc. The Coordinating Unit of the MNR, which has gained experience under the Agriculture Sector II program, will assist the GOH institutions in this effort. AID, in June, also will train GOH agencies in AID contractual and procurement processes and provide models and sample documents. The GOH agencies will prepare procurement plans and specifications

During July and August, 1980, the GOH agencies will complete work on the procurement plan and related specifications. The Procurement plan will be submitted to A.I.D. and the Proveeduria for approval. The GOH agencies, with A.I.D. assistance, will begin selection of personnel.

2) During September, October, November and December, 1980

The Proveeduria issues IFB's for first procurements and GOH agencies initiate contract negotiations for personnel. In October, 1980, the GOH agencies complete personal services contracts; A.I.D. approves contracts. Most initial personnel to be on-board on or about January 1, 1981). Proveeduria begins process for L/Com. and L/C. In December, the Proveeduria analyzes bids; selects bidders; makes award. Proveeduria also completes L/C action and informs awarded bidder.

F. Monitoring Plans

The USAID Office of Environment and Technology will have primary USAID responsibility for this Project. It will draw upon other Mission offices, e.g. Engineering, the Controller, and Agriculture to assist with specific technical concerns or issues and the monitoring of implementation activities.

A Project Coordinator will be contracted by the Project to assist in maintaining relationships between the various participating institutions and in providing A.I.D. with information necessary for its monitoring of the Project.

G) Reimbursement

Early action on the formation and staffing of the Project Office, the delivery of vehicles and arrival of technical assistance is essential if Project activities are to be properly phased with the agricultural crop cycle and the rainy season. Normally, AID will not approve reimbursement for eligible costs incurred prior to meeting the Initial Conditions Precedent which include a legal opinion that the Project constitutes a binding obligation of the Cooperating Country. The problem that is faced is that under normal circumstances the preparation,

processing, clearance and publication of the required GOH legal opinion in the Official Gazette takes 60 to 90 days. With the convening of the Constituent Assemoly in July (whose authority over such actions is yet to be defined) and with the possibility of a major cabinet change, additional delays and bureaucratic inertia may be encountered. If the Project is authorized in June and if procurement action is not begun until September because of the delay in publishing the legal opinion, the implmentation plan for the Choluteca Watershed part of the Project will be seriously delayed. Accordingly, it is in the interest of the U.S.G., that upon compliance with the Initial Conditions Precedent to Disbursement by the Cooperating Country, AID may disburse loan/grant funds for eligible costs associated with the formation and staffing of the Project Office, procurement of vehicles and contracting of technical assistance incurred subsequent to the signing of the Project Authorization, provided that contracts or agreements for such activities or services were approved in accordance with AID regulations and procedures and were approved in advance by AID and provided that the sum of the total costs for such eligible items do not exceed U.S.$750,000.

H. Negotiation Status, Conditions Precedent and Covenants

1) Negotiating Status

Representatives of CODEFOR, PCN, CONSUPLANE, and the MNR have worked closely with Mission staff on the Project's design. There are no outstanding issues to be resolved.

2) Conditions Precedent to Initial Disbursement

Prior to any disbursement, or to the issuance of any commitment document under the Project Agreement, the Cooperating Country shall furnish in form and substance satisfactory to A.I.D.:

i) An opinion of a legal representative of the Cooperating Country acceptable to A.I.D. that the Project Agreement has been duly authorized and/or ratified by the Cooperating Country and executed on its behalf, and that it constitutes a valid and legally binding obligation of the Cooperating Country in accordance with all of its terms;

ii) A statement and specimen signature of the person or persons acting as a representative of the Cooperating Country for purposes of the Project Agreement; and

iii) Evidence that the Natural Resources Executive Committee and the Land Use Classification Technical Committee have been established officially and that the Project Office has been established by the MNR as the administrative host for the Project.

3) Conditions Precedent to Disbursement for Certain Activities

a) Conditions Precedent to Disbursement for Watershed Management Activities

Prior to any disbursement, or to the issuance of any commitment document under the Project Agreement to finance sub-loans or sub-grants activities for tree propagation or planting under the Watershed Management element of the Project, the Cooperating Country will, except as otherwise agreed in writing, furnish in form and substance satisfactory to A.I.D. evidence that the appropriate regulations have been established to assure that responsibility for the management, control, and disposition of all trees planted using Project monies, will be vested in the Project beneficiaries as long as the Project beneficiaries observe good natural resource management practices and adhere to the approved farm plan which was the basis for the provision of Project financing and materials.

b) Conditions Precedent to Disbursement from the Watershed Management Credit Fund

Prior to any disbursement or the issuance of any commitment document under the Project Agreement to finance Watershed Management Credit activities, the Borrower/Grantee will furnish in form and substance satisfactory to A.I.D., evidence that a Choluteca Watershed Management Fiduciary Credit Fund has been established, and that procedures have been developed to supervise said Fund.

c) Condition Precedent to Disbursement for the Community/Cooperative Plant and Tree Nursery Grants

Prior to any disbursement or the issuance of any commitment document under the Project Agreement to finance the construction, equipping and supplying of the Community/Cooperative nurseries to be established under the Project, the Borrower/Grantee will furnish in form and substance satisfactory to A.I.D. a set of regulations and procedures to be followed in awarding such grants.

4. Special Covenants

The Borrower/Grantee will covenant as follows:

i) that the Project Office in cooperation with the participating GOH institutions will provide to AID, by the first of August, an annual, detailed implementation plan and budget for the first and each subsequent year of the Project that provides a schedule for the procurement of Project inputs including technical assistance, training and commodities;

ii) that adequate budgetary support will be provided for expanded activities as required and as specified in the Project Agreement;

iii) to provide to the Watershed Management Credit Fund, $1.2 million of continued financial support per year for an additional five year period beyond the completion of the implementation of the Project and the Watershed Management Credit Fund, except as A.I.D. may otherwise agree in writing;

iv) that on or before the beginning of the forth Project year, responsibility and authority for natural resources management policy, planning and execution will be assigned a permenent institutional form;

v) that on or before the fifth Project year a permanent institutional form will be established to continue the work of the Project in the Choluteca Watershed and to extend the work to other watersheds in Honduras.

SECRETARIA DE HACIENDA Y CREDITO PUBLICO
REPUBLICA DE HONDURAS

Tegucigalpa, D. C., junio 4, 1980 Nº CP-0627

RECEIVED
USAID, TEGUCIGALPA
5 JUN. 1980
C & R

Señor
JOHN R. OLESSON
Director Agencia para el
Desarrollo Internacional
Presente

Estimado Señor Olesson:

El Gobierno de Honduras está plenamente consciente de la necesidad de adoptar medidas al más corto plazo posible para el manejo adecuado de los recursos naturales con que cuenta el país. La definición de políticas y programas, así como la obtención, análisis y mejor aprovechamiento de las estadísticas disponibles sobre recursos naturales, es un elemento básico de esas medidas.

Adicionalmente, el Gobierno de Honduras ha tomado la decisión de iniciar de inmediato un programa para el manejo y desarrollo de la Cuenca del Río Choluteca, con el propósito de detener el continuado deterioro de los recursos naturales (bosques, agua y suelos) de la zona y para mejorar y estabilizar los ingresos de los campesinos que viven en el área.

Para la ejecución de este Programa estamos solicitando a la Agencia para el Desarrollo Internacional, asistencia financiera con el propósito de desarrollar las siguientes actividades básicas:

1. Diseñar una política adecuada y mejorar los sistemas de formulación y análisis de políticas y mecanismos para el estudio y manejo de los recursos naturales.

2. Incrementar el potencial de obtención, análisis y procesamiento de la información básica relacionada con los recursos naturales; y

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3. Iniciar un programa de manejo y desarrollo de la Cuenca del Río Choluteca.

El proyecto de cinco años está diseñado para tener un impacto de gran significación sobre el grupo de campesinos seleccionados como beneficiarios del Proyecto que constituye la gran mayoría del sector rural pobre que vive en la zona del proyecto.

A continuación se presenta el desglose del presupuesto global estimado para las seis actividades principales durante los primeros cinco años del proyecto.

		US$	En Miles de Lempiras
I.	Política y Planificación	1,078.2	2,156.4
	1. Apoyo técnico para la formulación de políticas y planificación	988.2	1,976.4
	2. Apoyo técnico a la Oficina Coordinadora del Ministerio de Recursos Naturales	90.0	180.0
II.	Información y Análisis de Recursos Naturales	5,643.0	11,286.0
	1. Apoyo al Programa de Catastro Nacional	4,660.0	9,320.0
	1.1 Programas y Sistemas	638.3	1,276.6
	1.2 Laboratorio de Suelos	892.2	1,784.4

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	1.3 Hidrometeorología	30.0	60.0
	1.4 Ecología y Clasificación Forestal	276.5	553.0
	1.5 Uso, clasificación y planificación de la tierra	514.5	1,029.0
	1.6 Delineación forestal	339.0	678.0
	1.7 Apoyo general al PCN	1,969.5	3,939.0
2.	Apoyo al Programa de Hidrología y Climatología del MRN	938.0	1,966.0
III	Programa para el Manejo y Desarrollo de la Cuenca del Río Choluteca	15,240.0	30,480.0
	1. Apoyo institucional	6,668.0	13,333.0
	2. Fondo Fiduciario de Préstamos	7,025.3	14,050.6
	2.1 Préstamos para fertilizantes	1,102.7	2,205.4
	2.2 Préstamos para plantaciones agroforestales y de leña	2,926.0	5,852.0
	2.3 Préstamos para reforestación	1,481.5	2,963.0
	2.4 Préstamos para mejora-		

/....Sigue

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	miento de pastos y manejo ganadero	1,515.1	3.030.2
3.	Donaciones y Subsidios del Programa	1,546.7	3,093.4
3.1	Donaciones para fertilizantes	491.2	982.4
3.2	Donaciones para viveros y herramientas comunales	1,055.5	2,111.0
IV.	Gran Total	$ 21,961.2	L. 43,922.4

El Gobierno de la República de Honduras solicita a la Agencia para el Desarrollo Internacional, que la asistencia financiera sea otorgada así: - L. 21.4 millones como préstamo a largo plazo y L. 8.6 millones como donación.

Las donaciones contempladas en el programa son indispensables para - poder llevar a buen término la variedad de experiencias nuevas que serían introducidas en la zona del proyecto. Además, existe un riesgo - sustancial por parte del Gobierno de Honduras y llevará algún tiempo para absorber los costos del proyecto.

A continuación se detallan los componentes del proyecto que serán cubiertos con donaciones de la AID :

Componentes del Proyecto que serán cubiertos con donaciones de AID

1.	Donaciones para fertilizantes	491.2	982.4

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2.	Donaciones para viveros y herramientas comunales	1,055.5	2,111.0
3.	Donaciones para estudios y servicios por contrato	592.0	1,184.0
4.	Donaciones para asistencia técnica	1,926.0	3,852.0
5.	Donaciones para la Oficina Coordinadora del Proyecto	225.0	450.0
	Total de Donaciones	4,289.7	8,579.4

El Gobierno de Honduras aportaría L. 13.8 millones en concepto de contraparte para asegurar la ejecución efectiva de los objetivos que aquí se plantean y a este respecto, la Secretaría de Hacienda y Crédito Público muy atentamente solicita a la Agencia para el Desarrollo Internacional a fin de que considere la posibilidad que sí, en el presente año se inicia la ejecución de este Proyecto, unicamente sea financiado con fondos de la AID y que la contraparte nacional proporcional sea aportada por el Gobierno de Honduras a partir del próximo año de 1981 .

El Ministerio de Recursos Naturales, el Programa de Catastro Nacional, y el Banco Nacional de Desarrollo Agrícola (BANADESA), que actuará como administrador del Fondo en Fideicomiso, serán las agencias principales encargadas de las diferentes fases del proyecto.

La política general relacionada con estas materias será formulada por la Comisión de Política Agrícola, de conformidad con el Memorandum de la Jefatura de Estado del 20 de mayo de 1980.

Agradeceremos una resolución favorable a la presente Solicitud y aprovechamos la oportunidad para patentizar al Señor Director, las muestras

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REPUBLICA DE HONDURAS

Tegucigalpa, D. C., **junio 4, 1980** **Pag. 6= Nº...CP-0627**

de nuestra consideración y estima.

JORGE HERNAN GALEAS DOMINGUEZ
Ministro de Hacienda y Crédito Público por Ley

AROV:mehc

JUNTA MILITAR DE GOBIERNO

REPUBLICA DE HONDURAS

Tegucigalpa, D.C., 20 de mayo de 1980

No.PJMG-019/80

Señor Secretario Ejecutivo:

ASUNTO: Participación del Gerente de la COHDEFOR en la Comisión de Política Agrícola, cuando trate asuntos relacionados con el medio ambiente.

La conservación, preservación, mejoramiento y recuperación del medio ambiente, así como el uso racional de los recursos naturales constituye una creciente preocupación del actual Gobierno Militar. Tanto así que hemos apoyado y continuamos apoyando todas aquellas medidas orientadas a la formulación de una política nacional de ordenamiento ambiental.

De conformidad con las atribuciones que le han sido conferidas y en vista de la vinculación con el desarrollo agrícola, la Comisión de Política Agrícola deberá constituirse, durante un tiempo prudencial, en el organismo coordinador de la política ambiental y conservación de los recursos naturales, en tanto se diseña y aprueba el mecanismo institucional más indicado para atender estos asuntos dentro de la administración pública.

Como los problemas del medio ambiente también están íntimamente relacionados con la explotación forestal y las cuencas nacionales, es conveniente que el Gerente General de la COHDEFOR se integre a la Comisión de Política Agrícola cuando se traten asuntos relacionados con este tema, para que preste su colaboración y participe de las resoluciones que correspondan.

Atentamente,

GENERAL DE BRIGADA

JUNTA MILITAR DE GOBIERNO - PRESIDENTE - HONDURAS, C.A.

POLICARPO PAZ GARCIA
Presidente

Al señor Secretario Ejecutivo
del Consejo Superior de Planificación Económica,
Licenciado Virgilio Cáceres Pineda,
Ciudad.

SECRETARIA DE ESTADO
EN EL DESPACHO DE
RECURSOS NATURALES
REPUBLICA DE HONDURAS, C. A.

NOTA No. S-352

Tegucigalpa, D.C., 20 de mayo de 1980.

Señor
John Oleson
Director AID en Honduras
Su Despacho

Señor Director:

De conformidad con la propuesta para una ejecución de colaboración entre el Gobierno de Honduras y la AID de los Estados Unidos de América tendiente a ejecutar el Proyecto de Manejo de Recursos Naturales de Abril de 1980, esta Secretaría de Estado se permite comunicarle que está de acuerdo con el establecimiento de la Unidad del Proyecto como una oficina adscrita administrativamente a la Secretaría de Recursos Naturales.

Tan pronto el Proyecto sea formalmente aprobado por las partes, esta Secretaría procederá a emitir el Acuerdo correspondiente para el funcionamiento de la referida Unidad.

Sin otro particular, aprovecho la oportunidad para suscribirme del Señor Director, atentamente,

Rafael Leonardo Callejas
Ministro

cc: Arch.

CERTIFICATION PURSUANT TO SECTION 611 (e) OF THE FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED

I, John R. Oleson, the principal officer of the Agency for International Development in Honduras, having taken into account among other factors the maintenance and utilization of projects in Honduras previously financed or assisted by the United States, do hereby certify that in my judgement Honduras has both the financial capability and human resources capability to effectively maintain and utilize the Project: NATURAL RESOURCES MANAGEMENT.

John R. Oleson

John R. Oleson
Director, USAID/HONDURAS

Date: May 21, 1980

5C (1) - COUNTRY CHECKLIST

A. GENERAL CRITERIA FOR COUNTRY ELIGIBILITY

1. FAA Sec. 116. Can it be demonstrated that contemplated assistance will directly benefit the needy? If not, has the Department of State determined that this government has engaged in a consistent pattern of gross violations of internationally recognized human rights?

2. FAA Sec. 481 Has it been determined that the government of the recipient country has failed to take adequate steps to prevent narcotics drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully?

3. FAA Sec. 620 (b) If assistance is to a government, has the Secretary of State determined that it is not dominated or controlled by the international Communist movement?

4. FAA Sec. 620 (c). If assistance is to a government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) the debt is not denied or contested by such government?

5C (1) - COUNTRY CHECKLIST

A. GENERAL CRITERIA FOR COUNTRY ELEGIBILITY

1. The Project Paper demonstrates that the assistance will directly benefit the needy.

2. No such determination has been made.

3. The Secretary of State has determined that Honduras is not controlled by the international Communist movement.

4. A.I.D. knows of no such cases.

5. FAA Sec. 620 (e) (1). If assistance is to a government, has it (including goverment agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities?

5. There is no evidence of such action.

6. FAA Sec. 620 (a), 620 (f), 620D; FY 80 App. Act. Sec. (511, 512 and 513.) Is recipient country a Communist country? Will assistance be provided to Angola, Cambodia, Cuba, Laos or Vietnam. Will assistance be provided to Afghanistan or Mozambique without a waiver?

6. Honduras is not a Communist country. Assistance will not be provided to any of the countries indicated.

7. FAA Sec. 620 (i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression?

7. A.I.D. has no evidence of any subversion or aggression or of plans for such action.

8. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property?

8. In the past there have been incidents where the GOH has been unsuccessful in containing demonstrations aimed at the U.S. Embassy. This has not been the case for many years.

9. FAA Sec. 620(l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, inconvertibility or confiscation, has the AID Administrator within the past year considered denying assistance to such government for this reason?

9. The OPIC Investment Guaranty Program is in operation in Honduras.

10. FAA Sec. 620(o), Fishermen's Protective Act of 1967, as amended, Sec. 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters,

10. Honduras has not seized or imposed any penalties or sanctions against U.S. vessels because of their activities in international waters during recent years.

a. has any deduction required by the Fishermen's Protective Act been made?

b. has complete denial of assistance been considered by AID Administrator?

11. FAA Sec. 620; FY 80 App. Act Sec. (518.) (a) Is the government of the recipient country in default for more than six months on interest or principal of any AID loan to the country?

(a) No.

(b) Is country in default exceeding one year on interest of principal on U.S. loan under program for which App. Act appropriates funds?

(b) No.

12. FAA Sec. 620(s). If contemplated assistance is development loan or from Economic Support Fund, has the Administrator taken into account the percentage of the country's budget which is for military expenditures, the amount of foreign exchange spent on military equipment and the amount spent for the purchase of sophisticated weapons systems? (An affirmative answer may refer to the record of the annual "Taking Into Consideration" memo: "Yes, taken into account by the Administrator at time of approval of Agency OYB." This approval by the Administrator of the Operational Year Budget can be the basis for an affirmative answer during the fiscal year unless significant changes in circumstances occur.)

12. Yes

13. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption?

13. No.

14. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget?

14. Honduras is not in arrears to the extent described in Article 19 of the U.N. Charter.

15. FAA Sec. 620A, FY 80 App. Act, Sec. (521.) Has the country granted sanctuary from prosecution to any individual or group which has committed an act of international terrorism? Has the country granted sanctuary from prosecution to any individual or group which has committed a war crime?

15. No.

16. FAA Sec. 666. Does the country object, on basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. there to carry out economic development program under FAA?

16. No.

17. FAA Sec. 669, 670. Has the country, after August 3, 1977, delivered or received nuclear enrichment or reprocessing equipment, materials, or technology, without specified arrangements or safeguards? Has it detonated a nuclear device after August 3, 1977, although not a "nuclear-weapon State" under the nonproliferation treaty?

17. No.

B. FUNDING SOURCE CRITERIA FOR COUNTRY ELIGIBILITY

1. Development Assistance Country Criteria.

a. FAA Sec. 102(b) (4). Have criteria been established and taken into account to assess commitment progress of country in effectively involving the poor in development, on such indexes as: (1) increase in agricultural productivity through small-farm labor intensive agriculture, (2) reduced infant mortality, (3) control of population growth, (4) equality of income distribution, (5) reduction of unemployment, and (6) increased literacy.

B. FUNDING SOURCE CRITERIA FOR COUNTRY ELEGIBILITY

1. Development Assistance Country Criteria

a. Criteria for assessing progress in involving the poor in development have been set through sector and subsector assessments in agriculture, education, and nutrition, and will be set through health sector assessment planned for the near future.

b. FAA Sec. 104(d) (1); IDC Act of 1979. If appropriate, is this development (including Sahel) activity designed to build motivation for smaller families through modification of economic and social conditions supportive of the desire for large families in programs such as education in and out of school, nutrition, disease control, maternal and child health services, agricultural production, rural development, assistance to urban poor and through community-based development programs which give recognition to people motivated to limit the size of their families?

b. Over the long-term improved economic conditions for the rural poor, promoted by development assistancse programs such as this one, are expected to impact positively on reductions in family size.

2. Economic Support Fund Country Criteria.

2. Economic Support Fund Country Criteria

a. FAA Sec. 502B. Has the country (a) engaged in a consistent pattern of gross violations of internationally recognized human rights or (b) made such significant improvements in its human rights record that furnishing such assistance is in the national interest?

2.a. Honduras has not engaged in gross violations of human rights.

b. FAA Sec. 533(b). Will assistance under the Southern Africa program be provided to Angola, Mozambique, Tanzania, or Zambia? If so, has President waived prohibition against the assistance by determining that such assistance will further U.S. foreign policy interests?

2.b. Not applicable.

c. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made?

2.c. Not applicable.

d. FY 80 App. Act Sec. (510.) Will assistance be provided for the purpose of aiding the efforts of the government of such country to repress the legitimate rights of the population of such country contrary to the Universal Declaration of Human Rights?

2.d. No.

e. FAA Sec. 620B, P.P. 94-329 Sec. 406. Will ESE be furnished to Argentina or Chile?

2.e. Not applicable.

5C(2) - PROJECT CHECKLIST

5C (2)- PROJECT CHECKLIST

A. GENERAL CRITERIA FOR PROJECT

A. GENERAL CRITERIA FOR PROJECT

1. FY 80 App. Act Unnumbered; FAA Sec. 634A; Sec. 653(b); (a) Describe how authorizing and appropriations Committees of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than $1 million over that figure)?

1. A Congressional Notification will be transmitted by A.I.D. to the Congress indicating funding requirements for this assistance program.

2. FAA Sec. 611(a) (1). Prior to obligation in excess of $100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?

2. Yes.

3. FAA Sec. 611 (a) (2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?

3. Not applicable.

4. FAA Sec. 611(b); FY 80 App. Act Sec. (501.) If for water or water-related land resource construction, has project met the standards and criteria as per the Principles and Standards for Planning Water and Related Land Resources dated October 25, 1973?

4. No.

5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed $1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project?

5. Yes.

6. FAA Sec. 209. Is project susceptible of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.

6. The technologies and practices being introduced under this project will have applicability to other water-sheds and climatic regions of Honduras and may be replicable in other countries of the region. The project is, however, tailored to the specific conditions of the Choluteca River basin watershed region and would require adaptation before use in other areas or countries. This activity is not conceived of as a regional or multilateral project although it will support and be closely coordinated with the activities of the multilateral donors who are not undertaking projects directly concerned with stabilization of destructive hillside farming practices. It is expected that the experience and information gained from this project will be exchanged with other countries in the area and will, thus, facilitate increased cooperation in natural resoure management.

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

7. This project will indirectly increase the flow of international trade by encouraging increased agricultural production. The project will encourage private small farmer initiatives in conservation, rational forestry exploitation and increased agriculture production. It will improve the technical efficiency of agriculture through improved farming, reforestation and conservation practices. Further, the project will discourage monopolistic practices, and will encourage community action with respect to water and soil conservation. The project will encourage cooperatives but will not have any direct effecton free labor unions, credit unions or savings and loan associations.

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

8. Not applicable.

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

9. The GOH has agreed to contribute substantial counterpart funding for services and other program costs.

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

10. The U.S. does not own such excess currency.

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

11. Yes.

12. FY 80 App. Act Sec. (521.) If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity?

12. This project is directed to the improvement of natural resource management practices and will not directly produce any commodity for export which is produced in the U.S.

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(b); 111; 113; 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102 (b); 111; 113; 281 a; (a) This project is directed to the promotion of the participation of the rural poor in the benefits of development. This will be accomplished through the planning and implementation of reforestation activities and farm improvements related to the rehabilitation and conservation of key watershed areas. The resulting gain from this improved natural resource management will include increased income from agricultural production and increased employ (b) The reliance of this project on community and/or local private groups and governmental

democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?

institutions for planning and implementation will encourage rural poor participation at the individual, group and community level. (c) This program is designed to reinforce the concept of community participation and "self-help". (d) This project will also promote the participation of women, in different community projects (nurseries, reforestation, more efficient use of fuelwood, etc.) as well as their participation in cooperative units and educational programs. (e) This project will indirectly promote regional cooperation by increasing the flow of interregional trade and by fostering cooperative efforts to tackle similar problems within the region through the interchange of experience and information.

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

b. <u>FAA Sec. 103, 103A, 104, 105, 106, 107</u>

(1) [103] for agriculture, rural development or nutrition; if so (a) extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, full account shall be taken of the needs of small farmers, and extensive use of field testing to adapt basic research to local conditions shall be made; (b) extent to which assistance is used in coordination with programs carried out under Sec. 104 to help improve nutrition of the people of developing countries through encouragement of increased production of crops with greater nutritional value, improvement of planning, research, and education with respect to nutrition, particularly with reference to improvement and expanded use of indigenously produced foodstuffs; and the undertaking of

b.(1) Through improved natural resource knowledge, reforestation activities, farm practice improvements, soil conservation measures, through improved natural resource management designed to protect key watershed areas from deterioration, this project will increase the productivity and income of the small farm families living in the project areas. The project will include specific watershed conservation activities, designed to reduce erosion, prevent further deterioration of the environment, and increase the efficient use of existing land resources in ways that are not detrimental to the environment. Activities will include the construction of erosion control devices such as terraces, catchment systems, and gulley stabilization structures; the improved planning and

pilot or demonstration programs explicitly addressing the problem of malnutrition of poor and vulnerable people, and (c) extent to which activity increases national food security by improving food policies and management and by strengthening national food reserves, with particular concern for the needs of the poor, through measures encouraging domestic production, building national food reserves, expanding available storage facilities, reducing post harvest food losses, and improving food distribution.

use of land covers such as grasses, trees, etc. to reduce erosion and resource deterioration and the training of farmers in the importance of conservation and improving farming practices.

c. (107) is appropriate effort placed on use of appropriate technology? (relatively smaller, cost-saving, labor using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor.)

c. Project sub-activities will employ labor intensive technologies.

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

d. The recipient country will provide at least 25% of the project costs, and such contribution will be reflected in the Project Agreement.

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

e. NO.

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

f. The Project has been designed to meet the desires and capacities of the populace of rural Honduras. The Project encourages development of local community betterment committees and will provide selected people in the local community with organizational skills and abilities to deal with GOH programs and personnel.

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

g. The Project will contribute directly to the economic development of rural Honduras. The integration of isolated communities into the national economy and the increase in agricultural productivity will contribute to sustained economic growth. It is consistent with, and is a necessary condition for other development activities in the area.

2. Development Assistance Project Criteria (Loans Only)

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

2. Development Assistance Project Criteria (Loans Only)

2.a. The Honduran economy has a healthy debt/export ratio and is capable of repaying the loan at a reasonable rate of interest.

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

2.b. Not applicable.

3. Project Criteria Solely for Economic Support Fund

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

3. Project Criteria Solely for Economic Support Fund

3.a. Yes.

b. FAA Sec. 531(c). Will assistance under this chapter be used for military, or paramilitary activities?

3.b. Not applicable.

5C(3) - STANDARD ITEM CHECKLIST

A. Procurement

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of commodities and services financed?

5C (3) - STANDARD ITEM CHECKLIST

A. Procurement

1. No major construction or major commodity purchases are planned under this project. All construction will be related to small efforts employing largely local materials and substantial amounts of self-help labor.

2. FAA Sec. 604(a). Will all procurement be from the U.S. except as otherwise determined by the President or under delegation from him?

2. Yes.

3. FAA Sec. 604(d) If the cooperating country discriminates against U.S. marine insurance companies, will commodities be insured in the United States against marine risk with a company or companies authorized to do a marine insurance business in the U.S.

3. Yes.

4. FAA Sec. 604(e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity?

4. No such procurement is contemplated.

5. FAA sec. 608(a). Compliance with requirement in section 901(b) of the Merchant Marine Act of 1936, as amended, that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates.

5. The Project agreement will provide for compliance with this requirement.

6. FAA Sec. 621. If technical assistance is financed, to the fullest extent practicable will such assistance, goods and professional and other services from private enterprise, be furnished on a contract basis? If the facilities of other Federal agencies will be utilized, are they particularly suitable , not competitive with private enterprise, and made available without undue interference with domestic programs?

6. Technical assistance to be financed under the program will be furnished to the fullest extent practicable by private organizations or individuals.

7. International Air Transport. Fair Competitive Practices Act, 1974. If air transportation of persons or property is financed on grant basis, will provision be made that U.S.-flag carriers will be utilized to the extent such service is available?

7. Yes.

8. FY 80 App. Act Sec. [505]. Does the contract for procurement contain a provision authorizing the termination of such contract for the convenience of the United States?

8. Yes.

B. Construction

1. FAA Sec. 601(d). If a capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interests?

2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable?

3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed $100 million?

C. Other Restrictions

1. FAA Sec. 122(b). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter?

2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, does Controller General have audit rights?

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

4. FAA Sec. 636(i). Is financing not permitted to be used, without waive, for purchase, sale, longterm lease, exchange or guaranty of motor vehicles manufactured outside the U.S.

5. Will arrangements preclude use of financing:

B. Construction

1. No major construction planned.

2. Yes.

3. Not applicable.

C. Other Restrictions

1. Yes.

2. No international organization will have administrative responsibilities under this program.

3. Yes.

4. Yes.

5. The project agreement will provide for specific use of A.I.D. funds for agreed upon purposes and thus preclude allocation of such funds for the purposes covered by the legislation cited in items 5.a. through 5.i

a. FAA Sec. 104(f). To pay for performance of abortions as a method of family planning or to, motivate or coerce persons to practice abortions; to pay for performance of involuntary sterilization as a method of family planning, or to coerce or provide financial incentive to any person to undergo sterilization?

b. FAA Sec. 620(g). To compensate owners for expropriated nationalized property?

c. FAA Sec. 660. To provide training or advice or provide any financial support for police, prisons, or other law enforcement forces, except for narcotics programs?

d. FAA Sec. 662. For CIA activities?

e. FY 80 App. Act Sec. [504] To pay pensions, etc., for military personnel?

f. FY 80 App Act Sec. [506] To pay U.N. assessments?

g. FY 80 App. Act Sec. [507] To carry out provisions of FAA section 209(d) (transfer of FAA funds to multilateral organizations for lending.)

h. FY 80 App. Act Sec. [511] To finance the export of nuclear equipment, fuel, or technology or to train foreign nationals in nuclear fields?

i. FY 80 App. Act Sec. [515] To be used for publicity or propaganda purposes within U.S. not authorized by Congress?

PROJECT AUTHORIZATION

Name of Country : Republic of Honduras

Name of Project : Natural Resources Management

Number of Project : 522-0168

Number of Loan :

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Natural Resources Management Project for the Republic of Honduras involving planned obligations of not to exceed $12,250,000 in loan funds and $2,[illegible] in grant funds over a five year period from date of authorization, subject to the availability of funds in accordance with the A.I.D. OYB/allotment process, to help in financing foreign exchange and local currency costs for the Project.

2. The Project consists of the following elements: (1) Natural Resource and Land Use Policy and Planning; (2) Natural Resources Data Collection and Analysis and; (3) Watershed Management, included to strengthen institutional mechanisms through which the Government of Honduras manages the country's natural resources, and to undertake an action program in selected watersheds to increase farmers' income and to conserve the natural resources of soil and water through the introduction of modified agricultural and forestry practices.

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

a. Interest Rate and Terms of Repayment

The Cooperating Country shall repay the Loan to A.I.D. in U.S. Dollars within forty (40) years from the date of first disbursement of the Loan, including a grace period of not to exceed ten (10) years. The Cooperating Country shall pay to A.I.D. in U.S. Dollars interest from the date of first disbursement of the Loan at the rate of (a) two percent (2%) per annum during the first ten (10) years, and (b) three percent (3%) per annum thereafter, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

b. Source and Origin of Goods and Services (Loan)

Goods and services, except for ocean shipping, financed by A.I.D. under the Project shall have their source and origin in the countries which are members

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of the Central American Common Market and in countries included in [illegible] Geographic Code 935, except as A.I.D. may otherwise agree in writing. [illegible] shipping financed by A.I.D. under the Project shall, except as A.I.D. may otherwise agree in writing, be financed only on flag vessels of the United States or countries that are members of the Central American Common Market.

c. Source and Origin of Goods and Services (Grant)

Goods and services, except for ocean shipping, financed by A.I.D. under the Project shall have their source and origin in the Countries of the Central American Common Market or in the United States except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the Project shall, except as A.I.D. may otherwise agree in writing, be financed only on flag vessels of the United States.

d. Reimbursement of Expenses

Upon compliance with the relevant Conditions Precedent to Disbursement, A.I.D. may disburse Loan or Grant funds as reimbursement for eligible items incurred subsequent to the date of this authorization.

e. Conditions Precedent

(1) Prior to any disbursement, or the issuances of any commitment document under the Project Agreement, the Cooperating Country will furnish in form and substance satisfactory to A.I.D., evidence that the Natural Resources Executive Committee has been established officially to provide overall direction and guidance to the Project and that the Project Office has been established by the Ministry of Natural Resources.

(2) Prior to any disbursement or the issuance of any commitment document under the Project Agreement to finance subsidies or subsidy activities for tree propagation or planting under the Watershed Management element of the Project, the Cooperating Country will, except as otherwise agreed in writing, furnish in form and substance satisfactory to A.I.D., evidence that the appropriate regulations have been established to assure that responsibility for the management, control and disposition of all trees planted using Project monies, will be vested in the Project beneficiaries as long as the Project beneficiaries observe good natural resource management practices and adhere to the approved farm plan which was the basis for the provision of Project financing and materials.

(3) Prior to any disbursement or to the issuance of any commitment document under the Project Agreement to finance Watershed Management Credit Activities, the Cooperating Country will furnish in form and substance satisfactory to A.I.D., evidence that a Choluteca Watershed Management Fiduciary Credit Fund has been established, and that adequate procedures have been developed to supervise said Fund.

(4) Prior to any disbursement or the issuance of any commitment document under the Project Agreement to finance the construction, equip-

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ping and supplying of the Community/Cooperative nurseries to be established under the Project, the Cooperating Country will furnish in form and substance satisfactory to A.I.D. a set of regulations and procedures to be followed in awarding such grants.

f. Covenants

The Cooperating Country will covenant as follows:

(1) that the Project Office in cooperation with the participating governmental institutions, will provide to A.I.D. by the first of each August, an annual, detailed implementation plan for the first and each subsequent year of the Project that provides a schedule for the procurement of Project inputs including technical assistance, training and commodities;

(2) that adequate budgetary support will be provided for expanded activities as required and as specified in the Project Agreement.

(3) to assure that the Watershed Management Credit Fund will be provided with the additional funds necessary to maintain, during the five years following the Project Assistance Completion Date (as defined in the Project Agreement), the level of grant and credit disbursements achieved during the last year of the Project;

(4) that on or before the beginning of the fourth Project year, responsibility and authority for natural resources management policy, planning and execution will be assigned a permanent institutional form; and

(5) that on or before the beginning of the fifth project year, permanent arrangements have been made in the Ministry of Natural Resources, Forest Development Corporation (CONADEFOR), and other such appropriate organizations as it may deem fit will be established to continue the work of the Project in the Choluteca Watershed and to extend the work to other watersheds in Honduras, as appropriate.

Administrator

Date

Clearances:

AAA/LAC:EWCoy — date 7/pl/80
AA/PPC:AShokow — date
GC:RLaHolmes — date

Drafted:GC/LAC:JLR:jlo:6/16/80:x23272

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PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Project Title and Number: Natural Resources Management

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
I. PROGRAM OR SECTOR GOAL. The broader objective to which this Project contributes:	Measures of Goal Achievement:		Assumptions for achieving goal targets:
(a) Improve employment and income of poor farm families living in watershed areas.	1) 67.2% increase in small farmer net income by the end of the Project.	1) Reports of MNR farm accounts.	
(b) To develop institutional capabilities and adapt known resource management techniques necessary to contain environmental deterioration in key watershed areas.	2) Alternative forest employment increasing.	2) COHDEFOR reports on forest industries.	
(c) Improve management of Honduras' natural resources.	3) Food imports decreasing.	3) Central Bank reports.	
	4) The rate of deterioration of watersheds and deforestation has slowed.	4) Periodic forest cover surveys.	
	5) Rational set of policies dealing with management of water, land and forests developed.	5) Laws and Policy Statements issued.	
	6) Policy making institution established dealing with natural resources.	6) Decrees issued.	

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Project Title & Number: Natural Resources Management

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
II. PROJECT PURPOSE:	Conditions that will indicate purpose has been achieved: End of Project status.		Assumptions for achieving purpose:
To strengthen institutional mechanisms through which the Government of Honduras manages the country's natural resources and to undertake an action program in a selected watershed to increase farmers' income and to conserve the natural resources of soil and water through the introduction of modified agriculture and forestry practices.	1) A national comprehensive land plan has been developed and 50% of Honduran land classified for potential use. 2) A Honduran watershed policy has been established and an organization functioning which effectively implements activities. 3) Trained personnel in place in planning and implementing agencies. 4) Increased production of fuel wood, commercial tree crops and cash crops.	1) Watershed policy published. 2) USAID observation. 3) Project reports. 4) Project reports. 5) PCN reports. 6) Aerial/Satellite photos.	GOH provides appropriate mechanisms for developing and promulgating policy. GOH establishes regulations to assure control of trees to project participants.

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Project Title & Number: Natural Resources Management

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
III. OUTPUTS:	Magnitude of Outputs:		Assumptions for achieving outputs:
1. Community nurseries established and, cooperatives/ community organizations formed.	1. 264 nurseries and coops/comm. organizations established.	1. Project reports, observations. 2. (a-e) Project reports, DCH records, PCN records, aerial/ satellite photos, MNR and COHDEFOR records and project supported climatological, hydrological and environmental monitoring stations reports.	
2. a) Detrimental hillside farming practices stabilized. b) Environmental deterioration contained. c) Reforestation with permanent and semi-permanent tree crops accomplished.	2. a) 18,000 has. to be treated with soil and water conservation and improved agricultural practices. b) 5050 has. of imp. pasture land. c) 4233 has. reforested with pine, etc. and 8360 has. with fuelwood species.		2. Continued GOH recognition of importance of integrated watershed management. Incentives will be offered to induce people to plant tree crops on public and private lands. 3. That public and private institutions will use the data produced.

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Project Title & Number: Natural Resources Management

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
			2. Continued GOH support for a coordinated approach to management of the country's land, water, watershed and forest resources.
3. Data collection, analysis and dessemination capabilities strengthened and improved.	3. a) 103 nat. res. data stations established. b) Increased use of data.	3. a) Project reports and observation. b) Number of reports prepared and distributed.	
4. Natural Resource Policy and Planning capabilities of the GOH strengthened and improved.	4. a) Nat. policies and priorities for management and utilization of natural resources developed. b) Responsibility of Comisión Política Agrícola expanded to include land use and natural resource management. c) National land use classification system established. d) Overall management policies/ systems developed for protection/ rational exploitation of natural resources.	4. (a-d) GOH policies and laws.	

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Project Title & Number: Natural Resources Management

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
IV. INPUTS:			
USAID and GOH Financing			
	Project Records.	Project records.	Funds are appropriated/ provided by the government in accordance with their financial requirements/obligations.

	AID	GOH	TOTAL
Policy and Planning	.816	.263	1.079
Nat. Resource Data and Analysis	3.319	2.324	5.643
Watershed Mgt. Activities	10.860	4.382	15.242
TOTAL			21.964

TELEGRAM STATE 266762

INCOMING
TEGUCIGALPA

ACTION OFFICE AID

INFO: AMB, DCM 1, POL, ECON, AID, ICA, JAO, PER, CSO, B&F, CRO, MSG, CONS, DAO, MILGP, PC, IAGS, NURSE, RF, CHRON 1

AID ACTION

INFO: DIR, AD, PROG, CRD, HRD, HRD-M, HRD-H, HRD-E, AGR, ENG, CONT, MGT, C&R, CHRON, NAN

UNCLASSIFIED

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P 120028Z OCT 79
FM SECSTATE WASHDC
TO AMEMBASSY TEGUCIGALPA PRIORITY 7661
BT
UNCLAS STATE 266762

AIDAC

E.O. 12065 N/A

TAGS:
SUBJECT: WATER RESOURCES MANAGEMENT/ENVIRONMENT PID

1. THE WATER RESOURCES MANAGEMENT/ENVIRONMENT PID WAS REVIEWED AND APPROVED BY THE DAEC ON SEPTEMBER 18, 1979 SUBJECT TO THE AVAILABILITY OF FUNDS. THE FOLLOWING SPECIFIC GUIDANCE IS PROVIDED TO ASSIST THE MISSION IN PREPARING THE PROJECT PAPER.

2. INSTITUTIONAL CAPACITY/COORDINATION. THE DESIGN OF THE PROPOSED PROJECT IS COMPLEX, REQUIRING INTERACTION AMONG SEVERAL GOH AGENCIES THAT ARE RESPONSIBLE FOR PROJECT IMPLEMENTATION. IN ADDITION, IMPLEMENTATION OF SOME PROJECT ACTIVITIES SUCH AS IRRIGATION WILL REQUIRE INPUTS FROM OTHER GOH ORGANIZATIONS SUCH AS THE NATIONAL DEVELOPMENT BANK THAT OTHERWISE ARE NOT DIRECTLY INVOLVED IN THE PROJECT. THE PROJECT PAPER (PP) SHOULD DISCUSS THE INTER-INSTITUTIONAL LINKAGES NECESSARY FOR PROJECT IMPLEMENTATION AS WELL AS THE RESPONSIBILITIES AND RESOURCES OF THE AGENCIES INVOLVED. THEIR OUTREACH (EXTENSION) CAPACITY SHOULD ALSO BE DISCUSSED. BECAUSE A GREAT DEAL OF THE COORDINATION RESPONSIBILITY APPEARS TO FALL ON THE TWO NEW HIGH LEVEL INSTITUTIONS, THE NATIONAL ENVIRONMENTAL COMMISSION AND THE NATIONAL COMMITTEE FOR ENVIRONMENTAL PROTECTION, THE PP SHOULD CLOSELY EXAMINE THEIR INSTITUTIONAL CAPACITY. THIS EXAMINATION SHOULD INCLUDE BUT NOT BE LIMITED TO STAFFING LEVEL, STAFF EXPERIENCE, SOURCES OF FUNDING, AND ORGANIZATIONAL STRUCTURE.

3. PROJECT IMPLEMENTATION. BECAUSE SO MANY AGENCIES ARE INVOLVED IN PROJECT IMPLEMENTATION, THE MISSION SHOULD CONSIDER THE NEED TO PLACE RESPONSIBILITY FOR OVERALL PROJECT IMPLEMENTATION IN ONE INSTITUTION (E.G. THE AGRICULTURAL POLICY COMMISSION), WHICH WOULD BE CAPABLE OF INSURING THAT INPUTS TO THE PROJECT ARE MADE ON A TIMELY BASIS BY ALL AGENCIES.

4. PROJECT STRATEGY. THE PURPOSE OF THE PROJECT IS TWO-FOLD: INCREASE SMALL FARMER PRODUCTION OF ANNUAL AND TREE CROPS, AND DEVELOP INSTITUTIONAL CAPACITY FOR IMPLEMENTING A NATIONAL LEVEL WATER RESOURCE MANAGEMENT PROGRAM. DURING INTENSIVE REVIEW THE MISSION SHOULD CONSIDER REDEFINING THE PROJECT TO FOCUS MORE INTENSELY ON THE BROADER INSTITUTIONAL PROBLEM OF NATURAL RESOURCE MANAGEMENT. CONSTRAINTS IN THIS AREA SHOULD BE IDENTIFIED AND THE MIX OF PROJECT ACTIVITIES REVISED TO MORE CLOSELY ADDRESS THEM. DURING THE DAEC A PARTICULAR QUESTION CONCERNING THE NEED FOR THE GROUND WATER COMPONENT WAS RAISED. FINALLY, THE PP SHOULD CONTAIN A JUSTIFICATION FOR THE CHOICE OF WATERSHED AREAS IN WHICH PILOT PROJECTS WILL BE IMPLEMENTED.

5. GOH COMMITMENT. THE RESPONSIBILITIES OF THE TWO NEW HIGH LEVEL INSTITUTIONS INCLUDE THE ESTABLISHMENT OF ENVIRONMENTAL NORMS AND POLICIES AS WELL AS A LAND-USE PLAN WHICH MAY CONFLICT WITH THE PROJECTS AND OBJECTIVES OF SEVERAL GOH AGENCIES SUCH AS THE NATIONAL AGRARIAN INSTITUTE (INA). THE PP SHOULD DISCUSS THE GOH'S COMMITMENT TO CARRY OUT THE TWO INSTITUTIONS' POLICIES AND PLANS. IN PARTICULAR THE POWERS OF THE INSTITUTIONS TO ENFORCE THEIR POLICIES AND PLANS SHOULD BE DESCRIBED. IN RELATION TO

POLICY SETTING ACTIVITIES, WE UNDERSTAND THAT THE GOH IS DRAFTING WATER MANAGEMENT LEGISLATION. THE MISSION MAY WISH TO CONSIDER PROVIDING RESOURCES TO ASSIST THE GOH IN THIS EFFORT.

6. EXISTING INFORMATION. THE PID STATES THAT THERE IS AN EXISTING BODY OF KNOWLEDGE ON FAST GROWING TREE SPECIES AND ACCEPTED CONSERVATION AND IRRIGATION POLICIES. THE PP SHOULD DESCRIBE THE SOURCES OF, AND MEANS TO DISSEMINATE, THIS KNOWLEDGE. THE PP SHOULD ALSO DESCRIBE HOW THE PROJECT WILL BE LINKED TO THE ROCAP FUELWOOD PROJECT WHICH WILL BE DEVELOPING ADDITIONAL INFORMATION ON FAST GROWING TREE SPECIES AND RELATED SILVICULTURAL TECHNIQUES.

7. SMALL IRRIGATION PROJECTS. THE PID PROPOSES THAT SEVERAL SMALL IRRIGATION PROJECTS BE CONSTRUCTED. THE COMMUNITIES IN WHICH THE SYSTEMS ARE LOCATED WOULD PROVIDE MOST OF THE NECESSARY INPUTS, WITH THE PROJECT PROVIDING SMALL CASH GRANTS OF UP TO DOLS 1,500. THE MISSION SHOULD EXAMINE PAST EXPERIENCES WITH IRRIGATION PROJECTS IN HONDURAS AND INCORPORATE RELEVANT FINDINGS INTO PROJECT DESIGN. (FYI-WATER PRICING WAS NOTED IN THE DAEC AS ONE AREA THAT CAUSED PROBLEMS FOR IRRIGATION PROJECTS IN THE PAST.) IN ADDITION, THE MISSION SHOULD EXAMINE PRESENT LAWS PERTAINING TO IRRIGATION SYSTEMS AS WELL AS THE WATER MANAGEMENT LEGISLATION CURRENTLY BEING DRAFTED TO DETERMINE WHETHER AN ADEQUATE LEGAL FRAMEWORK FOR IRRIGATION SYSTEMS WILL EXIST ONCE THE NEW LEGISLATION IS PASSED. THE PP SHOULD DESCRIBE THE ROLE OF THE COMMUNITY IN THE CONSTRUCTION, OWNERSHIP AND OPERATION OF THE IRRIGATION SYSTEMS, AS WELL AS HOW THE BENEFITS GENERATED BY THE SYSTEMS WILL BE DISTRIBUTED. THE RESPONSIBILITIES OF THE MUNICIPAL GOVERNMENTS SHOULD BE EXPLAINED AS WELL AS THE ROLES OF OTHER SOCIAL ORGANIZATIONS (E.G. COOPERATIVES, COMMUNITIES, WATER USER ASSOCIATIONS) REQUIRED FOR CONSTRUCTION AND OPERATION. THE MISSION MAY WISH TO SEEK SHORT-TERM ASSISTANCE ON THIS GENERAL SUBJECT FROM ORGANIZATIONS SUCH AS THE WISCONSIN LAND TENURE CENTER.

8. INCENTIVES. FINANCIAL OR OTHER TYPES OF INCENTIVES MUST BE OFFERED TO INDUCE SMALL FARMERS TO ADOPT DESIRED FARMING/CONSERVATION PRACTICES. HOWEVER, SOME OF THE ACTIVITIES PROPOSED IN THE PROJECT (E.G. REFORESTATION) APPEAR TO OFFER RETURNS OVER THE LONG-RUN WHICH CANNOT MEET THE IMMEDIATE NEEDS OF THE SMALL FARMER, AND THEREFORE, MAY BE OF LITTLE INTEREST. THE PP SHOULD DESCRIBE AND DISCUSS THE ADEQUACY OF THE INCENTIVES THAT WILL BE OFFERED TO THE SMALL FARMER.

9. RURAL TRAILS. UNDER THE PROJECT, RURAL TRAILS WILL BE IMPROVED TO PREVENT EROSION AND TO PROVIDE BETTER ACCESS. HOWEVER, IMPROVED ACCESSIBILITY IS KNOWN TO LEAD TO INCREASED FOREST CUTTING AND SQUATTER SETTLEMENT. THE PP SHOULD DESCRIBE WHAT ACTIONS WILL BE TAKEN TO MINIMIZE ENVIRONMENTAL DEGRADATION. TO THE EXTENT POSSIBLE THE MISSION SHOULD SEEK TO COORDINATE THE IMPLEMENTATION OF THE TRAIL PROTECTION COMPONENT WITH THAT OF THE RURAL TRAILS AND ACCESS ROADS PROJECT (522-0164).

10. PROJECT BUDGET. THE BUDGET PRESENTED IN THE LOGICAL FRAMEWORK ALLOCATES DOLS 3.3 MILLION TO THE OTHER COST LINE ITEM WITHOUT PROVIDING FURTHER EXPLANATION. IN THE PP THE MISSION SHOULD PROVIDE A DETAILED BREAKDOWN OF THIS LINE ITEM.

11. COUNTERPART FUNDING. COUNTERPART FUNDING DOES NOT MEET THE REQUIREMENTS OF SECTION 110(A) OF THE FAA. THEREFORE, THE MISSION SHOULD EXAMINE WAYS TO INCREASE COUNTERPART FUNDING OR DECREASE AID FUNDING IN ORDER TO MEET SECTION 110(A).

12. PROJECT FUNDING. THE PID PROPOSES THAT THE PROJECT BE GRANT FUNDED. HOWEVER, BECAUSE A GREAT DEAL OF INFRASTRUCTURE WOULD BE PROVIDED THROUGH THE PROJECT IT WAS DECIDED THAT THE PROJECT SHOULD BE LOAN FUNDED. VANCE
BT

PART I
INITIAL ENVIRONMENTAL EXAMINATION

Project Location: Republic of Honduras

Project Title: Natural Resource Management

Funding:
FY 1980 $5,000,000
FY 1982 $5,000,000
FY 1983 $5,000,000

Life of Project: Five Years

IEE Prepared by: Lyle Dean Bernius - PCR
Roger L. Russell - Mission Environmental Evaluation Officer

Date: April 12, 1980

Threshold Decision:

a) Recommendations:

It is the opinion of the Mission that this project will positively effect the environment and any potential that exists for short-term negative impact will be offset by careful planning and construction methods. The inclusion of an Environmental Monitoring and Review process is envisioned as the most efficient instrument for monitoring the environmental impact of the project and overcoming any potentially negative change which may occur. A Negative Determination is recommended.

b) Concurrence

//signed//John R. Oleson

John R. Oleson, Director
USAID/Honduras

Date April 3, 1980

PART II
DESCRIPTION OF THE PROJECT

The purpose of this Project is to strengthen institutional mechanisms through which the Government of Honduras manages the country's natural resources, and to undertake an action program in a selected watershed to increase farmers income and to conserve the natural resources of soil and water through the introduction of modified agriculture and forestry practices. At present, Honduras is faced with an escalating rate of deterioration in its natural resource base. The consequences are many: increased flooding, soil erosion and depletion, loss of much potentially productive forest, and a reduced water retention capability. A number of key watersheds are already largely deforested with ominous implications for the future, including decreased water availability for the urban areas. This deterioration must be contained, and the fledgling efforts of improved resource management institutions strengthened, if Honduras is not to suffer irreversible environmental damage and decreased agricultural production.

The project will support: (a) improved basic hydrological, climatological and natural resource data collection, analysis, storage and dissemination; (b) training and technical assistance in specific natural resource technical fields; (c) a coordinated water and related soils development and conservation planning capability within the agricultural sector; and (d) improved land use policies and farmer practices which emphasize protection and conservation of the country's natural resources.

The three principal GOH agencies to be involved in this project are: The Ministry of Natural Resources (MNR), which is primarily concerned with agricultural programs; the Honduran Forestry Development Corporation (COHDEFOR) which has the responsibility for managing the country's forests and watersheds; and the National Cadaster Program (PCN), which is concerned with land titling, the collection and analysis of land use data, and the establishment of a basis for a national property tax system.

The results or outputs expected and the anticipated level of AID financial support for each of the three project components are:

1. Natural Resource Data Collection, Analysis and Dissemination ($3.4 million) The national system for basic hydrological, climatological and natural resource data collection, analysis, storage and dissemination will be strengthened through the provision of equipment, logistical and publication support, increased computer capacity, training and technical assistance.

2. Natural Resources and Land Use Policy and Planning ($.8 million) Policy and planning capabilities of the Government will be

improved and strengthened through the provision of training, technical assistance, equipment, and logistical support. The activities in this area, along with the expanded activities in natural resource data collection will be designed to build a basis upon which comprehensive and multiple purpose resource planning can take place.

3. Watershed Management ($10.1 million) Environmentally damaging hillside farming patterns in five sub-watershed areas of the Choluteca River Basin watershed area will be stabilized. Stabilization will be accomplished through the introduction of conservation practices and structures, improved water management techniques, the introduction of permanent and semi-permanent crops, changed cropping systems and patterns and the reforestation of denuded and eroded areas. Particular attention will be directed to improving the income of the small hillside farmer within a framework of improved environmental practices.

PART III
IDENTIFICATION AND EVALUATION OF ENVIRONMENTAL IMPACT

The Project is designed to provide information, personnel and institutional capacity for improved data collection, policy planning and management and implementation of projects which are directed at improved utilization and conservation of Honduras' water and related soils resources. The institutional strengthening elements of this project will have an indirect impact on the environment. Improved institutional capabilities will lead to improved land utilization, improved natural resource planning, more effective laws and regulations governing natural resource development and an improved natural resource knowledge base. Such improved capabilities will indirectly, but positively, affect land use throughout Honduras. This institutional strengthening is seen as an essential prerequisite for the establishment of a rational natural resource development and conservation program. It will form the basis upon which future programs having a major effect on water and related soils resources can be developed.

The watershed rehabilitation activities will take place in the Choluteca Basin, which is one of the most critically deteriorated watersheds in Honduras. It was selected as a site for this project because of the number of poor farmers resident in the area; the variety of ecological zones which are present; and the level of deterioration which is substantial, but which has the potential of being stabilized; and because results and knowledge generated by this project will be applicable to other watersheds and climatic conditions.

While the watershed rehabilitation activities to be undertaken will involve some physical environmental modifications, it must be noted that serious and negative environmental changes will continue to occur in the absence of this project due to improper farming practices.

A. Direct Impacts

The physical environmental modifications, which will take place as a result of this project include the following: construction of conservation terraces and water catchment systems, planting of live barriers, establishment of a number of plant nurseries in the project area, the construction of gulley stabilization structures, introduction of improved pasture management and reforestation. The project also calls for the education of the small hillside farmer in improved farming techniques. The direct environmental effects of this project will include:

-- reduced, diverted or changed water run-off patterns
-- some clearing of fields and gulleys in connection with the construction of terraces, catchment systems, gulley stabilization structures and live barriers
-- some increased sedimentation and erosion resulting from construction activities
-- some small amounts of dust

The most significant of these effects are increased construction related erosion and sedimentation and the altered or modified water run-off patterns. Deleterious effects should, however, be minimized as all construction will take into account existing cultivation and erosion patterns, be undertaken during the dry season; be engineered to minimize negative effects; and be constantly monitored by a technical assistance team whose membership shall include conservation and resource management specialists. An environmental monitoring and review component is also being built into this project to constantly monitor the environmental change resulting from this project.

B. Indirect Impacts

Experience with other natural resource projects in other parts of the world highlights the difficulties involved in inducing change in farming practices. Conservation structures must be maintained, and the live barriers tended, if they are to be effective. Failure to do so will often exacerbate the erosion situation. New agro-forestry type crops must also be protected against fire and properly nurtured and tended. Equally, the exploitation of these agroforestry type crops or enterprises must be carefully undertaken as improperly constructed or engineered timbering or marketing roads (which are not a part of our project but which could conceivably result from new forest areas and new tree crops) could cause serious environmental damage, as could the improper cutting of the trees. Lastly, the more productive use of the land could also lead to increased labor demand and population inflows with accompanying environmentally deleterious effects. It is anticipated, however, that the stabilization of farming practices will avoid transient farming situations and effect a more stable and prosperous local economy.

In summary, this project should have a strongly positive environmental effect on the five badly eroded and denuded subwatershed areas where this project will be located. Through the organization of farmer organizations and coops, the use of incentives, and the provision of seeds, plant stock and technical assistance, this project will stabilize those hillside farming practices which are deleterious to the environment and natural resource base. Farmers will be encouraged to adopt farming techniques which are more environmentally sound, to construct terraces and other conservation devices, and to plant crops and trees which offer both better income possibilities and which help protect the natural resource base. The positive results expected from this project are:

-- increased income, particularly for the small hillside farmer;
-- more stabilized farming practices, i.e. less burning, the acceptance of terraces, use of live barriers, etc., adopted as positive farming practices;
-- increased agro-forestry enterprises, i.e. fuelwood production, citrus growing, increased coffee production, etc;
-- a resulting positive change in the subwatersheds, i.e. less erosion, increased water retention, and improved cover for wildlife; and
-- increased campesino awareness about the environment and his impact upon it.

C. Environmental Monitoring and Review Process

While careful planning and project execution should offset most of the possible negative environmental consequences of this activity and while the overall effect of this project will be environmentally beneficial, some concern remains that environmental monitoring and review is necessary. Accordingly, the Government and USAID/Honduras have agreed to develop and implement an environmental review process.

In the project development process the GOH and USAID shall review all existing environmental data on the Choluteca River Basin Watershed area. During the preliminary implementation planning period standards for measuring environmental changes or modifications will be developed, a system for the regularized collection of environmental data designed, and any additional baseline data needed to permit environmental monitoring collected. Sites will be selected and instrumentation installed to measure change i.e. to collect information on sedimentation, run-off, erosion, etc. This data will be regularly collected by individuals hired for this purpose, by the farmer organizations or coops in the area, or by existing government entities. This data will be analyzed annually by an environmental specialist who will be employed under this project. Funds have been included in the project budget for the development of the environmental standards, the development of an environmental data collection system, the collection of any additional needed baseline environmental data, and for the regular monitoring of the project.

The development of the environmental standards will be a pre-condition to the initiation of construction work. The standards

will be circulated to all entities associated with the project and all personnel involved in the implementation of project activities. The technical assistance teams, comprised of a conservation specialist, a land use technician, a forest management specialist, etc. will carry the principal responsibility in ensuring that environmental standards are observed and sound conservation practices followed. The environmental specialist will review the data collected annually with the technical assistance teams and modifications will be effected, as necessary, in the implementation of the watershed activities. The environmental specialist, based upon an analysis of the data collected and a review of the practices employed, will be empowered to halt or modify any practice found to be environmentally detrimental. Equally, the reviews will examine positive environmental changes resulting from the project with a view toward exploitation of those devices or activities determined to be most productive.

Early in the implementation of the project, at project mid-life and at the end of the project, detailed aerial photographs of the sub-watershed areas will be collected and analyzed. Particular attention will be directed to the resolution of any negative effects resulting from the project, but the photos will also be a tool in the planning of specific watershed interventions. The environmental specialist will issue yearly environmental reports.

NATURAL RESOURCES MANAGEMENT PROJECT
IMPACT IDENTIFICATION AND EVALUATION FORM
CHECKLIST

Impact Areas and Sub-Areas	Impact Identification and Evaluation 1/
A. LAND USE	
1. Changing the character of the land through:	
a. Increasing the population	N
b. Extracting natural resources	L
c. Land clearing	L
d. Changing soil character	L
2. Altering natural defenses	M
3. Foreclosing important uses	N
4 Jeopardizing man or his works	N
5. Other factors	
Modification of land use	L
B. WATER QUALITY	
1. Physical state of water	L
2. Chemical and biological states	N
3. Ecological balance	N
4. Other factors	
5. Drainage patterns	M
C. ATMOSPHERIC	
1. Air additives	N
2. Air pollution	N
3. Noise pollution	N
4. Other factors	
D. NATURAL RESOURCES	
1. Diversion, altered use of water	M
2. Irreversible, inefficient commitments	N
3. Other factors	

E. CULTURAL

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

F. SOCIOECONOMIC

1.	Changes in economic/employment patterns	L
2.	Changes in population	N
3.	Changes in cultural patterns	L

G. HEALTH

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

H. GENERAL

1.	International impacts	N
2.	Controversial impacts	N
3.	Larger Program Impacts	N
4.	Other factors	

I. OTHER POSSIBLE IMPACTS (not listed above)
See Part III Identification and Evaluation of Environmental Impact.

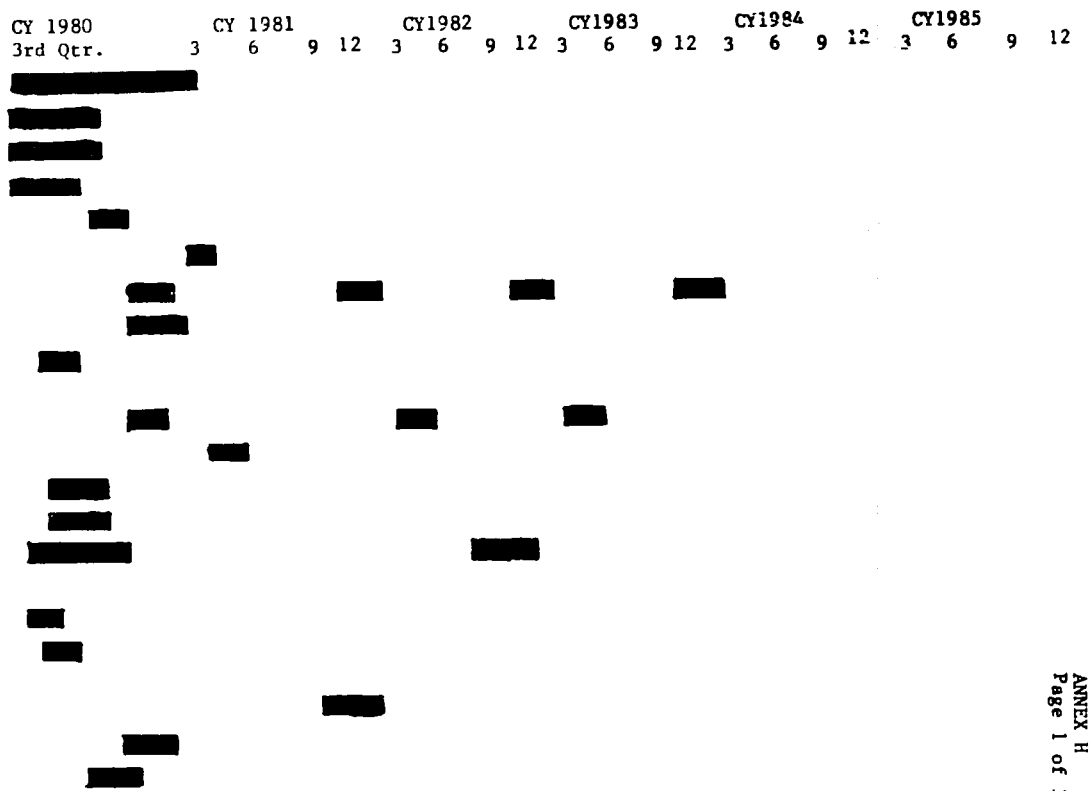
1/ Explanation of symbols:
N - No environmental impact
L - Little environment impact
M - Moderate environmental impact
H - High environmental impact
U - Unknown environment impact

PART IV
RECOMMENDATIONS FOR ENVIRONMENTAL ACTION

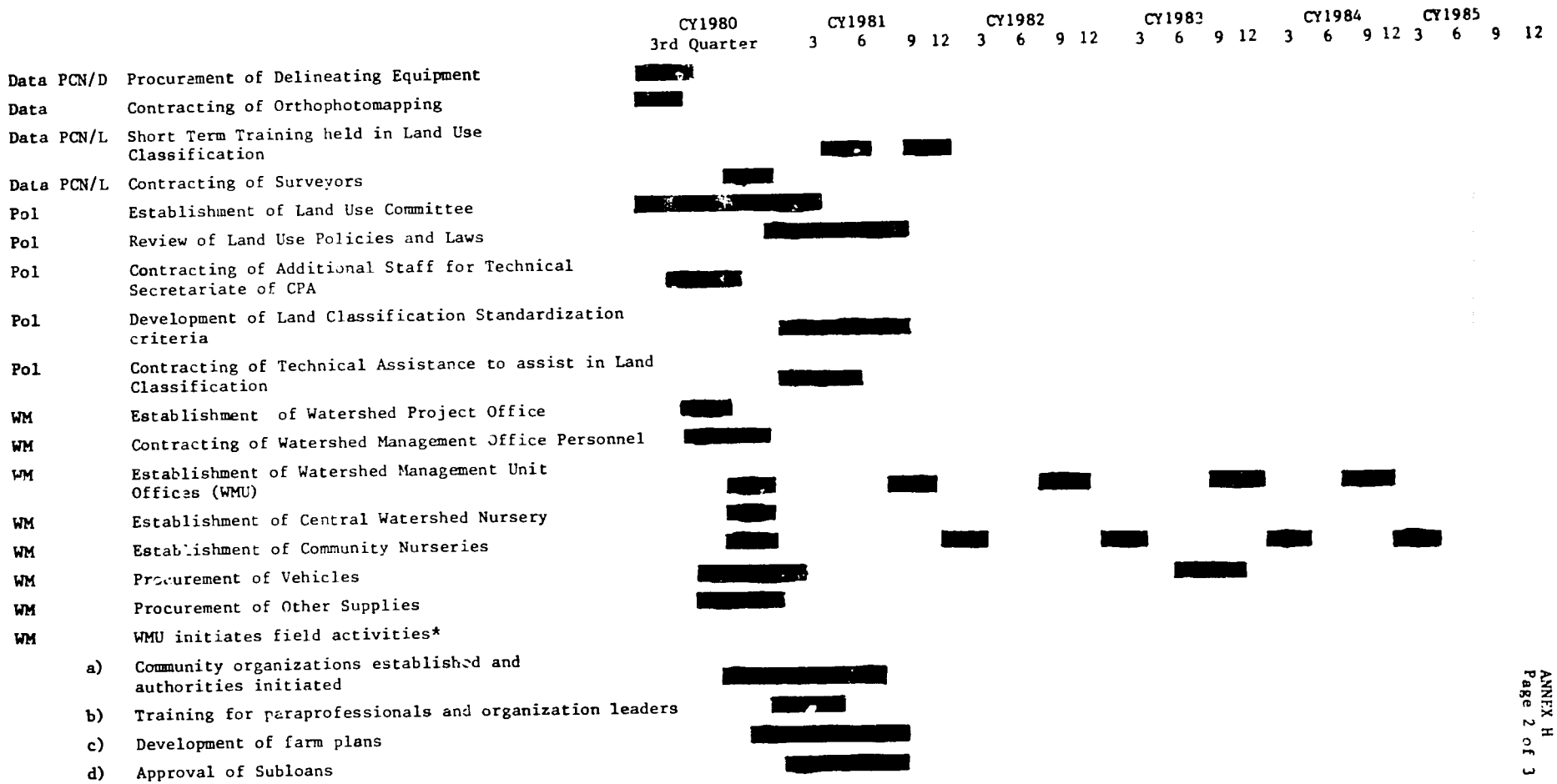
Having evaluated the Natural Resources Management project for potentially significant environmental impacts, the Mission has concluded that the overall impact of this project will be beneficial and that the majority of any potential negative impacts will be relieved by careful planning and implementation of conservation works. It is also the Mission's opinion that the formation of the environmental monitoring and review process will permit prompt identification of both positive and negative environment impacts and permit any corrective action should that be required. A negative determination is, therefore, proposed.

NATURAL RESOURCE MANAGEMENT

IMPLEMENTATION PLAN



Data PCN	Establishment of Data Revision Standardization Committee
Data PCN/D	Contracting of Data Unit-Data Unit Personnel
Data PCN/S	Contracting of Lab Unit (Technicians)
Data PCN/D	Procurement-Computer Equipment
Data PCN/D	Contracting of Computer Service
Data PCN/D	Short term computer training courses
Data H/C	Establishment of Climate Stations
Data H/C	Contracting of Meteorological Unit (Technicians)
Data H/C	Long Term Training - Participants selected and sent
Data H/C	Long Term Training begins in Hydrology and Climatology
Data PCN/S	Short Term Training Courses held
Data PCN/S	Lab equipment purchased
Data H/C	Hydrology and Climatology equipment purchased
Data PCN	Vehicles procured
Data H/C	Contracting of Technical Assistance in Hydrology and Climatology
Data PCN/E	Land Use Unit established
Data PCN/E	Contracting of Agricultural Economist and Forest Economist
Data PCN/E	Establishment of Ecological Unit (Support Staff)
Data PCN/D	Contracting of Delineating Staff


CY1980
3rd Quarter
CY1981
3 6 9 12
CY1982
3 6 9 12
CY1983
3 6 9 12
CY1984
3 6 9 12
CY1985
3 6 9 12
Data PCN/D Procurement of Delineating Equipment
Data Contracting of Orthophotomapping
Data PCN/L Short Term Training held in Land Use Classification
Data PCN/L Contracting of Surveyors
Pol Establishment of Land Use Committee
Pol Review of Land Use Policies and Laws
Pol Contracting of Additional Staff for Technical Secretariate of CPA
Pol Development of Land Classification Standardization criteria
Pol Contracting of Technical Assistance to assist in Land Classification
WM Establishment of Watershed Project Office
WM Contracting of Watershed Management Office Personnel
WM Establishment of Watershed Management Unit Offices (WMU)
WM Establishment of Central Watershed Nursery
WM Establishment of Community Nurseries
WM Procurement of Vehicles
WM Procurement of Other Supplies
WM WMU initiates field activities*
a) Community organizations established and authorities initiated
b) Training for paraprofessionals and organization leaders
c) Development of farm plans
d) Approval of Subloans

***NOTE:** Additional WMU Technical Assistance Teams will be added over the life of the Project. As new team(s) are added, they will each begin a series of field activities. These are listed for the first teams only which will begin field activities in January 1981, but they will be repeated by the other teams as they come on board.

CODES:

Data:	Natural Resource Data Collection and Analysis Component
Pol:	Natural Resources Policy and Planning Component
WM:	Watershed Management Component
PCN:	National Cadaster Program
D:	Data Collection Sub-activity
H/C:	Hydrology and Climatological
S:	Soils Sub-activity
E:	Ecology Sub-activity
D:	Delineation
L:	Land Use
WMU:	Watershed Management Units (field units)

EVALUATION PLAN

Evaluation Arrangements

The evaluation function in this Project is to be given exceptional importance as the institutions strengthened, the expertise gained and the lessons learned will form the base for other natural resource management projects elsewhere in Honduras.

A. Annual Evaluations

The annual evaluation, which will be undertaken jointly by the GOH and AID, will assess progress toward attainment of the Project's objectives. It is expected that the annual and impact evaluation teams will be composed of representatives from the: coordinating unit, project office, A.I.D., institution(s) being evaluated, and from other private or GOH organizations/institutions such as CONSUPLANE, MNR, PCN, etc. that the Government may select. Overall responsibility for coordination and implementation of the evaluations will rest with the Coordinating Unit. The quarterly reviews will normally be conducted by AID and representatives from the Coordinating Unit. As appropriate and necessary, the participation of the implementing institutions in the quarterly reviews will be encouraged and sought. The annual evaluation will examine Project processes and institutional systems in terms of measuring expected outputs and the contribution of these outputs to achievement of the Project's purposes. It is anticipated that the annual evaluations will include end-use audit checks of specific items procured under this Project. Thirty to sixty days prior to the initiation of the annual evaluation, the GOH will provide a plan of work covering the evaluation for AID's approval.

Quarterly administrative reviews will provide much of the baseline data needed to conduct the annual evaluations. The quarterly administrative reviews also will be conducted jointly by the GOH and AID. Their specific purpose will be to examine, on a quarterly basis: financial progress in the implementation of the program; success in achieving outputs as expected; and problems which may be impeding project implementation. The quarterly administrative reviews will help insure coordination among the participating entities, permit a more expeditious identification of impediments or problems in Project implementation, and insure more prompt action in resolving those impediments or problems. The quarterly administrative review will, out of necessity, be relatively superficial in nature, and is designed for implementation problem identification and resolution. It is anticipated that the quarterly program reviews will be most critical in the early stages of Project's implementation when closer coordination and cooperation is essential. Later in the Project, the need for the quarterly reviews should be less, and a semi-annual program review may be sufficient.

B. Impact Evaluation

At Project mid-life and upon termination of the project, in-depth evaluations will be undertaken. The evaluations will focus primarily upon the effect this Project has had upon its target population and in strengthening local and national natural resource management institutions.

The impact evaluations will assess the Projects' effect on:

-- improving the economic and social well-being of the small hillside farmer;

-- reforming detrimental hillside farming practices;

-- containing environmental deterioration in the five sub-watersheds of the Choluteca River Basin Watershed area;

-- developing effective land use, water and forest management policies and programs; and

-- strengthening the natural resource data collection and analysis capabilities of the participating GOH institutions.

The results of the annual evaluations will be used as baseline information in the conduct of the impact evaluations.

The evaluation of the Project's contribution to an increase in income and employment opportunities will be based on a comparison of baseline income and employment data collected under this Project with data generated by other Projects. Information contained in the farm surveys conducted in 1977 as part of the Agriculture Sector Assessment for Honduras and which is being updated as part of the farmer survey and sample framework under the Agriculture Sector II program, will be used in determining income and employment increases achieved under this project.

Land use data collected under this Project will be compared to PCN records to determine land use changes. Aerial photos or other appropriate methods will be used in the impact evaluations to identify changes in erosion patterns. This will be supplemented by data collected under the Environmental Monitoring and Review component (see Initial Environment Assesment Annex for detailed explanation). These sources will be used in determining the project's effectiveness in containing environmental deterioration. The impact evaluations will attempt to identify practices and techniques which can be replicated in other watershed areas of Honduras.

The institutional analysis will examine the capabilities of the GOH agencies involved in this Project to deliver goods and services essential to improved natural resource management. The impact evaluation conducted during the third year of the Project also will examine the GOH's ability to assume responsibilities for field watershed activities previously

handled separately under this Project. The evaluation report will include recommendations with respect to strengthening modifications which will be necessary to enable GOH institutions to assume such field responsibilities.

C. Audits

In addition to the end-use audits of selected goods and materials financed under this project, which for reasons of economy and efficiency are included in the annual evaluations, periodic financial audits will be required. The financial audits will examine the financial books and records of the respective organizations and entities directly involved in or receiving financial support from this Project. The audits will insure proper accounting practices are being employed, that proper bookkeeping procedures are being observed, and that expenditures of Project monies are being properly made. Financial audits may be requested at any time by AID or the GOH. At a minimum, one financial audit will be conducted.

D. Environmental Monitoring and Review

While careful planning and project execution should offset most of the possible negative environmental consequences of this Project, some concern remains that environmental monitoring and review is necessary. Accordingly, as explained in Annex G, Initial Environmental Examination an Environmental Monitoring and Review process is built into this Project. The yearly reports produced by the environmental specialist will be used in determining environmental changes resulting from this Project. The information produced also will help determine impact and will be used as base material for the impact evaluations. Funding for the Environmental Monitoring and Review Component is included under the Watershed Management Activity.

E. Costs

A total of $78,000 is being included in the project to cover evaluation and audit costs.

(a) Annual Evaluations

To be conducted by personnel drawn from the participating GOH entities and AID. Team, as needed, may include outside specialists. Evaluation normally requires 1-2 weeks (1-2 people).....$6,000. Annual Evaluations will be conducted in first, second and fourth years of project at total cost of $18,000.

(b) Impact Evaluations

The final impact evaluation normally is conducted by an outside team and is expected to take 2-4 weeks (3-4 people).....$24,000. The impact evaluations will be conducted during the third and fifth (final evaluation) years at a total of $48,000.

(c) Audits

Provision is being made under the Project for the financing of one financial audit by external financial specialists which is expected to require 2-3 weeks each (2 people) at a cost of $12,000. It is anticipated that any other Project audits, either required or requested, would be accomplished using GOH and/or AID personnel.

ANNEX J

NATURAL RESOURCES MANAGEMENT

Illustrative Budgets. Disbursements by Calendar Year

A. Summary of Disbursements by Calendar Year

I. Policy and Planning

II. National Resource Data and Analysis

III. Choluteca Watershed Management Program

ANNEX J

Natural Resources Management

A. Summary of Disbursements

Exhibit A-1: Summary Cost Estimate by Source of Funding

Exhibit A-2: Costing of Project Outputs/Inputs

Exhibit A-3: Disbursement Schedule by Calendar Year

EXHIBIT A - 1

Summary Cost Estimate by Source of Funding
(US$000)

Type of Expenditure	SOURCE OF FUNDS: AID Loan Funds FX	AID Loan Funds LC	AID Loan Funds TOTAL	GOH FX	GOH LC	GOH TOTAL	TOTAL
Operating Costs	2,539.5	1140.1	3,679.6	16.0	6,950.7	6,966.7	10,646.3
Personnel	-	631.7	631.7	-	4,047.9	4,047.9	4,679.6
Support Personnel	-	73.1	73.1	-	341.9	341.9	415.0
Benefits	-	104.3	104.3	-	658.7	658.7	763.0
Per Diem and Expenses	-	7.5	7.5	-	739.6	739.6	747.1
Contracts Studies and Services	-*	-*	-*	-	-	-	-
Materials, Equipment and Supplies	1,717.9	59.0	1,776.9	16.0	235.8	251.8	2,028.7
Technical Assistance	-*	-*	-*	-	6.0	6.0	6.0
Vehicles and Maintenance	608.0	-	608.0	-	310.3	310.3	918.3
Training and Seminars	206.6	255.5	462.1	-	15.0	15.0	477.1
Rent and Utilities	-	-	-	-	200.8	200.8	200.8
Miscellaneous	-	-	-	-	136.2	136.2	136.2
Contingencies and Inflation	7.0	9.0	16.0	-	258.5	258.5	274.5
Choluteca Watershed Management Credit Fund	-	8,572.0	8,572.0	-	-	-	8,572.0
Fertilizer Loans	-	1,102.7	1,102.7	-	-	-	1,102.7
Fertilizer Grants	-	491.2	491.2				491.2
Agro-Forestry and Fuelwood Loans	-	2,926.0	2,926.0	-	-	-	2,926.0
Reforestation Loans	-	1,481.5	1,481.5	-	-	-	1,481.5
Range Management and Pasture Improvement Loans	-	1,515.1	1,515.1	-	-	-	1,515.1
Community Nursery & Tool Grants	-	1,055.5	1,055.5				1,055.5
Subtotal Loan Funds	2,539.5	9,712.1	12,251.6	-	-	-	(12,251.6)
AID Grant Funds							
Project Grants	2,111.0	632.0	2,743.0	-	-	-	2,743.0
Contract Studies and Services	177.0	415.0	592.0	-	-	-	592.0
Technical Assistance	1,926.0	-	1,926.0	-	-	-	1,926.0
AID Coordinating Office	8.0	217.0	225.0	-	-	-	225.0
GRAND TOTAL	4,650.5	10,344.1	14,994.6	16.0	6,950.7	6,966.7	21,961.3

* Included as AID grants.

EXHIBIT A-2
NATURAL RESOURCES MANAGEMENT PROJECT
COSTING OF PROJECT OUTPUTS/INPUTS
(U.S.$000)

PROJECT INPUTS	PROJECT OUTPUTS			
	Policy and Planning	Natural Resource Data and Analysis	Choluteca Watershed Management Program	TOTAL
Operating Costs	1,078.2	5,643.1	6,668.0	13,389.3
Personnel	350.0	1,745.3	2,734.3	4,829.6
Support Personnel	80.0	88.5	286.5	455.0
Benefits	36.0	275.3	451.7	763.0
Per Diem & Expenses	24.0	160.0	563.1	747.1
Contract Studies & Services	315.0	177.0	100.0	592.0
Equipment and Supplies	31.0	1,744.5	268.2	2,043.7
Technical Assistance	156.0	450.0	1,326.0	1,932.0
Vehicle & Maintenance	16.0	565.5	344.8	926.3
Training and Seminars	30.0	317.9	129.2	477.1
Contingency and Inflation	40.2	119.1	127.2	286.5
Rent and Utilities	-	-	200.8	200.8
Miscellaneous	-	-	136.2	136.2
Choluteca Watershed Management			8,572.0	8,572.0
Fertilizer Grants	-	-	491.2	491.2
Community Nurseries and Tool Grants	-	-	1,055.5	1,055.5
Fertilizer Loans	-	-	1,102.7	1,102.7
Agro-Forestry and Fuelwood Loans	-	-	2,926.0	2,926.0
Reforestation Loans	-	-	1,481.5	1,481.5
Range Management and Pasture	-	-	-	-
Improvement Loans	-	-	1,515.1	1,515.1
Grand Total	1,078.2	5,643.1	15,240.0	21,961.3

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EXIBIT A-3

NATURAL RESOURCE MANAGEMENT PROJECT
DISBURSEMENT SCHEDULE BY CALENDAR YEAR
(U.S. $000)

Component	1980		1981		1982		1983		1984		1985		Totals	
	AID	GOH	AID	GOH	AID	GOH	AID	GOH	AID	GOH	AID	GOH	AID	GOH
Policy and Planning	31.5	-	318.7	-	188.0	62.7	123.0	65.3	87.0	67.3	67.5	67.2	815.7	262.5
Natural Res. Data and Analysis	1001.6	-	1552.8	78.0	675.8	565.0	58.0	605.4	17.6	609.8	13.2	465.9	3319.0	2324.1
Choluteca Watershed	179.7	-	1623.9	117.9	1895.3	675.1	2165.8	944.1	2309.6	1198.4	2685.5	1444.6	10,859.9	4380.1
GRAND TOTAL	1212.8	-	3495.4	195.9	2759.1	1302.8	2346.8	1614.8	2414.2	1875.5	2766.7	1977.7	14,994.6	6,966.7

ANNEX J

I. Policy and Planning

Exhibit I-1: Disbursements-Policy and Planning

EXHIBIT I-1

DISBURSEMENTS - POLICY AND PLANNING
(U.S.$000)

	1980		1981		1982		1983		1984		1985		TOTAL	TOTAL
	AID	GOH	AID	GOH	AID	GOH	AID	GOH	AID	GOH	AID	GOH	AID	GOH
Agricultural Policy Commission														
Personnel														
Forest Economy			20.0			20.0		20.0		20.0		20.0	20.0	80.0
Nat.Res.& Watershed			20.0			20.0		20.0		20.0		20.0	20.0	80.0
Subtotal			40.0			40.0		40.0		40.0		40.0	40.0	160.0
Support Personnel (Sec.)			.0			8.0		8.0		8.0		8.0	8.0	32.0
Benefits			7.2			7.2		7.2		7.2		7.2	7.2	28.8
Travel and Per Diem			7.5			7.5		3.0		3.0		3.0	7.5	16.5
Contracts														
Contract Studies			50.0		50.0		25.0						125.0	
Contract Services			20.0		20.0		20.0		20.0		20.0		100.0	
Subtotal			70.0		70.0		45.0		20.0		20.0		225.0	
Materials & Supplies			5.0		5.0			2.0		2.0		2.0	10.0	6.0
Tech. Assist. (39 pm)														
Land Class. (15 pm)			80.0		20.0								100.0	
Nat.Res. Econ. (24 pm)			16.0		8.0								24.0	
Subtotal			112.0		44.0								156.0	
Vehicles (1)	8.0												8.0	
Training & Seminars			10.0		10.0		10.0						30.0	
Contingency & Inflation							5.0	5.1	4.0	7.1		7.0	9.0	19.2
Subtotal	8.0		259.7		129.0	62.7	60.0	65.3	24.0	67.3	20.0	67.3	500.7	262.6
Personnel (Coordinator)	7.5		30.0		30.0		30.0		30.0		22.5		150.0	
Support Personnel (Sec.)	2.0		8.0		8.0		8.0		8.0		6.0		40.0	
Materials & Supplies	1.0		3.0		3.0		3.0		3.0		2.0		15.0	
Vehicles (1)	8.0												8.0	
Contingency & Inflation							4.0		4.0		4.0		12.0	
Subtotal	18.5		41.0		41.0		45.0		45.0		34.5		225.0	
MNR Coordinating Office (Contract Prof. Serv.)	5.0		18.0		18.0		18.0		18.0		13.0		90.0	
GRAND TOTAL	31.5		318.7		188.0	62.7	123.0	65.3	87.0	67.3	67.5	67.2	815.7	262.5

ANNEX J

II. Natural Resources Data Analysis Information

Exhibit II-1: Disbursements by Calendar Year

- PCN Program and Systems Department
- PCN Soils Section and Laboratory
- PCN Hydrometeorology Section
- MNR Department of Hydrology and Climatology
- PCN Ecology and Forest Classification
- PCN Actual/P tential Land Classification and Planning
- PCN Forest Delineation
- PCN General Support

EXHIBIT II-1

DISBURSEMENTS-NATURAL RESOURCE DATA ANALYSIS AND INFORMATION SYSTEMS
(US$000)

DESCRIPTION	1980 AID	1980 GOH	1981 AID	1981 GOH	1982 AID	1982 GOH	1983 AID	1983 GOH	1984 AID	1984 GOH	1985 AID	1985 GOH	TOTAL AID	TOTAL GOH
PCN Programs and Systems Department														
Technical and Professional Personnel														
Data Investigators	4.0		16.0			16.0		16.0		16.0		12.0	20.0	60.0
Digitizers	3.0		12.0			12.0		12.0		12.0		9.0	15.0	45.0
Terminal Operators	3.0		12.0			12.0		12.0		12.0		9.0	15.0	45.0
Support Personnel														
Secretary	1.5		6.0			6.0		6.0		6.		4.5	7.5	22.5
Benefits	1.8		6.9			6.9		6.9		6.9		5.1	8.7	25.8
Professional and Service Contracts														
Computer Servicing	4.0		16.0		16.0		16.0		16.0		12.0		80.0	
Software Packages			11.0		6.0								17.0	
Equipment, Materials and Supplies														
Computer Supplies				5.0		4.0		4.0		4.0		3.0		20.0
CPU	75.0												75.0	
CRT Terminals	20.0												20.0	
Design/Digitizing Stations	35.0												35.0	
Disk Drive	27.0												27.0	
Accessories	4.0												4.0	

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Technical Assistance													
Data Base Specialist		25.0		25.0								50.0	
Training and Seminars													
Short Term Training													
Remote Sensing Info. Processing		5.1										5.1	
Computer Maintenance		1.7										1.7	
Systems Design and Analysis		8.5										8.5	
Travel for Short Term Training													
Remote Sensing Information Processing		5.1										5.1	
Computer Maintenace		1.7										1.7	
Systems Design and Analysis		8.5										8.5	
Contingency and Inflation						1.6	3.9	1.6	3.9	1.2	3.0	4.4	10.8
ACTIVITY TOTALS	178.3	135.5	5.0	47.0	56.9	17.6	50.8	17.6	60.8	13.2	45.6	409.2	229.1

	1980		1981		1982		1983		1984		1985		TOTAL	
	AID	GOH	AID	GOH	AID	GOH	AID	GOH	AID	GOH	AID	GOH	AID	GOH
PCN Soils Section & Lab														
Survey Correlators (3)	6.0		24.0			36.0		36.0		36.0		27.0	30.0	135.0
Soil Surveyors (5)						30.0		30.0		30.0		22.5		112.5
Lab Supervisor (1)	3.0		12.0			12.0		12.0		12.0		9.0	15.0	45.0
Lab Techni ians (6)	7.5		30.0			30.0		30.0		30.0		22.5	37.5	112.5
Support Personnel														
Secretary (1)	1.5		6.0			6.0		6.0		6.0		4.5	7.5	22.5
Benefits	2.7		10.8			17.1		17.1		17.1		13.0	13.5	64.3
Travel and Per Diem														
Soil Survey Crews				4.0		6.0		6.0		6.0		4.5		26.5
Equipment, Materials and Supplies														
Atomic Absorption Spectrophoto (1)	15.0												15.0	
Lab Equipment	10.0												10.0	
Maintenance & Repair C sts	1.0		2.0			2.0		2.0		2.0		2.0	3.0	8.0
Lab Supplies	1.0		2.0			2.0		2.0		2.0		2.0	3.0	8.0
Field Equipment	5.0												5.0	
Technical Assistance														
Soil Survey Specialist	20.0		80.0		60.0								160.0	
Training and Seminars														
Short Term Training														
4-month Training w/USDA			7.5										7.5	
4-month Training w/USDA			7.5										7.5	
Travel for Short Term Training														
4-month Training w/USDA			7.5										7.5	
4-month Training w/USDA			7.5										7.5	
Contingency and Inflation							9.7		9.7		9.0			28.4
ACTIVITY TOTALS	72.7		196.8	4.0	60.0	141.1		150.8		150.8		116.0	329.5	562.7

PCN Hydrometeorology Section								
Training and Seminars								
Short Term Training								
4-month Meteorology Training w/USDA	7.5						7.5	
4-month Hydrology Training w/USDA	7.5						7.5	
Travel for Short Term Training								
4-month Meteorology Training w/USDA	7.5						7.5	
4-month Hydrology Training w/USDA	7.5						7.5	
ACTIVITY TOTALS	30.0						30.0	
DHC Dept. Hydrology & Climatology								
Technical and Professional Personnel								
Meteorology Tech.(4) Full Time	6.0		12.0	12.0	12.0	9.0	6.0	45.0
Meteorology Techninians (13) Half Time	4.8		9.6	15.6	15.6	11.7	4.8	52.5
Meteorology Technicians(48) Part Time	4.3		8.6	12.9	17.3	12.9	4.3	51.7
Hydrologic Tech.(4) Full Time	12.0		24.0	24.0	24.0	18.0	12.0	90.0
Computer Operators (2)	6.0		12.0	12.0	12.0	9.0	6.0	45.0
Benefits	4.9		9.9	11.4	12.1	9.2	4.9	42.6
Travel and Per Diem Hydrology and Meteorology Field Crews		3.0	6.0	6.0	6.0	4.5		25.5
Contracts								
Hydrologist	20.0	20.0					40.0	
Meteorologist	20.0	20.0					40.0	

Equipment, Materials and Supplies										
Office Supplies		5.0		5.0		5.0		5.0	4.5		24.5
Climatic Stations:										
HMP (4)	40.0									40.0	
HMO (13)	52.0									52.0	
TP (3)	3.0									3.0	
PV (45)	9.0									9.0	
Hydrologic Stations:											
HP (7)	21.0									21.0	
HS (21)	10.5									10.5	
H3 (10)	2.5									2.5	
General Equipment											
Calibration/Equipment Maintenance	5.0									5.0	
Sediment Lab	10.0									10.0	
Construction Tools	3.0									3.0	
Metal and Carpentry	3.0									3.0	
Electric Calculators	1.0									1.0	
Technical Assistance											
Hydroclimatic Specialist	8.0		8.0		8.0					24.0	
Data Analyst	8.0		8.0		8.0					24.0	
Vehicles & Maintenance											
Field Crews & TA (5)	40.0									40.0	
Gas & Maintenance		5.0		5.0		5.0		5.0	3.5		23.5
Training & Seminars											
Long Term Training											
BS-Meteorology	18.0		21.0							39.0	
BS-Hydrology	18.0		21.0							39.0	
Short Term Meteorology	3.2		3.3		3.3					9.8	
Short Term Hydrology	6.5		6.5		6.5					19.5	
Travel & Expenses for Training											
BS-Meteorology	12.0		12.0							24.0	
BS-Hydrology	12.0		12.0							24.0	
Short Term Meteorology	4.0		4.0		4.0					12.0	
Short Term Hydrology	8.0		8.0		8.0					24.0	
Contingency & Inflation					2.6	8.0		7.5	7.3	2.6	22.8
ACTIVITY TOTALS	375.7	13.0	143.8	92.1	40.4	111.9		116.5	89.6	559.9	423.1

PCN Ecology and Forest Classification Section										
Technical Professional Personnel										
Ecology & Forest Classif. Supervisor (1)		12.0			12.0	12.0	12.0	9.0	12.0	45.0
Forest Class. Tech. (2)		18.0			18.0	18.0	18.0	13.5	18.0	67.5
Support Personnel										
Secretary (1)		6.0			6.0	6.0	6.0	4.5	6.0	22.5
Benefits		5.4			5.4	5.4	5.4	4.1	5.4	20.3
Travel and Per Diem										
Field Crews			6.0		6.0	6.0	6.0	4.5		28.5
Equipment, Materials and Supplies										
Field Equipment	5.0								5.0	
Office Equipment			1.0		1.0	1.0	1.0	1.0		5.0
Technical Assistance										
Ecology & Forest Class. Spec.		16.0		16.0					32.0	
Contingency & Inflation						3.5	3.3	2.5		9.3
ACTIVITY TOTALS	5.0	57.4	7.0	16.0	48.4	51.9	51.7	39.1	78.4	198.1

Actual/Potential Land Class. and Planning Section										
Technical & Professional Personnel										
Agric. Economists (1)					12.0	12.0	12.0	9.0		45.0
Forest Economist (1)					24.0	24.0	24.0	18.0		90.0
Land Use Classifiers (2)	4.0	24.0			32.0	32.0	32.0	24.0	28.0	120.0
Field Surveyors (2)		18.0			18.0	18.0	18.0	13.5	18.0	67.5
Benefits	6.0	6.3			12.9	12.9	12.9	9.7	6.9	48.4
Travel and Per Diem										
Field Crews			10.0		12.5					22.5
Equipment, Materials and Supplies										
Office Equipment			1.0		1.0	1.0	1.0	1.0		5.0
Field Equipment	1.0	1.0							2.0	
Training and Seminars										
Short Term Training										
Land Class./Plan.		18.0		6.0					24.0	
Travel for Short Term Training										
Land Class./Plan.		9.0		3.0					12.0	
Contingency & Inflation						8.2	8.2	8.8		25.2
ACTIVITY TOTAL	5.6	76.3	11.0	9.0	112.4	108.1	108.1	84.0	90.9	423.6

PCN Forest Delineation													
Technical Professional Personnel													
Delineators(10)		15.0			30.0		30.0		30.0		22.5	15.0	112.5
Assistant Delineators(10)		12.0			24.0		24.0		24.0		18.0	12.0	90.0
Benefits		4.1			8.1		8.1		8.1		6.1	4.1	30.4
Travel and Per Diem													
Field Crews			6.0		12.0		12.0		12.0		9.0		51.0
Equipment, Materials, and Supplies													
Field Equipment		10.											
Contingency & Inflation							5.1		5.1		3.8		14
ACTIVITY TOTALS		41.1	6.0		74.1		79.2		79.2		59.4	41.1	297.9
PCN General Support													
Technical Assistance													
Cartographer	20.0	80.0		60.								160.0	
Equipment, Materials and Supplies													
Orthophoto Mapping	600.00	400.00		300.0								1300.0	
Vehicles & Maintenance													
Vehicles (40)	120.0	160.0		40.0								320.0	
Vehicle Maintenance			32.0		40.0		40.0		40.0		30.0		182.0
Contingency & Inflation							2.7		2.7		2.2		7.6
ACTIVITY TOTAL	740.0	640.0	32.0	400.0	40.0		42.7		42.7		32.1	1780.0	189.6
GRAND TOTAL	1001.6	1552.8	78.0	675.8	565.0	58.0	605.4	17.6	609.8	13.2	465.9	3319.0	2324.1

ANNEX J

III. Choluteca Watershed Management Program

Disbursements by Calendar Year:

Exhibit III-1:	Summary Budget of Total Costs
Exhibit III-2:	Institutional Costs
Exhibit III-3:	Estimated Institutional Costs ($000), Personnel
Exhibit III-4:	Summary Budget. Equipment and Supplies
Exhibit III-5:	Summary Budget. Supporting Costs GOH
Exhibit III-6:	Technical Assistance
Exhibit III-7:	Training and Seminars
Exhibit III-8:	Programming activities and direct cost of Program
Exhibit III-9:	Community Nursery Program, Total Cost of Grants -- A.I.D.
Exhibit III-10:	Summary Budget Institutional Costs
Exhibit III-11:	Prorating of Costs for Project Activities

EXHIBIT III - 1

CHOLUTECA WATERSHED PROJECT
SUMMARY BUDGET OF TOTAL COSTS
(US $000)

ITEM	1980 AID	1980 GOH	1981 AID	1981 GOH	1982 AID	1982 GOH	1983 AID	1983 GOH	1984 AID	1984 GOH	1985 AID	1985 GOH	TOTAL AID	TOTAL GOH
I. Direct cost of Activities	38.1	-	897.7	-	1273.4	-	1697.0	-	2120.9	-	2544.8	-	8571.9	-
1. Production Loans	-	-	702.5	-	1053.8	-	1405.0	-	1756.3	-	2107.6	-	7025.2	-
2. Production Subsidies	-	-	49.1	-	73.7	-	98.2	-	122.8	-	147.4	-	491.2	-
3. Nursery and Tool Grants	38.1	-	146.1	-	145.9	-	193.8	-	241.8	-	289.8	-	1055.5	-
II. Institutional Costs	141.6		726.2	117.9	621.9	675.1	468.8	944.0	188.7	1198.4	140.7	1444.6	2287.9	4380.1
III. Total Costs	179.7		1623.9	117.9	1895.3	675.1	2165.8	944.0	2309.6	1198.4	2685.5	1444.6	10859.8	4380.1

EXHIBIT III 2

CHOLUTECA WATERSHED PROJECT. INSTITUTIONAL COSTS

ITEM	1980 AID	1980 GOH	1981 AID	1981 GOH	1982 AID	1982 GOH	1983 AID	1983 GOH	1984 AID	1984 GOH	1985 AID	1985 GOH	TOTAL AID	TOTAL GOH
I. Project Office														
1.1 Proj. Director (1 pos.)	6.3	-	25.0	-	-	25.0	-	25.0	-	25.0	-	25.0	31.3	100.0
1.2 Field Director (1 pos.)	5.0	-	20.0	-	-	20.0	-	20.0	-	20.0	-	20.0	25.0	80.0
1.3 Adm. and Finan. Mgr. (1 pos.)	4.5	-	18.0	-	-	18.0	-	18.0	-	18.0	-	18.0	22.5	72.0
1.4 Controller (1 pos.)	-	-	12.0	-	-	12.0	-	12.0	-	12.0	-	12.0	12.0	48.0
1.5 Marketing Spec. (1 pos.)	6.3	-	25.0	-	-	25.0	-	25.0	-	25.0	-	25.0	31.3	100.0
1.6 Exec.Sec. (1)	1.8	-	7.2	-	-	7.2	-	7.2	-	7.2	-	7.2	9.0	28.8
1.7 Comm.Sec. (2)	-	-	3.6	-	-	7.2	-	7.2	-	7.2	-	7.2	3.6	28.8
1.8 Accountants (2)	2.4	-	9.6	-	-	9.6	-	9.6	-	9.6	-	9.6	12.0	38.4
1.9 Chauffer (1)	1.2	-	4.8	-	-	4.8	-	4.8	-	4.8	-	4.8	6.0	19.2
1.10 Messenger (1)	0.6	-	2.4	-	-	2.4	-	2.4	-	2.4	-	2.4	3.0	9.6
1.11 On-Farm water Mgt.Spec. (1)	6.0	-	24.0	-	-	24.0	-	24.0	-	24.0	-	24.0	30.0	96.0
1.12 Personnel's Benefit	5.1	-	21.2	-	-	23.3	-	23.3	-	23.3	-	23.3	26.3	93.2
Subtotal	39.2	-	172.8	-	-	178.5	-	178.5	-	178.5	-	178.5	212.0	714.0
1.13 Contracts Edu. Campaign	10.0	-	10.0	-	20.0	-	20.0	-	20.0	-	20.0	-	100.0	-
1.14 Contingencies and Inflation	--	-	-	-	-	-	-	12.4	-	12.4	-	12.4	-	37.2
TOTAL	49.2	-	182.8	-	20.0	178.5	20.0	190.9	20.0	190.9	20.0	190.9	312.0	751.2

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EXHIBIT III - 3

CHOLUTECA WATERSHED PROJECT. ESTIMATED INSTITUTIONAL COSTS ($000), PERSONNEL

ITEM	1980		1981		1982		1983		1984		1985		TOTAL	
	AID	GOH	AID	GOH	AID	GOH	AID	GOH	AID	GOH	AID	GOH	AID	GOH
II. Watershed Mgt. Units														
1. Unit Coor. (5 pos.)	3.0	-	12.0	-	-	24.0	-	36.0	-	48.0	-	60.0	15.0	168.0
2. Soc.Promoters (20 pos.)	6.0	-	24.0	-	-	48.0	-	72.0	-	96.0	-	120.0	30.0	336.0
3. Agronomists (20 pos.)	7.2	-	28.8	-	-	57.6	-	86.4	-	115.2	-	144.0	36.0	403.2
4. Silviculturalist (20 pos.)	7.2	-	28.8	-	-	57.6	-	86.4	-	115.2	-	144.0	36.0	403.2
5. Coop. experts (10 pos.)	3.0	-	12.0	-	-	24.0	-	36.0	-	48.0	-	60.0	15.0	168.0
6. Land Surveyors (10 pos.)	3.0	-	12.0	-	-	24.0	-	36.0	-	48.0	-	60.0	15.0	168.0
7. Secretary (5 pos.)	0.9	-	3.6	-	-	7.2	-	10.8	-	14.4	-	18.0	4.5	50.4
8. Accountants (20 pos.)	4.8	-	19.2	-	-	38.4	-	57.6	-	76.8	-	96.0	24.0	268.8
9. Chauffer-Messenger (5 pos.)	1.2	-	4.8	-	-	9.6	-	14.4	-	19.2	-	24.0	6.0	67.2
10. Personnel's Benefits	5.5	-	21.8	-	-	43.6	-	65.3	-	87.1	-	108.9	27.3	304.9
Subtotal	41.8	-	167.0	-	-	334.0	-	500.9	-	667.9	-	834.9	.8	2337.7
11. Contingencies and Inflation	-	-	-	-	-	-		19.9	-	29.9	-	40.1	-	90.0
TOTAL	41.8	-	167.0	-	-	334.0		520.8	-	697.8	-	875.0	208.8	2,427.7

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EXHIBIT III -4

SUMMARY BUDGET

EQUIPMENT AND SUPPLIES ($000)

AID	1980		1981		1982		1983		1984		1985		SUBTOTAL	
	AID	GOH	AID	GOH	AID	GOH	AID	GOH	AID	GOH	AID	GOH	AID	GOH
I. Project Office														
2 Vehicles at $10,000	20.0	-	-	-	-	-	-	-	-	-	-	-	20.0	-
8 Programmable calculators	2.5	-	2.5	-	-	-	-	-	-	-	-	-	5.0	-
6 Electron.Cal.	1.2	-	1.2	-	-	-	-	-	-	-	-	-	2.4	-
3 Elec.Type.	2.0	-	1.0	-	-	-	-	-	-	-	-	-	3.0	-
Misc. Office Equipment	10.0	-	5.0	-	3.0	-	-	-	-	-	-	-	18.0	-
Misc. Field & Map.Equip.	5.0	-	5.0	-	5.0	-	-	-	-	-	-	-	15.0	-
Subtotal	40.7	-	14.7	-	8.0	-	-	-	-	-	-	-	63.4	-
II. Watershed Mgt. Units														
20 Vehicles at $8,000		-	32.0	-	32.0	-	32.0	-	32.0	-	32.0	-	200.0	-
5 Utility Veh. at $12,000	-	-	12.0	-	12.0	-	12.0	-	12.0	-	12.0	-	60.0	-
10 Programmable Calculators	1.0	-	1.0	-	1.0	-	1.0	-	1.0	-	-	-	5.0	-
10 Electronic Calculators	0.4	-	0.4	-	0.4	-	0.4	-	0.4	-	-	-	2.0	-
5 Typewriters	0.5	-	0.5	-	0.5	-	0.5	-	0.5	-	-	-	2.5	-
Misc.Off.Equip.	5.0	-	5.0	-	5.0	-	5.0	-	5.0	-	-	-	25.0	-
Misc. Field & Map. Equip.	3.0	-	3.0	-	3.0		3.0	-	3.0	-	-	-	15.0	-
Subtotal	9.9	-	53.9	-	53.9	-	53.9	-	53.9	-	-	-	269.5	-
Total	50.6		68.6		61.9		53.9		53.9				332.9	

EXHIBIT III-6

DISBURSMENTS-CHOLUTECA WATERSHED PROJECT

TECHNICAL ASSISTANCE
(US$000)

	1981		1982		1983		1984		1985		TOTAL	TOTAL
	AID	GOH	AID	GOH	AID	GOH	AID	GOH	AID	GOH	AID	GOH
Technical Assistance												
Long Term T.A.												
Watershed Mgt.Spec. (30 p/m)	80.0		80.0		40.0						200.0	
Community Planning (24 p/m)	25.0		25.0								50.0	
Soil Conser. Spec. (30 p/m)	70.0		70.0		40.0						180.0	
Forest Mgt. (24 p/m)			80.0		80.0						160.0	
Pasture Mgt. (24 p/m)			80.0		80.0						160.0	
On-Farm Water Mgt. Spec. (36 p/m)			60.0		60.0		60.0				180.0	
Short Term T.A.												
Agro-Forestry Spec. (6 p/m)	15.0										15.0	
Environ. Monit. & Tech. Eva. (20 p/m)	36.0		26.0		31.0		26.0	6.0	46.0		165.0	6.0
Tropical Plant Spec. (12 p/m)	10.0		10.0		10.0						30.0	
Pasture Mgt. (6 p/m)			30.0								30.0	
Silviculturist (12 p/m)	30.0		30.0								60.0	
Marketing Spec. (12 p/m)	30.0		30.0		30.0						90.0	
TOTAL (236 p/m)	296.0		521.0		371.0		86.0	6.0	46.0		1,320.0	6.0

EXHIBIT III - 7

SUMMARY BUDGET: TRAINING AND SEMINARS
($000)

	1981		1982		1983		1984		1985		Total	
	AID	GOH	AID	GOH	AID	GOH	AID	GOH	AID	GOH	AID	GOH
Training and Seminars												
Paraprofessional Training: (264 for 15 days each at $20/day)	7.8	-	12.0	-	15.9	-	19.8	-	23.7	-	79.2	-
Seminars (10 each at $2,000.00)	4.0	-	4.0	-	4.0	-	4.0	-	4.0	-	20.0	-
Invitational Travel: 5 trips x 6 participants x $500.00 per trip	-	-	3.0	-	4.0	-	5.0	-	3.0	-	15.0	-
5 trips x 6 participants at $50/day x 10 days/trip	-	-	-	3.0	-	4.0	-	5.0	-	3.0	-	15.0
SUBTOTAL	11.8	-	19.0	3.0	23.9	4.0	28.8	5.0	30.7	3.0	114.2	15.0

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EXHIBIT III - 8

CHOLUTECA WATERSHED PROJECT. PROGRAMMING OF ACTIVITIES AND DIRECT COSTS OF PROGRAM
(US$000)

ACTIVITY	1981 Target Area (Has.)	1981 Total Cost ($000)	1982 Target Area (Has.)	1982 Total Cost ($000)	1983 Target Area (Has.)	1983 Total Cost ($000)	1984 Target Area (Has.)	1984 Total Cost ($000)	1985 Target Area (Has.)	1985 Total Cost ($000)	TOTAL Target Area (Has.)	TOTAL Total Cost ($000)
I. Soil & Water Cons.& Intensive Agric. Practices	1792	159.4	2688	239.1	3583	318.8	4479	398.5	5375	478.1	17917	1593.8
1. Fertilizer (subsidy)	526	49.1	788	73.7	1051	98.2	1314	122.8	1577	147.4	5256	491.2
1.1 $60/Ha Subsidy	95	5.7	142	8.5	190	11.4	237	14.2	284	17.1	948	56.9
1.2 $80/Ha "	259	20.7	388	31.0	517	51.7	646	51.7	776	62.0	2585	206.8
1.3 $120/Ha "	103	12.4	155	18.6	207	24.8	259	31.0	311	37.2	1036	124.1
1.4 $150/Ha "	69	10.3	103	15.5	138	20.7	172	25.9	207	31.0	689	103.4
2. Fertilizer (Loans)	1266	110.3	1899	165.4	2532	220.5	3165	275.7	3798	330.8	12661	1102.6
2.1 $60/Ha Loans	602	36.1	904	54.2	1205	72.3	1506	90.4	1807	108.4	6024	361.4
2.2 $80/Ha "	259	20.7	389	31.1	519	41.5	648	51.9	778	62.2	2593	207.4
2.3 $120/Ha "	243	29.1	364	43.7	485	58.2	607	72.8	728	87.3	2426	291.1
2.4 $150/Ha "	162	24.3	243	36.4	324	48.5	405	60.7	485	72.8	1618	242.7
II. Agro-Forestry & Fuelwood Prod. $350/Ha Establishment Loan	836	292.6	1254	438.9	1672	585.2	2090	731.5	2508	877.8	8360	2926.0
III. Reforestation $350/Ha Establishment Loan	423	148.1	635	222.2	847	296.3	1058	370.4	1270	444.5	4233	1481.6
IV. Range Magmt. & Pasture Improv. $300/Ha Establishment Loan	505	151.5	758	227.3	1010	303.0	1263	378.8	1515	454.5	5050	1515.0
V. TOTALS	3557	751.6	5335	1127.5	7112	1503.3	8890	1879.1	10668	2254.9	35560	7516.4
Subsidies	526	49.1	788	73.7	1051	98.2	1314	122.8	1577	147.4	5256	491.2
Loans	3030	702.5	4546	1053.8	6061	1405.0	7576	1756.3	9091	2107.6	30304	7025.2

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Exhibit III - 9

CHOLUTECA WATERSHED PROJECT

Community Nursery Program, Total Cost of Grants

(US$000)

	Item	1980	1981	1982	1983	1984	1985	TOTAL
A.	Area to be Treated with Agro-Forestry, Fuelwood Production or Reforestation	-	1,259	1,889	2,519	3,148	3,778	12,593
	1. Agro-Forestry and Fuelwood	-	836	1,254	1,672	2,090	2,508	8,360
	2. Reforestation	-	423	635	847	1,058	1,270	4,233
B.	Nurseries to be Established	1*	26	40	53	66	79	265
C.	Number of Plants to be Produced (000's) 1/	1260*	2,518	3,778	5,038	6,296	7,556	26,446
D.	Costs of Establishment	-	78.2	118.6	157.7	196.8	235.9	787.2
	1. Infrastructure 2/	-	26.0	40.0	53.0	66.0	79.0	264.0
	2. Materials and Supplies 3/	-	42.8	64.2	85.6	107.0	128.5	428.2
	3. Other Costs 4/	-	9.4	14.4	19.1	23.8	28.4	95.0
E.	Demonstration/Training Nursery	38.1	50.2	-	-	-	-	88.3
F.	Communities' Tool Grants	-	17.7	27.3	36.1	45.0	53.9	180.0
G.	Total Community Grants	38.1	146.1	145.9	193.8	241.8	289.8	1055.5

1/ Calculated on the basis of 2,000 plants per hectare.

2/ Calculated on the basis of 10 "Las Lajas" model nursery tables, at a cost of $100.00 each, and a total capacity of 9,540 plants per table, for a total of 95,400 plants per nursery. One nursery per community organization

3/ Calculated on the basis of $17.00 per thousand plants: $3.00 per thousand plastic bags; $14.00 for seeds, fertilizers, pesticides, etc., per thousand plants.

4/ An average of $360.00 per nursery to cover other costs such as tools, land preparation rentals, and other miscelaneous costs.

* Demonstration/Training Nursery with a total capaci for 1.3 million plants.

EXHIBIT III-11

CHOLUTECA WATERSHED MANAGEMENT PROGRAM

PRORRATING OF COSTS FOR PROJECT ACTIVITIES
(In US$000)

	Direct Cost of Program (AID)				Institutional Costs 1/	TOTAL	TOTAL	Total Institutional Costs		Total Costs	
	($000)	Has.	Cost/Ha.	%	AID ($000)	AID ($000)	GOH ($000)	Total ($000)	Per Ha.($)	Total ($000)	Cost per Ha. ($)
1. Soil & Water Conservation Pract.	1,593.8	17,917	88.95	0.18593	425.4	2,019.2	814.4	1,239.8	69.20	2,833.6	158.2
1.1 Subsidies	491.2	5,256	93.46	0.05730	131.1	622.3	251.0	382.1	72.70	873.3	166.2
1.2 Loans	1,102.6	12,661	87.09	0.12863	294.3	1,396.9	563.4	857.7	67.74	1,960.3	154.8
2. Agro-Forestry (Loans)	2,926.0	8,360	350.00	0.34136	781.0	3,707.0	1,495.3	2,276.3	272.3	5,202.3	622.3
3. Reforestation (Loans)	1,481.6	4,233	350.00	0.17284	395.4	1,877.0	757.1	1,152.5	272.3	2,634.1	622.3
4. Range Mgmt. and Pasture Improv. (Loans)	1,515.0	5,050	300.00	0.17674	404.4	1,919.4	774.1	1,178.5	233.4	2,693.5	533.4
5. Community Nurseries and Tools (Subsidies)	1,055.5	35,560	29.68 *	0.12313	281.7	1,337.2	593.3	875.0	24.61 *	1,876.5	52.8
TOTAL	8,571.9	35,560	241.04	100.00%	2,287.9	10,859.8	4,380.1	6,668.0	187.5	15,240.0	428.6

1/ Includes $1,420,000 in grants to cover the cost of technical assistance and contract studies and services.

* Calculated on the basis that the nurseries and tools will benefit the whole area of the Project.

PROCEDURES AND REGULATIONS FOR SUBLOANS AND SUBGRANTS

I. Introduction

This set of regulations and procedures has been prepared as a result of Project Agreement No. 522-0168, between the Government of Honduras and the U.S. Agency for International Development, whose purpose is the financing of the Natural Resources Management Project.

The policies, procedures, rules and standards for the application, disbursement and repayment of funds as stated herein will govern the Choluteca Watershed Management Fund, for both sub-loans and sub-grants.

The Choluteca Watershed Management component of the project seeks to improve the basic socio-economic conditions of the farmers living in the watershed as well as to protect the soil and improve soil productivity by means of five project activities:

i) soil and water conservation combined with intensive agricultural practices;
ii) agroforestry activities and fuelwood production;
iii) reforestation activities;
iv) range management and pasture improvement; and
v) community nursery projects.

The administrative implementation of this component of the Project will be the responsibility of the Project Office.

II. Subloan and Subgrant Subjects

The ultimate subloan and subgrant beneficiaries under this Project will be the individual farmers residing in the Choluteca Watershed area.

In order to be eligible for subloans or subgrants under this Project, the individual farmers must satisfy the following requirements:

a) be an accredited member of a community organization as certified by the latter in writing. Likewise, the community organization must have either legal standing, properly certified or the necessary steps must have been taken to allow the community organization to enter into legally valid contractual arrangements;

b) show possession or ownership rights to the land by each of the organization members, over the land on which conservation treatments will be carried out, either by proper exhibition of title or any other valid document, or as certified by the National Agrarian Institute or other pertinent public entity (Central or Municipal Government);

c) agree to accept financing under this Project on the basis of individual farm plans to be developed with the assistance of the Watershed Management Unit and approved by the community organization (see Section III - Procedures for Subloans and Section IV - Procedures for Subgrants);

d) have a maximum amount of land no greater that 50 hectares, located in the Choluteca Watershed area;

e) agree to work their farms as per individual farm plans to be developed jointly by the farmers and the Watershed Management Units;

f) agree to participate in training courses, as proposed by the Watershed Management Units;

g) agree to accept technical assistance in fields related to the areas of exploitation for each particular farm.

The requirements stipulated in paragraphs (c), (e), (f), and (g) will be included in the loan agreements.

The individual farmers will present their credit applications through the community organization of which they are members.

III. Procedures for Subloans

As a requisite first step, each WMU will send its social promoter to the area served by the WMU to survey individual farmers in order to

(a) explain the benefits to be derived through participation in the Project;

(b) determine the degree of willingness of the individual farmers to participate;

(c) ascertain the extent to which community organizations exist in the area or, in their absence, the extent to which area residents are willing to organize into such groups.

Based on the positive results of the foregoing, the WMU community organization expert will be sent to the area to explain community organization and provide alternate forms of community association, and to assist in the establishment of the type of organization selected.

Once the community organization has been established, the remaining members of the WMU (agronomist, silviculturist, land support specialist) will be sent to the area to carry out such initial work as determining the appropriate use of the land and appropriate agricultural practices on each farm and assisting in securing land tenancy or ownership rights, if needed.

Based on these studies and evaluations made by the WMU teams, recommendations will be made to the Project Office regarding the acceptability and willingness of the community to participate in those project activities more suitable to individual farmers in each community in the various sub-watersheds. After initial approval of these recommendations, individual farm plans will be developed by the farmers with the assistance of the community organizations and the WMU teams. Based on these plans, the community organizations will accept loan applications to be prepared by the farmers with the assistance of the WMU, for financing the specific project activities as recommended by the WMU teams.

Loans granted to farmers under this Project will be destined for:

a) the purchase of fertilizer as an incentive for applying soil and water conservation treatments;
b) the introduction of agroforestry and fuelwood production;
c) reforestation;
d) range management and pasture improvement practices;
e) a combination of any or all of the above.

The terms and conditions for the loans will be as follows:

a) <u>Soil Conservation and Intensive Agricultural Practices Activity</u>

1. loans will be made for the purchase of fertilizer in exchange for the amount of work performed in soil and water conservation treatments, as follows:

(i) 4 bags of fertilizer per ha. for slopes from 0 to 15% (for an average of 400 meters of conservation treatments per hectare); loans will not exceed $60 per hectare;

(ii) 5 bags of fertilizer per ha. for slopes from 15 to 30% (for an average of 500 meters of conservation treatments per hectare); loans will not exceed $80 per hectare;

(iii) 8 bags of fertilizer per ha. for slopes from 30 to 50% (for an average of 800 meters of conservation treatments per hectare) where live barriers are planted; loans will not exceed $120 per hectare;

(iv) 10 bags of fertilizer per ha. for slopes from 30 to 50% (for an average of 500 meters of conservation treatments per ha.) where hillside ditches are constructed; loans will not exceed $150 per hectare;

2. loans will be granted for a term of 15 years, with a five year grace period, interest at 8% per annum, and 10 years to repay principal and accrued interest.

b) Agro-forestry and Fuelwood Production Activities

1. loans will be granted for establishing agro-forestry or fuelwood production.

2. the loans will be granted for a term of 18 years, with an eight year grace period, and 10 years to repay principal and accrued interest. Interest will be 6% per annum during the grace period and 8% per annum thereafter.

3. Loans will not exceed $350.00 per hectare in cash.

c) Reforestation Activities

1. loans will be granted for reforestation with pine trees on lands with slopes greater that 50% to cover costs of labor input, seedlings and establishment costs;

2. the loans will be granted for a term of 15 years, with a five year grace period, interest at 8% per annum, and 10 years to repay principal and accrued interest.

3. In the loan agreement, it will be specified that if the beneficiary complies with all the technical requirements for proper care of the trees planted and these kinds of loans, as certified each year by the WMU, the GOH will reimburse the loan when it comes due. Otherwise, principal and accrued interest will have to be paid by the farmer as stated in the loan agreement.

4. Loans will not exceed $350.00 per hectare in cash.

d) Range Management and Pasture Improvement Activities

1. loans will be granted for the adoption of range management practices, in parallel with the improvement of pastures;

2. the loans will be granted for a term of 15 years, with a five year grace period, interest at 12% per annum and ten years to repay principal and accrued interest.

3. Loans will not exceed $300.00 per hectare in cash.

Each loan proposal will contain the following information:

a) individual farm plan
b) available resources
c) current debt
d) form of current exploitation

e) profitability of projects
f) estimate of income and expense
g) description and appraisal of guarantees
h) amortization schedule for loans
i) general conditions to be fulfilled by the farmers

The credit applications and individual farm plans will be presented on forms to be supplied by the Project Office, through the WMU's. They will be prepared and revised, when necessary, jointly by the farmers and the Watershed Management Units. The WMU technical personnel will assist the beneficiaries in the selection of the best technologies appropriate to the soils, slopes and climatical conditions of each farm.

The community organizations will establish Loan Committees whose function will be to review and approve each individual loan application, based on their judgement of the feasibility of the conservation activities to be undertaken, their appropriateness with regard to the topographical and climatic factors affecting the farm and the proven moral and financial responsibility of the farmer.

Upon approval, the community organization will consolidate these individual loan applications into a global request for financing and forward this request, through the WMU, to the Project Office.

The community organization will accompany its consolidated annual request for credit with the following:

a) certification of legal status (Personalidad Juridica) or legal steps taken to obtain it;
b) individual farm plan;
c) accounting registers, and the latest Balance Sheet and Income and Expense Statement, if available. If not, these must be presented beginning in the second year;
d) list of members with appropriate identification for each;
e) extract of minutes, signed by the Secretary, certifying that the General Assembly, Board of Directors, or other authorized body has agreed to request credit from the Trust Fund, and granting power to the legal representative to request, contract, receive and withdraw funds.

The Project Office, through a Credit Committee to be composed of the Project Director, to act as president, the Field Director, and the Financial Manager and a representative from BANADESA, will review the credit requests of the individual cooperatives or community organizations, paying particular attention to the Individual Farm Plans, which should stress the development potential of the farm unit.

Credit Committee approval of a loan request will consist of the approval of at least (3) of the (4) members of the Credit Committee, including that of the President of the Committee.

Upon approval, the Project Office will send an advice of approval to the Fiduciary Fund in BANADESA. BANADESA, in turn will send this note of

approval to the community organization, together with a promissory note or loan agreement, for signature. The loan agreement will be signed by the necessary officer of the community organization and will commit the community organization to the collective responsibility of all of its members for complying with all the terms of repayment of the credit granted. Upon the return of the signed promissory note or loan agreement BANADESA will have the necessary authorization to effect disbursement from the Fiduciary Fund. (It is intended that BANADESA will act strictly as a disbursing and receiving agent with regard to subloan funds, with no additional intervention other than that of submitting periodic reports regarding the status of Fund and subloan collections).

BANADESA will effect disbursement from the Fiduciary Fund in the form of a check in favor of the community organization, to be cashed at the bank by the duly authorized representative(s) of the community organization. In some cases, it might be feasible for the community organization to open an account at BANADESA, in which case disbursements from the Fiduciary Fund would be credited directly to the account. As will be stated in the Fiduciary Agreement, BANADESA will collect a maximum of 2% of the loan disbursement in advance, for one single time per loan, as payment for services to be rendered.

Disbursement to individual farmers will be made by the Treasurer of the community organization in accordance with the implementation schedules established in the farm plans. Accounting records will be maintained showing the total amount of credits approved, disbursement schedules, total funds disbursed, total funds available for disbursement, repayments made, accrued interest payable, and interest payments received. These accounting records will be set up with the assistance of the WMU accountant, as required.

IV. Procedures for Subgrants

All subgrants disbursed under the Project will be governed by the A.I.D. Standard Provisions for Non-U.S. grantees and Non-U.S. subgrantees, and by the same procedures as for subloans (see Section III) except as modified below.

Grants under the Project will involve (a) the Soil and Water Conservation and Intensive Agricultural Practices Activity and (b) the Community Nurseries Project activity for the Choluteca Watershed Management Component.

The ultimate grant beneficiaries under the Project will be:

a) those farmers residing in the Choluteca Watershed area and having less than 5 ha of land. In this case, the grants will be made through the respective community organizations, in the form of credit notes for the purchase of fertilizer, whose total amount will be determined by the following criteria:

i) 4 bags of fertilizer per ha. for lands with slopes from 0-15% (for an average of 400 meters of conservation treatments per hectare); grants will not exceed $60 per hectare;

ii) 5 bags of fertilizer per hectare for lands with slopes from 15 to 30% (for an average of 500 meters of conservation treatments per hectare); grants will not exceed $80 per hectare;

iii) 8 bags of fertilizer per hectare for lands with slopes from 30 to 50% (for an average of 300 meters of conservation treatments per ha.) wherever live barriers are planted; grants will not exceed $120 per hectare;

iv) 10 bags of fertilizer per hectare for lands with slopes from 30-50% (for an average of 500 meters of conservation treatments per hectare) whenever hillside ditches are constructed; grants will not exceed $150 per hectare.

b) participating community organizations located in the Choluteca Watershed area. In this case, the grants will be made for the purpose of establishing nurseries for the production of seedlings at the community level. The grants will cover the initial basic costs of the nurseries such as planting tables and potting sheds, the initial materials and supplies such as plastic bags, seeds, fertilizers and pesticides and other initial costs of establishment, such as tools, land preparation, rentals and other miscellaneous costs, as approved by the WMU. In addition the grants will provide the necessary funds to cover the cost of the list of basic tools which will be approved by the WMU. Grants for community nurseries will not exceed $2,982 per community; similarly, grants for tools will not exceed $632 per community.

In the case of individual subgrants for the purchase of fertilizer, credit committee approval will be granted to applicants having less than five hectares of land. The measurements of the land will be made by visual observation during field inspections by the WMU, except in borderline cases in which a more accurate survey will be made. An evaluation of the results of applying this criterion i.e. size of farm for grant eligibility, will be made after the first year of the Project, to determine if additional criteria, i.e., level of income, land classification, etc., could be used or justified. The farmers will sign agreements with the community organization, by means of which the farmers will not receive the fertilizer until after the required conservation treatments have been performed. As in the case of subloans, subgrants will be consolidated and forwarded to the Project Office through the WMU. A minimum of 15 participating members will be necessary in order for the consolidated request to be considered. The community

organization will agree in writing to the Project Office that all subgrant funds will be used for their intended purpose. Any funds not used for the specified purposes will be repaid to the Project.

An approval letter will be sent by the Project Office to the community organization, through the WMU, and the community organization will issue notes in favor of individual farmers, who will present them to participating fertilizer dealers in exchange for the pre-determined number of bags of fertilizer. The dealer in turn will present the total number of notes redeemed to BANADESA for reimbursement in cash. For this purpose, a special account will be opened in BANADESA with a rotating fund to cover the cost of these reimbursements.

In the case of grants for establishing community-based nurseries, the community organizations will carry out, with the assistance of the WMU, a study showing the number of trees to be planted by the participating farmers, and based on this information, the costs of establishing the nursery. These costs will be broken down into total number of seedlings required for each type of tree; costs of materials, supplies and tools, and labor costs. An application for grant financing will then be prepared and submitted to the Project Office for approval. A subgrant agreement will be signed by the community organization by which it agrees to (a) sell the seedlings at a price not to exceed $0.115 each; (b) use the proceeds from sales for community activities such as trail improvement and protection, catchment dams, water supply systems, etc.; and (c) follow the technical advice provided by the WMU regarding the species of tree to be planted, and its proper care.

On approval, the Project Office will notify the community organization of approval and issue a check for the amount approved against the special grant account to be opened in BANADESA. The Project Office will make sure that the necessary steps are taken by the community organization for appropriate delivery of the necessary seeds, supplies and materials required by the nursery. Actual setting up of the nurseries will be carried out with the assistance and supervision of the WMU.

V. Monitoring and Control of Subloans and Subgrants

All withdrawals of the loan and grant funds will be carried out in accordance with the current individual farm plan and on the recommendation of the Watershed Management Team.

The community organization will establish a review committee for the purpose of monitoring the end use of funds disbursed, adherence to the approved farm plan, timely payment of loan quotas, progress achieved and problems encountered; and for taking collective action to provide remedial assistance if necessary.

The review committee will be assisted in this task by the paraprofessionals attached to each WMU team. These paraprofessionals, of which at least one will be appointed per community organization, will be campesinos recruited from the local participating communities and trained for these purposes. Their principal function will be to act as a point

of contact and communication between the farmers, the WMU and the community organizations. They will monitor subloan and subgrant financed activities and report back to the community organization or WMU regarding technical, credit and administrative matters.

For those borrowers who do not comply with loan conditions without duly verified and justified cause, or who do not provide the cooperation necessary for the proper execution of the loan-financed activities, pending loan disbursements may be suspended and outstanding amounts of principal and accrued interest may become due and payable.

BANADESA will maintain a Special Register for the loans granted to each participating organization in the program in order to determine, at any time, the total amount of loans granted, their purpose, disbursements made, unused loan commitments, payments and delinquency status. This information will be provided monthly to the Project Office.

The Watershed Management Units will make periodic evaluations in order to determine the status of loan-financed activities and the technical assistance provided, as well as the perspectives for, and constraints against, achieving the objectives of the individual farm plans. Copies of these evaluation reports will be forwarded to the Project Office.

All repayments of principal and interest received will be credited to the Fiduciary Fund, to be used for additional loans under the same terms and conditions as stated herein.

The borrowers will agree to take the steps necessary to ensure that all loan funds received will be invested at a reasonable cost, taking into account such factors as quality, efficiency, etc.

Any aspect of the subloan and subgrant program not covered herein will be resolved by the Project Office, in accordance with the Project Agreement signed between AID and the Government of Honduras.

NATURAL RESOURCE MANAGEMENT PROJECT
AMPLIFIED PROJECT BACKGROUND AND DESCRIPTION

PROJECT BACKGROUND

I. Nature of the Watershed and Forestry Problem in Honduras

A. Introduction

a. The Forest Resource: Honduras has a total area of 112,088 km2 or 11,208,800 hectares. About 17% of the land is in valleys and plains. The remainder is mostly mountainous with slopes commonly ranging from 20% to 60% grade. Because of the soil and climatic conditions, the dominant natural vegetation is forest. Approximately 83% of the total land area (9,303,304 Ha) is considered best suited for forest or grazing. Probably less than 70% is presently in forest. An estimated 60% of the forested area is predominantly tropical broadleaf species and 40% is in pine.

b. Forestry Production Base - The value of exports of wood and wood products from Honduras is exceeded only by the value of exports of bananas and coffee. Forestry exports have expanded rapidly in response to increasing CACM and world demand since 1966 when the reported value totalled over $10.5 million. By 1977, according to the Corporacion Hondurena de Desarrollo Forestal (COHDEFOR), the export value exceeded $47 million. The 1976 export production was 234 million board feet and production for domestic use, including lumber, plywood and firewood was estimated at over 47 million board feet. This figure does not include firewood and fence posts used by rural dwellers.

c. Institutional Framework - Sweeping changes in public policy for the forestry based sector were initiated in early 1974. On January 10 through Decree No. 103, the GOH created the Corporacion Hondurena de Desarrollo Forestal (COHDEFOR), a semi-autonomous institution. The decree stipulates that the C rporation shall be governed by a Board of Directors headed by the Chief of State.

The Corporation has control of all forests, public and private. Its mandate is to utilize, protect and conserve the nation's forests, to reforest denuded areas, and to establish sound systems of organization. It has the authority to utilize all forestry resources under any system it elects and can determine when the forest can be exploited. There is an obligation to pay private owners for their timber at a price fixed by the Corporation. Currently this is 40% of the value of the product for the owner and 60% for the Corporation. Industrialization or harvesting and manufacture of forest products by the Corporation may be through joint ventures, contracts with private sector or may be Corporation operated. All exporting and domestic wholesaling of primary wood products will be done by the Corporation.

The Corporation is obligated to operate a Social Forestry System for the large number of families that subsist in the nation's forested areas. It has the authority to determine, with the collaboration of the National Agrarian Institute, the extent and location of lands in forested zones suitable for agriculture and livestock. Article 3 of the Decree directs the Corporation to execute alone or with other agencies, works that are vital for the protection of watersheds.

The broad powers COHDEFOR exercises over the nation's extensive forested area leave many unresolved problems between the Corporation and the rest of the agricultural sector. For example: management of the river basin systems; criteria for determining forest lands, grazing lands and agricultural lands; management of fish and wildlife in national forests and access; plus exploitation of mineral resources.

Lack of trained manpower is a serious constraint facing COHDEFOR in its attempt to manage and develop Honduras' forest resources. COHDEFOR sponsors the National School of Forest Sciences (ESNACIFOR) at Siguatepeque. New facilities are being added to raise the school's capacity to 132 students with 45 to be graduated annually. The National University also trains B.S. level foresters. The real problem seems to be the lack of middle level managers.

The Corporation is under considerable pressure to maximize earnings from the resource base with the manpower available. The forest resource problem ranges from having to harvest scattered pines in large areas so regeneration can take place to not knowing quite how to most profitably handle the hardwoods. The forest industrial complex now envisioned will require large volumes of timber on a sustained basis.

It is becoming imperative in Honduras to formulate and implement a clear cut strategy for the preservation and management of watersheds, particularly of those with the most "utilization-pressure": Choluteca, Chamelecon and Ulua. In general, it can be said that the issue of natural resources conservation is intimately associated with preserving or restoring forest cover particularly in the watersheds. The amount of forest cover is clearly tied with the degrees of soil erosion, with the hydrographic balance of watersheds, with the preservation of the ecosystem and wildlife habitat as well as with the issue of adequate land utilization.

In summary, the three most important watersheds in the country, which represent a potential soil reservoir for capturing and distributing the flow of the seasonal rainfall and providing water supply are becoming increasingly impacted by human settlement. Watershed depletion and the appropriate utilization of land within the watersheds is a serious socio-economic problem with far reaching implications for the future development of Honduras.

B. The Basic Causes of Deforestation

Currently the three principal causes for forest depletion are extraction of firewood, increasing slash and burn agriculture resulting from increasing land pressure, and ground fires on harvested areas converted to cattle grazing. Previous to the imposition of control of production by COHDEFOR, wood extraction operations for foreign multi-national firms created some of the problems now faced by Honduras. Extraction of high grades, overharvesting and poor conservation practices in areas close to major infrastructure led to current problems of relatively poor second growth forests, soil erosion, substantial increased use of harvested areas by cattle operations, etc. The effect on new growth, either by natural regeneration or by replanting, of the loss of nutrients, ground cover, moisture, etc. cannot be calculated.

Calculation of the percent that each of the causes contributes to deforestation for the country is illustrated by the following estimates from the Comayagua Plan (an integrated forestry development plan which covers 1/4 of the pine reserve in the center of the country):

Total area of the Plan:	1,268,600 a
Total area with pines:	700,000 a
Total pine reserve.....	30,000,000 m3
Commercial wood extraction (per year): (See Note)	270,000 m3
Firewood extraction (per year):	300,000 m3
Loss to fires (per year):.....	100,000 m3

Recent estimates indicate that fire control programs of COHDEFOR may have reduced loss to fires of pine forested areas from 1,000,000 hectares in 1974 to 60,000 ha in 1978. However, in April of 1980, the adequacy of the fire control system was put in doubt when ground fires burned througout the country and a pall of smoke covered 3/4 of Honduras into early May. Final data is not yet in, but some estimate that as high as 75% of the pine forest was burned.

Current commercial wood extraction practices by national companies are considered by COHDEFOR to be acceptable and to have little negative impact on future forest development. However, because of the lack of a definite, country wide data base regarding the forest inventory, this judgement may be premature.

NOTE: Caution must be exercised in attributing deforestation to commercial wood extraction since with the proper management and conservation practices, which are now generally required to be employed, the forest resource base can be improved over time.

Firewood extraction is probably the most significant in terms of loss of current stands and with current population growth of possibly 3.5% and limited access to alternative energy sources, it is likely to represent a major challenge for the GOH in the near future. The effect of firewood extraction, though nominally under control of CORDEFOR, is classic in that most hills around urban and village areas are denuded and firewood gathering extends more and more into the rural forest.

Although firewood collection is presumed to include primarily deadwood, timber cuttings and branchwood, a common sight in many parts of the country is firewood cut up from 6" - 8" diameter trees.

Consumption of the firewood for domestic use is estimated in FAO Project Hon/77/006, January 1979, as high as 1.0 m3 per person per year. According to this source, the annual firewood consumption per family equals approximately the volume produced in natural pine forest per ha/year. At the national level, about 380,000 families use firewood as fuel. Assuming 5.7 persons per family and an average consumption of 1.0 m3 per person/year, the annual consumption is estimated at 2.2 million m3 per year. Assuming again that domestic use of firewood represents about 50% of total firewood consumption, the estimated total annual consumption would be of the order of 4.4 million m3.

One characteristic feature of the Honduran agricultural economy is that all of the readily accessible productive valleys in the country are already occupied. The alternative for the bulk of the landless poor and the minifundistas is to continue their migratory trend up into the hills and mountains. This movement is accelerated by the opening of new roads, as can be seen in the Olancho forest reserve area. Forested slopes are cleared for shifting cultivation and extensive grazing. Networks for trails are carved out with no regard for the erosion hazard they create. Fires are allowed to escape from their fields and burn without control. Forest stands are cut indiscriminately for fuelwood.

Honduran forests, vital to the national economy and ecology, are being depleted at an alarming rate. Recent studies made by the National Planning Council (CONSUPLANE), indicate that the forest ecosystems are being depleted at a rate of 30,000 hectares per year, equivalent to 3.1 million cubic meters. Beginning in 1980, with the incorporation of exploitation of the Olancho forest reserve for lumber and pulp, this rate of depletion will double, increasing wood exports but with the consequent deterioration of the soils and of the water supply. At these rates, the exhaustion of the pine forests in the country, which are economically productive, could occur within a period of 20 years.

In the three most important watersheds but particularly in the Choluteca watershed, excessive clearing of forests not only for forest exploitation itself (timber production), but for agriculture and livestock has caused a severe firewood shortage. Available firewood

resources are now more than a day's walking distance from many villages and people are increasingly substituting kerosene for firewood or illegally cutting firewood.

In addition to firewood cutting, other practices and customs aggravate the problems of Honduras watersheds and rivers, particularly those related to shifting cultivation, subsistence cultivation on steep slopes, indiscriminate burning, haphazard road and trail construction, timber cutting and overgrazing. The clearest consequences of these practices are accelerated erosion, increased flooding and siltation of valleys with damage to fields, irrigation works, reservoirs and settlements, attended by environmental degradation and further impoverishment of the peasants themselves. These practices will continue unless alternatives are found. If the population doubles over the next 20 years, as predicted, and if alternatives are not found, the degradation of the country's already depleted watersheds will become irreversible.

In Honduras, the process of deforestation has a very clearly defined cycle: recently cleared areas generally are first planted with annual crops but are rapidly converted to pastures or, in some cases, to perennial crops. The worst land passes from annual crops to secondary forest or from annual crops to pastures or secondary forest. Wherever land is cleared by speculators or absentee landowners, the forest passes directly to pasture.

It is important to note that the cattle grower benefit from this type of migratory agriculture. The coffee grower, the citrus grower and even the corn grower, has to sell his piece of land because it has been losing its value due to soil loss and its attendant loss of natural fertility.

When the peasant leaves the cleared land to the cattle grower, what he leaves is precisely the value of clearing the land. This activity, in portions of dense tropical forests and sloped lands, has a market value estimated in $150/ha. in Honduras. This explains the great destructive activity of slash and burn by the migratory agriculturalist, since this subsidizes the clearing necessary for the expansion of coffee and corn plantations, or pasture land for cattle growing in sloping lands clearly of forest vocation.

From an ecologic standpoint, it is not appropriate to substitute the original forest vegetation with pastures. The original forest reaches 30-40 m in height and also has very extensive and deep root system, which can reach up to 500 cm in depth. Pasture on the other hand, or corn crops only reach about 30 cm in root depth.

Even though adequate statistical information is not available regarding the extent to which land deforestation has proceeded in the different regions of the country, some global information on this matter

allows some inferences on the subject. Table 1, for example, compares the basic data available in two different periods -- separated by a five-year span -- on the actual land use and availability for the country as a whole. It can be seen that the extent of land considered "eroded" has increased alarmingly by an estimated 91.0%; an increase of more than 362,200 Ha of eroded land. The estimation in the reduction of the pine forest areas, of only 1.4% seems extremely low in view of the extent of deforestation which has been going on in the country, within the last twenty years. On the other hand, it can be noted that during the five-year period under consideration there has been an increase of about 314,000 Ha of cultivated pastures (an increase of 42.7%), concomitant with a reduction of the area under natural pastures of about 160,000 hectares (a reduction of about 35.5%). This phenomenon has been associated with a slower increase in the extent of land devoted to crops, which has only increased by 85,000 hectares (an increase of 13.4%).

Other more recent estimations indicate that 17% of the total available land is located in the valleys, while the largest proportion of the remaining land is in the mountain areas, where the slopes of hillsides go from 20% to 60%. It is precisely in these areas where most of the 2.7 million ha.of pine are located. It is also estimated that of the 7.4 million Ha of forest and non-utilized land, about 2.2 million hectares are already deforested. The information available on this subject, however, does not allow for estimating of the proportion of land use changes which follow this kind of cycle.

In summary, the forests should cover 9.5 million ha of Honduras but over 2.2 million ha are deforested. Although close control of forest industry is exercised by the National Forestry Corporation (COHOEFOR), for many decades foreign logging companies abused the forests by highgrading and other exploitive techniques. Slash and burn agriculture has moved rapidly into previously untouched forest lands. Until recently uncontrolled forest fires, many caused by campesinos burning their milpa patch, annually burned over 1/3 of the forested areas thereby effectively preventing natural regeneration of the pine forests. Hundreds of thousands of hectares of land that should be producing pine trees stand unproductive.

The combination of the misuse of the forest lands and movement of campesinos and cattle into the hillsides has led to severe erosion and loss of water holding capacity in many of the major watersheds in Honduras.

TABLE 1

HONDURAS: ACTUAL LAND USE AND AVAILABILITY
(Period 1970/72, 1975/77)
(Thousands of Hectares and Percentages)

	1975/1977		Differences 1970/1972 1970/72 - 1975/77		
	Hectares	Percent	Hectares	Percent	Hectares
A. Forest Areas and Non-Utilized Land	6,544.9	56.91	7,380.0		
1. Tropical Hardwoods	3,408.3	29.64	3,920.0		
2. Eroded Lands and Other	397.8	3.46	760.0		
3. Pine Forest Areas	2,738.8	23.82	2,700.0		
B. Agricultural Land	3,869.0	33.64	2,800.0		
1. Cultivated Land	1,370.5	11.92	1,769.1		
a. Crops	634.8	5.52	719.6		
b. Cultivated Pastures	735.7	6.40	1,049.5		
2. Non-cultivated Land	2,498.5	21.73	1,030.9		
a. Potentially available	1,824.5	15.87	741.0		
b. Natural Pastures	449.6	3.91	289.9		
c. Fallow Land	224.4	1.95	-		
C. Urban Areas, Mangroves and Swamp Areas	1,086.1	9.44	1,028.8		
D. Total Geographic Area 1/	11,500.0	100.0%	11,208.8		

1/ The total area was officially modified after 1972.

SOURCE: CONSUPLANE. Plan Nacional Agropecuario 1979/83, page 2.

The three major watersheds which are in advanced stages of deterioration as cited in the National Development Plan are the Chamelecon in the west and north, the Ulua in the north and the Choluteca in the central and south regions.

Although there are many laws which deal with utilization of the natural resource base; land, water, and forests, until recently little attention has been paid to the management and protection of those renewable resources.

The existence of land use policies in the forestry and agrarian reform laws for some years has not led to effective land use classification regulations nor to appropriate policies and programs. There has been no effective forum in the GOH to establish and manage renewable natural resource policies; to bring together the various agencies involved and review current and future programs and projects for their natural resource/environmental and land use impact. The current use of the natural resources in Honduras puts a premium on short term aims at the expense of loss of the renewable natural resources e.g. the location of agrarian reform farm groups on erodable hillsides, the establishment of excess sawmill capacity in some forest areas and unrestricted cattle grazing on hillsides and in forests.

Although the GOH has a series of institutions involved in soil, water, climate, forest and land use data collection and analysis they lack full cabability and interchange of data to provide the basis for effective management of Honduras' natural resources. The National Cadaster Program (PCN), assisted by an AID loan has developed delineation, soils, land use, hydrology and climate data for the valleys and settled areas in over one half of Honduras. Except for forest inventories little data collection has been done in the forest areas.

To reduce and hopefully in time to reverse the loss of soils, water and forests which is occurring at a rapid rate appropriate policies and programs for rational use of the land and the renewable natural resources are needed.

The GOH must develop the capacity and the mechanisms to establish policies for classification and use of land as between forests and agriculture; for management and protection of the agricultural and forests lands, soils and water. GOH capacity must be strengthened to design and implement new or expanded programs which are needed to deal with the two most pressing natural resource problems, degradation of the watersheds and loss of forests.

C. The Consequences of Deforestation

At present, two thirds of the population of Honduras is rural. Over the next twenty years, if current population growth rates continue, this

population will double. Consequently, invasion of watersheds and forest lands is likely to proceed at an accelerating pace with negative environmental implications.

Mostly due to the population pressure in the Choluteca and Chamelecon watersheds -- and to a lesser extent in the Ulua watershed -- the wooded hillsides of thirty years ago have been denuded, the thin soil cover has been washed away; and the rural poor residents of those hillsides have lost what little natural resources they had had to eke out a living in large portions of the watershed. In this process, the Southern regions of Honduras (Southern and Central-Oriental, as well as the Occidental regions) have suffered the most. These areas, being drier and more accessible than the lands closer to the Atlantic in the northern part of Honduras, were the first to be deforested. These two areas (Choluteca and Chamelecon watersheds), which still produce important quantities of corn and beans, have been gradually transformed to extensive dairy and beef cattle grazing land as a result of the rapid decline of soil fertility which follows several years of annual cropping.

In direct correlation with the establishment of more cattle-growing farms in the hillsides, unemployment tends to increase relative to alternative crops that could be grown in those areas. Wherever extensive areas of land are converted into pasture, therefore, it aggravates unemployment for thousands of rural families which have to look elsewhere for sources of income if they are not clearing additional lands in the mountains in order to eke out a subsistence level of living.

Despite the fact that water is one of Honduras' most abundant resources, it has been inadequately exploited. Traditionally, agriculture has developed in those areas where soils and rainfall have been favorable enough to permit the semi-subsistence farmer majority to meet their needs and those of the relatively small farm sector. As the population has increased, however, these lands are not adequate, given current production and terrain patterns, to support more farmers, pressuring increasing numbers to move back into the hills where soils are shallow, highly erodible and less fertile and into areas where rainfall is inadequate for reliable production of traditional food crops. The Government's effort to encourage a more intensive production in the alluvial valleys (such as the Aguan Valley) have not kept pace with the problem. Only about 35,000 families have benefitted from the Agrarian Reform Program. Moreover, only about ten thousand hectares have been brought under irrigation for small farmer beneficiaries, but of this only a third receives adequate irrigation due in large measure to inadequate system design and management.

The problems and consequences derived from deforestation can be corrected in the Pacific area, particularly in the Choluteca Watershed, and can be averted in the Atlantic basin. A concerted effort will be required in Honduras just to maintain the watersheds in their present condition. A much greater effort will be necessary if their condition is to be improved. The improvements as well as the effort to avert further deterioration of watersheds can pay large benefits to Honduras. The

alternatives in terms of the environment, natural resources conservation and the well-being of hillside dwellers are bleak. A greater understanding of water and soil relationships and their relation to the environment, as well as a sustained and coordinated effort of national agencies concerned with land use and conservation is undoubtedly needed.

To attack the problem, the degraded and deteriorating areas of the Choluteca watershed -- and also of the Chamelecon and Ulua watersheds -- must be made more productive through reforestation; improved pasture management; more soil conserving and productive agricultural practices; soil conservation measures; and various mixture of trees, annual crops and pastures. The policies and laws impinging upon rights of land ownership, and influencing land, water and forest use must be analyzed and some of them changed, so as to promote, rather than inhibit, the wise use of the nation's renewable natural resources.

II. Project Developmemt

The original PID for this project, included in the FY1978 ABS, stressed the need for feasibility studies and recommended a number of pilot water projects. The design was altered shortly thereafter to include an essential human resource development element, information gathering and institutional strengthening. Design of the more comprehensive effort, started in July 1978, was being directed to the land use policy question. An "Aide Memoire" outlined the mission's concerns and urged action.

GOH progress on this matter has been slow but consistent. An interagency working group was established under the auspices of the ministerial level Agricultural Policy Commission (CPA).

A second PID was signed in September 8, 1979 and approved by the DAEC on September 18, 1978. This PID formed the basis for the development of this project as it is now written. Several areas identified in the PID have been substantially revised or dropped out all together during the intensive project development work. In January 1980, a review by the mission, based on early design work on the project, resulted in the following decisions:

1. Since it was concluded that there is sufficient experience and manpower of requisite quality in Honduras to carry out a watershed project of large dimension and since the pace of deterioration of the Choluteca watershed had increased substantially in the last five years it has been decided to undertake a rapid action program to avoid a potential desertification of that watershed;

2. The Project will be more centrally focussed on stabilizing and improving the condition of the target farmers (who were contributing most to the deterioration and therefore most in jeopardy of losing their soil base) through an integrated team approach, bringing to bear an array of technologies which are appropriate to both the physical and economic resources of the farm family;

3. Reforestation no longer will be a major activity but one of the important tools to meet the Project goals. (A separate Project concerned with forestry matters is being prepared fy FY 1981);

4. Trail protection was eliminated in order to concentrate resources on farming practices which are the major contributer to erosion. Protection of the trails cannot be accomplished unless the surrounding farm lands are stabilized since they are a source of substantial sheet wash water, carrying heavy sediment loads on to the trails. (The Project still contemplates self-help community action for trail improvement and a separated Project obligated on March 31, 1980 will address environment concerns connected with the improvement of rural roads and trails).

5. The Project no longer contains special mini-irrigation and soil conservation teams to be established in each of the seven agricultural regions. Rather improved management of water and soils is built into the Project as two technologies which are applied in improving the total farm operation. The Watershed Management teams as now contemplated will include both irrigation and soil conservationists but will operate only in the Choluteca Watershed under this Project.

E. GOH Strategy and Commitment

Public sector efforts to date have placed more emphasis on environmental exploitation than on environmental protection. There is little long-term planning for exploitation, development, conservation of the nation's natural resources, especially water and related land resources. Responsibilities for the development and conservation of natural resources are split principally among the Ministry of Natural Resources, (MNR) the Agrarian Reform Institute (INA) and the Forestry Development Corporation (COHDEFOR).Their activities frequently work at cross-purposes. Much planning is project-oriented with little conception of the interaction of component pieces to advance the net development effect. Moreover, little attention is being given to the uninterrupted consequences of the activities of campesinos living in the nation's watershed areas, composing some two-thirds of Honduras' land mass.

Although some standards for land use in watersheds have been attempted, no standards can now be enforced because there is neither the data nor the analytic capability to apply the standards to specific parcels of land nor a Honduran agency responsible and with the authority to enforce compliance with the standards.

The forests and watersheds also suffer from competing interests of Honduran agencies. The National Agrarian Institute (INA), for example, has established settlements within forested lands where COHDEFOR believes the settlements are inappropriate and harmful. There is no national land use plan or agency which can arbitrate between the competing interests and agencies.

The Government of Honduras, through the Agricultural Policy Commission (CPA) is now well aware that the management of the country's water and land resources is an area of concern which warrants increased attention as the demand for increased food production grow more acute and as the country's forested areas give way to denuded slopes forced by population pressure on the land.

The CPA has taken the first steps to formulate a land use policy and to expand its role to perform national land use planning/zoning. A proposed National Program for Environmental Protection and Improvement has been drafted by the Superior Economic Planning Council (CONSUPLANE) for inclusion into the five year (1979-1983) National Development Plan.

The Ministry of Natural Resources in its proposed Water Law (Ante-Proyecto de Ley General de Aguas, July 1978), proposes the creation of a National Water Council as a technical entity to set national policy for multi-purpose utilization and rational administration of water resources. Both the Water Law and the National Environmental Plan delineate specific "Protected Zones" where the exploitation of water and forest resources will be subject to authorization by appropriate entities.

The National Cadaster which is performing a national inventory of land (mapping and determining ownership or tenancy) and natural resources will be designated the agency to obtain the basic data either from other agencies or directly, and to determine potential land use. The National Cadaster has collected information on water, soils, climatology, vegetation and tenancy, as well as potential land use and is entering the information into a computerized data bank. The potential land use classification data now being collected by Cadaster has been for value assessment of agricultural land for tax purposes. Thus the priority areas of the Cadaster effort are the alluvial valleys. With the mandate to be established under the proposed Project the Cadaster will increase its level of effort to the watersheds and forested areas. The GOH has indicated high priority for the Project by a continuing series of oral and written requests.

Many other GOH agencies have begun programs for natural resources conservation. COHDEFOR has implemented a "social forestry program" presently employing about 5,000 families in the forest system without destroying basic forest productivity. COHDEFOR also maintains programs in reforestation and fire control and has initiated its first experimental watershed project. There is not at present a watershed management program as such. However, as a consequence of the 1974 floods COHDEFOR created in 1976 a specialized unit on watershed management. CONSUPLANE has within its organizational structure, a Water Resources and Environmental Unit. The National School of Forestry Science (ESNACIFOR) is planning to initiate a program for the training of watershed management technicians in addition to its program for forest technicians. The General Directorate of Renewable Natural Resources (DIGERENARE) currently has under consideration 15 wildland areas that would be designated principally for preservation of tropical wildlife and environments.

In addition, a number of ongoing and proposed programs by GOH and international donor agencies provide valuable experience and insights into natural resources management. For example, knowledge gained from a FAO watershed program UNDP/FAO-007 in the North Coast and Lake Yojoa will be drawn upon.

Additionally, the MNR will provide valuable input from a modest, ongoing small farm soil conservation program in effect on one of the watersheds. COHDEFOR as a recipient agency for a variety of T.A. provides a forum for the exchange of experience and knowledge with other donors. Programs such as the ongoing Canadian International Development Agency's activity in Forest Fire Protection and Hardwood Forest Protection in Olancho and Colon; the incipient IDB reforestation program in Comayagua and the present project will be mutually supportive.

Thus it can be seen that an awareness is growing within the GOH that it cannot afford to delay in assuming control over the country's natural resources. It is appropriate, at this time, to lend assistance to the Government's planning and implementing entities to further develop plans and capacity for the development and conservation of natural resources. The political will exists to work toward this objective at all levels of Government.

Since September 1979, the GOH has been considering how it will deal with its problems in natural resources management and environment. It has decided to expand the mandate of the Agricultural Policy Commission1/ to include natural resource management and to include the General Manager of COHDEFOR as a member. It also decided to directly manage the Natural Resources Management Project as a major vehicle for improving the government's ability to control its important and most critical renewable resources.

III. AID's Strategy and Relationship to other A.I.D. Projects

AID's overall strategy, as articulated in the FY1982-86 CDSS, is to "help Honduras sustain a high rate of economic growth with justice and greater equity in order to support the transition to and consolidation of constitutional government and to help this second poorest country in Latin American catch up with the rest of Central America so that the countries of the region can advance and work together better".

One of the main development problem facing Honduras, where agriculture is the mainstay of the economy is how to make the agriculture sector more productive and to get rural incomes for the vast majority of the rural population up over the poverty line. AID principal objectives in agriculture, as stated in the CDSS, involve assisting the GOH to:

--improve its capacity to deliver goods and services which enhance income and employment opportunities,
--develop information, inputs and more appropriate technology in a form and content which can bring about relative increases in income and employment,
--improve its capacity to identify policy alternatives and to determine the likely costs and benefits of specific decisions,
--increase access to productive land by the landless poor and provide them with essential support services, and
--expand non-farm employment opportunities, principally for landless laborers and subsistence farmers.

A major component of AID's country strategy is to improve the efficient use of productive resources of the rural poor, primarily land and labor, with the objective of increasing income and employment. A complement to this strategy is to encourage the optimal use of natural resources so as to enhance their productive life while contributing both to national productivity and to improved life-support systems for the rural poor.

This project will support AID objectives in agriculture and will complement a number of ongoing bilateral efforts. The major AID programs which will be bolstered by this new project initiative include:

a. Agriculture Sector II Program (522-0150): The Ag Sector II program is the centerpiece of the AID agriculture strategy. Drawing from an indepth sector analysis, this sector program, which is now in the early implementation stages, will provide assistance in three critical areas: (1) Human Resources Development (2) Institutional Development and (3) Delivery of Services and Related Inputs. Within these three areas, thirteen individual activities will be financed. These include: participant training, development of the Atlantic Coast Regional University (CURLA), in service training, strengthening of the planning capabilities, development of an information system, marketing research and analysis of extension improvement, formation of cooperatives, assistance to National Agricultural Development Bank, zonal infrastructure, etc.

This project will complement the Ag Sector II program. For example, the Natural Resources Project will employ some of the experts trained under this program although most of the people trained in the U.S. are going into already identified positions; will supplement and strengthen the data capabilities of the Ministry; and will use the services of the National Ag. Bank. Equally the lessons learned under this Natural Resources project and the interdisciplinary approach being taken are expected to result in curriculum changes and increased interest in and attention to natural resources/watershed management issues at CURLA, the development of effective technical and organizational approaches within the GOH to generate agricultural development, increased quantity and quality of natural resources data for use in planning infrastructure and other activities and improved planning capabilities.

b. National Cadaster Program (522-034): Under this project authorized in 1974, A.I.D. was to assist in the establishment of (1) an efficient system of land titling, (2) a nationally administered property tax system and, (3) an inventory of agricultural resources. The Cadaster program's natural resource data gathering, analysis, and dissemination capability will be strengthened and expanded. For example, at present soils work is fragmented through a variety of private and public agencies and the quality and quantity of work is substandard. With assistance from this project, PCN should be able to respond to a wider variety of needs -- thus accelerating the programs of both the host government and other donors. The soils data produced will be essential in determining potential land use treament packages, etc. Data and maps produced under project 522-0111 are presently being used to define project areas and for the planning of specific project activities. By strengthening the PCN's planning and forest delineation efforts, data will be available to all organizations planning natural resource projects.

c. Other Projects:

i Rural Technologies (522-0157): The recently initiated Rural Technologies Project is designed to foster the development, adaptation and widespread dissemination of inexpensive, capital saving technologies to increase output and reduce drudgery on small farms and to increase small scale rural industrialization. These technologies may have application to the Natural Resource Management Project which will involve changing deleterious hillside farming practices within the watertshed as well as technologies for the utilization and commercialization for fuelwood and lumber trees.

ii Small Farmers Technologies(522-0123): This project is to increase the productivity of the farm families participating in

the project by providing the participants with a wider choice of farm technology to operate their farm businesses. Experience gained under this project in the preparation handling and financing of farm plans is expected to be relevant to the Natural Resources Mangement effort.

In summary, because the project expects to increase income and production within a framework of improved land use and more environmentally sound practices, the effort of the project will extend beyond agriculture and into improved health and education.

In FY 1981, a Forest Resource Development project, will be developed. The forestry element is not being included in the Natural Resources Management project for the administrative reasons given below. In terms of natural resources and land use policy and planning, forestry issues are an essential concern in the Natural Resources Management Project. Simply, land use policy decisions can not exclude forest lands or forest utilization. The administrative reasons which have lead the mission to decide to develop the forest project separately are as follows:

i The Natural Resources Management project already involves a considerable number of institutions and agencies. The addition of a forestry element would add heavily to the management and implementation workload.

ii The Natural Resources Management Project is directed to the delivery of an interdisiplinary set of skills and techniques designed to increase farmers' income within a framework of more rational resource use. The forestry element would most likely have a different focus.

iii A.I.D. lacks in-depth knowledge about forestry and COHDEFOR. The wide range of organizations and donors working with COHDEFOR will require a thorough assessment/analysis if overlap is to be avoided and our support is to be well placed. This calls for a careful approach to the forestry problem.

IV. Other Donor Activities

A number of bilateral and multilateral organizations are supporting government efforts to develop an improved natural resource management capability. Of particular importance are the following programs:

1. United Nations

a) Forestry Classification and Production and Development of Primary Industry (UN $1.2 mil/GOH 6.1 mil): This integrated project with COHDEFOR has both intermediate and long term objectives which include: forestry classification, rural development, conservation, development of forest industries and natural resource and forestry training.

b) Watershed Classification and Planning (UN $.7 mil/GOH .7 mil): Components include: The development of watershed management plans the Yojoa and Rio Aguan areas and the strengthening and expansion of COHDEFOR technical capabilities through training and the sponsorship of special studies.

c) Agricultural Extension Training (U.N. $0.6 mil/GOH $0.4 mil): This project focuses upon improved agricultural production, increased local income and improvement in the standard of living of the affected population. Immediate goals are to establish a well-organized agricultural extension service and to train agricultural extension agents and campesino promotors.

d) Watershed Management (UN $.7 mil/GOH .7 mil): Objective is to promote more rational land use in areas having an essentially forestry vocation. Project components include: the strengthening of the planning and management capacity of the watershed management unit of COHDEFOR; the initiation of integrated watershed management activities in the Yojoa Lake area; and the training of personnel. This is a follow-on to an earlier project entitled: "Planning and Execution of Measures for the Rehabilitation of the Watersheds Affected by Hurricane Fifi".

e) Regional Forestry Training (UN $.3 mil/GOH $.3 mil): This regional project (Dominican Republic, Panama and Honduras) provides training to the National School of Forestry Sciences (ESNACIFOR) personnel in silviculture, forest and watershed classification and conservation.

2. Canadian International Development Agency (CIDA

a) Forest Inventory (CIDA $2.0 mil/GOH $.8 mil): To assist COHDEFOR in obtaining data necessary for the classification of the forest cover in the departments of Comayagua, Yoro and Francisco Morazan and the development of plans for the rational use of the forest resources in the Meseta Central region.

b) Institutional Support to COHDEFOR (CIDA $2.9 mil loan/GOH $.6 mil): To provide institutional assistance particularly in the areas of evaluation and coordination. Assistance includes T.A. and training.

c) Integrated Development in the Valley of Guayape (CIDA $6.1 mil/GOH $2.2 mil) a broad range program to increase agriculture production. Includes conservation, improved water management and improved agricultural inputs.

d) Forest Protection and Conservation (CIDA $1.2 mil/GOH $.3 mil): Project will: improve COHDEFOR's firefighting methods, train fire fighting personnel and will educate the rural populace in the importance of forestry protection. Project is principally directed to the development of an adequate forestry protection system for the Department of Olancho.

3. World Bank

a) Second Agricultural Credit Project (WB $25.0 mil/GOH $13.5 mil): This project will assist national programs of agricultural development and agrarian reform by expanding the area under food crop production; increasing livestock production; improving the contribution of the agricultural sector to export earnings and import substitution; increasing employment opportunities and improving family incomes; supporting selected institutions for further planning and development of the agricultural sector; and conservation of natural resources. Major project components include a nationwide agricultural credit program; a pilot forestry program; studies of groundwater resources; and training for the staffs of COHBANA, COHDEFOR and the Planning Unit (MNR).

4. Interamerican Development Bank (IDB)

a) Olancho Forest Industry Development (Venezuelan Trust Fund $25.0 mil-1977; IDB $59.5 mil-1976): The 1976 IDB loan will help finance the first stage of the Olancho project consisting of some 156 miles of roads to connect the port of Castilla on the north coast with sawmills and a pulp and paper plant. The Venezuelan Trust Fund (VFF) loan will capitalize the Corporacion Forestal Industrial de Olancho (CORFINO). CORFINO is a $500 million Honduran Forestry development enterprise to develp the vast forestry reserve of Olancho.

b) Miscellaneous: Other projects include general T.A. to the MNR and COHDEFOR in natural resource administration and planning.

5. United Kingdom

a) National School of Forestry Sciences/ESNACIFOR (Total financing not known): Technical assistance in collection of seeds, prevention of forest fires, and reforestation. Four experts are financed.

b) Seed Bank at National School of Forestry Sciences (ESNACIFOR) - (Total financing not known): The establishment of a center for the collection and treatment of seeds - pine, etc.

c) Miscellaneous: Includes soil studies in Talanga Valley, technical assistance to the MNR in (Horticulture), etc.

6. Others

Other bilateral and multilateral donors active in natural resource management related areas include:

a) European Common Market (ECC $3.2 mil loan/GOH $6.0 mil): Assists the MNR in such diverse activities as agriculture education, production and sale of seeds and management and conservation of soils. Loan was signed in 1971 but program is continuing.

b) Japan: The provision of volunteers who are assisting with reforestation efforts - particularly in Mosquitia.

c) Organization of American States: Tehnical assistance to CONSUPLANE in agriculture and natural resource planning.

d) World Meteorological Organization: Provision of meteorological equipment.

e) Miscellaneous: France, Spain, Republic of Germany and Finland.

Projects of other donors under consideration or in implementation include: a forestry inventory of the districts of El Paraiso and Olancho (Japan); a Forest Development Program which includes the rehabilitation of forest cover and the establishment of related wood industries in the zone of Comayagua (Spain); and technical assistance and training assistance to COHDEFOR and ESNACIFOR (Finland and Germany).

While there are some similarities between the proposed AID projects and several of the projects of other donors described above, it should be emphasized that (a) these projects are operating in different geographic and topographical areas and (b) these other projects do not offer a similar broad range of specific watershed treatments which will be delivered in an integrated manner as the project being proposed by AID.

V. Project Description

A. Project Strategy

The project has three components: policy and planning including natural resource management and land use classification, natural resource data and analysis improvement and; the largest element is the design and implementation of the rehabilitation of the Choluteca watershed.

The Choluteca watershed, one of the most critically deteriorated in Honduras as designated in the NationaL Development Plan was selected on the basis of the number of target group farmers included in the watershed area, 20,000; a substantial level of watershed deterioration; the variety of ecological zones included and; the potential to yield results and knowledge which is applicable to other watersheds and climatic conditions in Honduras.

The strategy to achieve the project's goals and purposes is:

First: The capacity of the GOH will be augmented to develop, design and implement appropriate natural resource/land use policies and programs through an improved institutional structure, an expansion of professional and sub-professional staff, and mechanisms for review and evaluation of natural resource management.

Second: P licy guidelines will be established by the Comisión de Politica Agricola regarding the development and management of watershed, land and forest resources, which will be adhered to by the Ministry of Natural Resources (MNR), the National Agrarian Institute (INA), the Honduran Forestry Development Corporation (COHDEFOR) and other public sector entities in developing programs involving these resources.

The Choluteca Watershed Management Project Organization will have developed and implemented a comprehensive Watershed Management Plan, including: 1) a Reforestation Plan, for the selected areas within the Choluteca Watershed; 2) a pasture and cattle management program; 3) a crop improvement program for the farms.

The third element is to start activities to improve a watershed in order to give practical expression to the overall policy, to test approaches before moving to a full national effort and to achieve practical impact on the watershed problem in the near future. The watershed management component will focus on activities to reduce slash and burn hillside farming practices, encourage conservation and introduce improved utilization of existing land and water resources. This element will support increased income for the small farmer within a framework of improved environmental protection and conservation, since without increases in income the farmer is not likely to continue the new practices. The Choluteca Watershed, one of the most critically deteriorated in Honduras was selected as the focus of this work on the basis of: the number of target group farmers included in the watershed area, 20,000; the level of its deterioration; the variety of ecological zones it includes; and the utility of the results and experience for other watersheds in Honduras.

The project's strategy, therefore, is to provide the appropriate public sector institutions with the necessary data and manpower base to rationally plan and execute watershed and land use programs benefiting low income rural based families while safeguarding natural resources essential to sustaining the long term growth and development of the agricultural sector. Moreover, the improved data/human resource base is an imperative prerequisite for the country to absorb and utilize external resources currently planned and programmed for watershed/land use development in Honduras.

The institution building aspect of the watershed management program is critical to achievement of all project purposes. The project must establish a capability within the GOH to both design and implement additional watershed management projects. The Choluteca Watershed Program will immediately contribute to a more rational use of renewable natural resources in the selected watersheds, although the project activities will represent only the initial phase of what must be on-going programs in other watersheds.

B. Goals and Purposes

The goal of the project is to improve employment and income of poor farm families living on the watershed through rational and more productive use of land. Since the long term productivity of the land depends on how the natural resource base is managed and protected, a second but equally important goal is to improve the management and use of land, forests and other renewable natural resource.

The major project purposes are to strengthen the institutional capabilities of the GOH to develop and implement policies, mechanisms and programs for management of the renewable natural resources and to establish an integrated watershed management program in the Choluteca River Basin which focuses on bringing improved agriculture agro-forestry, forestry and soil conservation technologies to bear in stabilizing the hillside farmer and increasing his income.

C. Project Components

1. NATURAL RESOURCES POLICY AND PLANNING

The Project has 2 closely interrelated components: natural resources policy and natural resources data collection and analysis. The project provides resources to the GOH executive/policy making structure to analyze and develop appropriate policies for management of Honduras' natural resources. These include the most critical areas of natural resources; the use and conservation of land, water and forests.

The first effort will be an analysis of the laws and regulations which impact on these natural resources and their effect over the short and long term. Some work has already been done in this area in connection with a proposed new water law. However, the analytical work done was primarily in connection with irrigation. Additional analyses will be needed to determine what is needed regarding use of water for hydro-electric dams, for potable water supplies and management of water pollution.

Additional analytical work has been done in conjunction with Project design to identify problems in natural resources laws in water, land use, forestry, as well as watershed management. This will serve as a basis for studies of alternative solutions and their economic development and social consequences.

As reported in the PID, some work has already been carried out by a GOH interinstitutional committee as to alternative methods for organizing the government to improve management of natural resources and the environment as well as to establish certain environment control mechanisms and project review procedures. The GOH decided however, that the organizational solutions were not adequate to fit the current government structure. The control mechanisms and policies proposed 1/ lacked a thorough analytical basis and insufficient attention to the necessary changes needed throughout the government structure to effect a positive approach to management of natural resources as opposed to negative control mechanisms.

As a result the mandate of the Comision de Politica Agricola (CPA) was expanded to include forest and water resources and to act as a natural resources council. The CPA will be concentrating its effort in developing comprehensive and rational policies in these critical areas as well as to study and propose the way in which the GOH and its agencies should be organized and operated to bring about improved management.

1/ Which are also expressed in the National Development Plan.

The project will provide technical assistance and other support t the CPA to achieve these plans. A forest economist and a watershed management specialist will be hired under the Project to coordinate or execute natural resource environmental policy studies. Studies will also be carried out under contracts or interinstitutional arrangements by consulting firms, the Environmental Unit of Consuplane, the Agricultural Sector Planning Office of the MNR and other appropriate institutions. $125,000 for contracts for some of these studies will be financed under this Project.

Long and short term technical assistance will be provided to the CPA in the area of natural resources, environmental policy, natural resource economics, land classification, ecology and environmental engineering.

A second but no less important function which the CPA will carry out is to develop and organize a capability within the GOH to do land use planning including classification of land use potential. This type of classification is essential for both planning and managing the critical land resources. It is both a technical and a political process requiring a sound natural resource data base. In order to establish a rational basis for determining the best use of land for both development and social purposes it is necessary to have data on soils, slopes, vegetation, hydrology, climate, land delineation, actual land use, costs of production, demography, marketing, infrastructure and services.

Much of this data is now being collected by various GOH agencies (described in par. 2 below) or will be collected under programs financed under Ag Sector II.

However, except for the work of the National Cadaster Program which classifies agricultural land capacity and actual land use, there is no system to classify land use potential. The Project will provide technical assistance to the CPA to develop such a system including criteria, standards and procedures. The Cadaster Program will collect and provide the basic data, and recommend classification of land use to a technical committee 1/ which will operate under the CPA. The CPA itself will make final determinations.

Because much of the data needed for classification has been collected by the PCN for the major valleys, the CPA will concentrate in those areas first but will also establish priorities for additional areas for classification.

Such land use classification is vital for development planning in agriculture and forestry. It will be used for assessing priorities of development programs and decisions with respect to areas most appropriate for agrarian reform settlements, reforestation activities, irrigation projects and watershed management and conservation efforts.

1/ Specialists include agronomist, silviculturalist, forest engineer, agricultural economist, agrarian reform specialist, soils scientist, hydrologist/climatologist, land classification specialist. Specialists will be drawn from INA, MNR, COHDEFOR and PCN.

The CPA with technical assistance from the project will also develop a system for incorporation of classification decisions in all planning and project development activities. A long term land classification specialist will advise the CPA in the design of a land classification system, standards and criteria; assist the land use classification technical committee in developing operational procedures and provide direct assistance to the land use section of the National Cadaster Program.

The project will provide funds for salary supplements to the members of the Land Use Classification Technical Committee.

Funds will be provided under this component of the project for administrative/management and support to the project by the MNR Coordination Office. The MNR Coordination Office was established under AG Sector I loan funds to assure timely submission of budgets, contracts and other committment documents; to assist project agencies to meet GOH and AID procurement/administrative regulations; to act as administrative coordinator with AID and to maintain records of implementation progress. This office will be used to provide similar support to the Natural Resources Management Project in order to avoid duplication of efforts and staff resources. Funds will be provided the MNR Coordinating Office to contract for services to support the Project.

An AID coordinator and support costs will be funded out of the Project to provide project supervision and coordination.

Grant funds are proposed for financing the AID coordinator's office and the service contracts for the MNR coordinating office since both these activities primarily serve AID's interests. Grant funds are also proposed to fund the foreign exchange for technical assistance and technical contracts because of the reluctance of the GOH to use loans funds and scarce foreign exchange to pay for high priced U.S. technicians. The quality of the technical assistance for this component of the Project is critical to its success.

The total estimated cost of this component is $1,078,200 of which AID loan funds will finance $815,700 and $262,500 in GOH counterpart. $696,000 of AID Funds will be granted to cover the costs of technical assistance, contract studies, AID coordination office and MNR coordination office.

NATURAL RESOURCES DATA COLLECTION AND ANALYSIS

a) Introduction

Goals and Purposes of a Natural Resource Data, Analysis and Information System.

Honduras is a country whose economy is derived from its forest and agricultural resources. Twenty-eight percent of its gross national product is generated from timber, food and fiber production. The Government of Honduras (GOH) has taken a first step in coping with the complexity of their natural resource data, analysis and information system. Data collection/analysis agencies and a policy/planning commission provide services to the agricultural and forestry sectors of the government.

The purpose of Project support for collecting, analyzing and disseminating natural resource data and information is to improve the GOH capabilities to support development in agriculture and forestry related projects and programs. Also, natural resource data and information is used to design and implement irrigation system projects, to recommend and design erosion control treatments, to improve domestic water supplies and to monitor water quality.

However, the GOH is weak in their capability to manage the country's natural resources, evaluate natural resource project feasibility, maximize forest and agriculture production, and implement an effective land use policy.

Timber is being depleted at a rate much faster than it is being replenished by natural forest regeneration or by reforestation efforts. Migratory agriculture, for basic grain production, contributes to the denudation of upland forest regions. As a result of forest clearing on the upland areas, tracts once protected by the forest canopy and by an absorptive humus layer are exposed to the erosive forces of rainfall and water runoff. Soil lost from the uplands becomes silt and sediment which fill waterways and reservoirs constructed for irrigation systems and for hydroelectric energy facilities. The abandoned, unfertile land is left unsuitable for further forest plantation, unless considerable capital is invested for reclamation.

Complete and periodically updated information on forest inventory and forest exploitation data would determine the actual rate of timber loss. Information on soil quality and soil loss would provide the basis to determine the tolerable limits of forest extraction. The basic information could also be used to recommend technical agricultural practices that would minimize soil degredation and stabilize the hillsides from accelerated erosion.

Agricultural land in parts of the country is underutilized. In a recently published study by the National Cadaster Program (PCN) it is stated that in the Sula and Cuyamel Valleys 50 percent of the alluvial land is utilized for cattle and dairy production. Actual land use information would be used in land use policy to determine the most feasible use of regional lands.

Irrigation agriculture has priority in government projects to increase agricultural production. Reports from the Water Resources Direction (DRH) of the Natural Resources Ministry (MRN) estimate the total quantity of groundwater in Honduras at 10 billion cubic meters. This, plus information regarding the amount of surface water should be utilized for planning irrigated agriculture in regions where the conditions are favorable for agricultural production but where water is lacking during certain periods of the year.

Even though irrigation is a priority for agricultural production, there are limitations in the project feasibility study and planning elements. In some instances, irrigation projects are planned and even constructed without the evaluation of soil and water resource information. Surface irrigation systems have been constructed on sandy soils or have been planned using only visual observations on minimum and maximum streamflow. The lack of information has prohibited the efforts of the GOH to meet its goal of converting 10,000 hectares, annually, into irrigated farmland.

One of the most important functions of a natural resources management system is the integration of physiographic, socio-economic and market information in a land use classification scheme. When actual and potential land uses are known it is much easier to carry out objective policy formation and planning for investments in the rural sector. Priorities for project selection and project design can be based on the potential of an area, thus reducing risks of failure and loss of investments.

The collection of socio-economic data and market information is in its early stages. The lack of a coordinating effort among the principal data collecting agencies hampers viable use of the information. No land use classification scheme exists for Honduras from which a land use potential can be determined. Projections of the supply and demand of agriculture and forestry products is determined more by conjecture than by any empirical rational.

Lack of trained professionals in areas of natural resource sciences and administration has left a gap in the government infrastructure. Transnational consulting firms are contracted to carry out project feasibility studies, planning and implementation for many GOH projects. In most cases, the firms depend on data and information that are generated through their own efforts.

For natural resource related projects, the basic data of soils, climate, hydrology and vegetation is unavailable in much of the country. Honduran specialists in data collection and analysis are unavailable to assist in the data collection efforts. Foreign technical assistance, at a high cost, must be contracted to complete the primary data gathering obligations.

For example, the Master Development Plan of the Irrigation Project, Rio Guayape, calls for 12 foreign technical assistants over a period of 30 months to work on the project. This is not only for data collection, but for project analysis, selection of sites, engineering and irrigation systems design and pilot project implementation. The irrigation project also requires equipment for a soils laboratory. This would appear to be unnecessary since an MRN National Soils Laboratory already exists. However, soils data produced by the government lab is generally inconsistent and the rate at which the lab results are returned is slow. International consulting firms cannot waste time in completing the feasibility studies and find it more efficient to use their own technical assistance and trained technicians.

PCN utilizes foreign technical assistance in their Soils and Cartographic Sections. The technical assistance is necessary to train personnel and to provide the expertise for project development.

Existing employees of the data collection and analysis agencies should participate in internationally funded training programs. In this manner GOH human resources will be improved. Personnel, qualified in specialized fields of natural resource management will provide capabilities for developement planning and for project design and implementation.

The introduction of foreign technical assistance and duplicating equipment is a burden to the Honduran economy. Excess costs augment the national budget which could be alleviated by contracting well trained Honduran technicians.

Honduras, unlike many developing countries, still has sufficient natural resources to support expanded development. However, action must be taken on a national level to assure accurate natural resource assessment and rational management. The existing natural resource data collection network must be improved and expanded. The data must be quality controlled and compiled in a computer storage facility or published so that the information may be accessed and analyzed by the institutional users. Information produced by the data analysis must be evaluated in a land use classification scheme so that land use potential may be determined.

The output of the Natural Resource Data, Analysis and Information Systems sub-activity will provide the existing Honduran institutions with the ability to continue forming an effective information base for their

natural resource planning, development and management system. Reliable, quantitative natural resource information produced by the sub-activity will be used for multidisciplinary purposes so that the Honduran government can plan their development, manage the exploitation of their natural resources, select priorities and design projects.

b) Institutional Background

Within the Honduran government there are programs and projects that are designed to collect, analyze and disseminate basic natural resource data and information; to determine property delineation, land tenure identification and land evaluation so that land use and long-range and short-range planning may progress. However, the natural resource data, analysis and information systems in Honduras function as independent and, for the most part, uncoordinated government sponsored activities. The capabilities of the government to provide high quality data, to make analyses using natural resource data, to evaluate project feasibility and to provide and disseminate natural resource information to policy making institutions for natural resources and land use planning are hindered by:

i. Insufficiently trained personnel in specialized fields of natural resource management;

ii. Lack of training facilities and/or technical asssistance to provide a high quality technical basis for natural resource studies;

iii. Lack of field, laboratory and information storage equipment for proper collection and utilization of natural resource information;

iv. Lack of an effective mechanism for the coordination of natural resource data gathering and analysis systems.

The two principal institutions which produce and analyze basic natural resource data and information, but are hindered in their efforts, are the National Cadaster Program (PCN) and the Ministry of Natural Resources (MRN).

The Natural Resource Department (DRN) of PCN makes surveys and maps of the country's soil, forest, hydrological and climatological resources. Other activities of the DRN include ecological life zone classification, actual land use surveys, agricultural economic studies and land delineation and land tenure identification. PCN is in the process of completing all field work in the eight departments (political units comparable to states) designated under the original AID Loan No. 522-T-024. Under the sub-activity of the Natural Resources Management Project PCN will continue natural resource surveys in the departments os Colon, Lempira, Copan, Intibuca, La Paz and Ocotepeque. One economic analysis has been published for the Sula and Cuyamel Valleys. The remainder of their reports and maps are either in draft or are incomplete.

DRN-PCN receives support in data compilation and storage, and in mapping from the PCN Programming and Systems Department (DPS). The DPS-PCN utilizes a PDP 11-34 computer with 128K memory for data compilation and storage and the M & S Interactive Graphics System for computer mapping.

The Department of Climatology and Hydrology (DCH) of the Direction of Water Resourses (DRH) of MNR collects, compiles, analyzes and publishes the national hydrology and climatology data. They currently operate and maintain 49 hydrologic stations and 102 climatologic stations. DCH has a special reports section, consisting of hydrometeorology specialists, that elaborate climatologic and hydrologic studies of interest to the DRH. The maintenance and construction section inspects existing stations for equipment failures, calibrates the equipment and instruments and constructs new stations and reconstructs old stations.

DHC has produced seven climatic and hydrologic summary bulletins as of 1975; none have been published in the last 5 years. The special projects section has produced a climatic atlas of thirty maps and four hydrologic and hydroclimatologic reports.

Other Honduran agencies involved in some aspects of hydrological and climatological data collection and analysis include the National Electric Energy Company (ENEE), the Honduran Forestry Company (COHDEFOR), the National Water Service (SANAA) and the National Meterological Service (SMN). However, these agencies generally collect limited data for specific functions. Their efforts are not on a national planning level and their information serves only their specific needs.

The National Soil Management and Conservation Program (PNMCS) of MRN undertakes detailed soil surveys. Their work serves as a basis for small irrigation projects and for fertilizer investigations.

COHDEFOR is in the process of completing a forest inventory. The emphasis of their work is timber exploitation and serves as a specific planning element for their operations. When their work is completed the information will be utilized in the land classification and land use potential scheme.

The AID Agricultural Sector Program II (522-0150) has an institution building element to providing funds for strenghtening the collection of socio-economic data and market and marketing information systems.

The Sectoral Planning Direction (DPS) of MRN is being strengthened to utilize socio-economic information produced by their statistics department in conjunction with the Department of Census and Statisitics of the Ministry of Economy (DGEC).

The Area Sample Frame project of the DGEC-DPS will provide a source of statistically reliable data when it is completed in December 1983. This appears now to be a good source of reliable land use related data. It will provide time series data for yet to be defined parameters.

The information produced from this program and utilized in a land use classification scheme will provide reliable data for land use policy and for agricultural production estimates.

The scarcity of professionals in natural resource sciences and administration has been identified as a limiting factor for natural resource management and land use planning. The Agricultural Sector II Program responded with an element for human resource development. Participant training in agricultural and natural resource disciplines will be offered to 302 candidates. The training for these candidates will be at the university, graduate, and post-graduate levels. Some training will be in-country. The majority of training will be abroad since required specializations are not offered in Honduras. Upon completion of the training, the government infrastructure will absorb the trained personnel in natural resource management and land use planning positions.

The total capacity of all agencies for data collection and surveys is far below current requirements. Thus, it is necessary to improve the quantity and quality of the data collected by existing agencies, and to unify and coordinate their efforts.

One of the most important functions of the Natural Resources Data and Analysis sub-activity is to strengthen the institutions so that they may play an important role in the management and development of Honduras' natural resources. The National Cadaster Program (PCN) and the Ministry of Natural Resources (MNR) will be supported through the project to bolster their natural resources data gathering/analysis/dissemination capacities. The PCN will be supported in its Natural Resources Department (DRN) and its Systems and Programming Department (DSP). The MNR will be supported through its Department of Climatology and Hydrology (DCH).

c) Project Description

i. Natural Resources Data Processing

A computerized data processing and data storage system was established under the AID funded project, National Cadaster Program (522-T-014). The system will be expanded to meet increased use from: (1) accelerating the rate of data and mapping compilation so that PCN can complete their work in the remainder of the country and extend work into the forest areas; (2) maintaining existing and future cadastral and natural resource surveys; (3) providing access to more data; and (4) facilitating the institutional user's natural resource analysis capabilities.

A major problem, to date, with the flow of natural resources data/information 1/ has been the lack of access to data and analytical materiel by data gathering and user agencies. DCH and other climatology and hydrology data gathering and analysis institutions have had to rely on a small memory capacity computer for data compilation and analysis. The expanded computer system will help to alleviate this problem by providing authorized users with access to the computer facility and access to a centralized body of natural resource data/information.

The consolidation of the data/information into a computer data bank will provide more capacity to user agencies for data access and data analysis. The computer system of PCN will become the center for the Honduran Natural Resource Data Bank.

In order to meet the increased storage and use of the information an additional central processing unit (CPU) with two accessory disk drives, a design and digitizing station, five cathode ray tube computer terminals (four to be used by producer/user agencies and one to be used by PCN) will be provided by project funds. COBOL and Remote Sensing Information Processing computer software packages will also be funded. A computer service contract will be provided between PCN and the computer supply company.

The DPS-PCN technical personnel will be augmented. PCN will be able to process, analyze and map their existing natural resource data, the data generated from their expanded natural resource surveys and the data contributed from the other institutional users for inclusion in the computer data bank. Two data investigators, two digitizers and two terminal operators will begin work in the last quarter of CY 1980.

A Data Base Specialist will be provided to DPS-PCN in CY 1981 and CY 1982 to design a computer program for storing, processing and retreiving data/information in the data bank.

Short term training will be provided to DPS-PCN employees in systems design and analysis, in remote sensing information processing and in computer maintenance.

A separate computer terminal room will be set up in PCN in which four computer terminals will be made available to users/producer agencies (COHDEFOR, MNR, CONSUPLANE, SANAA, ENEE, CNRH, private firms and others). The agencies will be provided with: basic data whose validity has been confirmed; software packages for standard types of analysis; bibliographies of published reports and analyses; and numerical types of information.

1/ A general distinction is made between data and information. Data is relatively unprocessed; information refers to data that has been interpreted/analyzed in the context of a problem.

An interinstitutional agreement for data/information exchange is essential if the data processing system is to function well. Each participating agency will agree to provide its own data/information when that is generally useful. To be acceptable, data will have to be gathered and presented with certain minimum standards. A Natural Resources Data Technical Committee set up under the Ag. Sector II program will select the standards for data/information and authorize institutional users. The commitee will consist of and represent the agencies involved in the areas of natural resource data gathering and dissemination. The areas and the agencies are: 1) Soils, PCN and MNR; 2) Ecology and Forestry, PCN and COHDEFOR; 3) Hydrology and Climatology, DCH, PCN, ENEE, SANNA, COHDEFOR, and SMN; 4) Actual/Potential Land Use, PCN and MNR.

The project costs for the Natural Resources Data Processing element total $638,300. AID loan funds will pay foreign exchange costs for computer equipment, service contracts, computer software and technical assistance. Some funds will be used to finance local costs for additional personal and operations during 1980 and 1981. AID inputs for the 5 year period will be $409,200. GOH counterpart will fund the balance of personnel and operating costs for a total of $229,100.

ii. Soil Surveys and Laboratory

Soil surveys and soil classification by the PCN have been hampered by a lack of trained personnel and by insufficient laboratory expertise. Soils surveys, supported by laboratory analysis, are essential tools for the planning of natural resource management activities. They provide soil information for the determination and mapping of land use capability and potential land use. They also provide information for irrigation project planning.

The reconnaissance and and semi-detailed surveys provide a prefeasibility examination of agricultural and forestry production. They also serve as a basis for further detailed soils surveys that must be made at the feasibility and implementation levels on specific project sites. Thus, the PCN soils information is a required base for planning and designing the substantial numbers of economic development and natural resource programs and projects in Honduras.

The project will augment the soil laboratory's output, the soil survey field work and the office preparation of maps and reports. It is expected that this will enable the PCN to double its capacity for the preparation of reconnaissance and semi-detailed soil surveys.

The Soils Section field and laboratory personnel will be augmented. One soil survey team, consisting of five members, will be added, in CY 1982, to the two existing survey teams. Three soil survey correlators will be added to supervise each of the field crews. One field crew will

continue on the semi-detailed survey in the valleys while the other two teams will work on the semi-detailed surveys in the upland and forest regions. Semi-detailed surveys will begin in CY 1981. Field equipment will be provided for the additional field crew.

In order to develop technical skills, funds for short-term training with the USDA and on-the-job training in Honduras will be provided. Two members of the GOH Soil Section will be sent to a work-training program with the USDA Soil Conservation Service. There they will learn techniques of soil survey and taxonomy, evaluation of soil loss, land use classification, aerial photography interpretation and soil conservation. Field technicians will be trained as they work in soil survey/taxonomy and aerial photography interpretation. The long-term technical advisor will provide the on-the-job training.

Funds will be provided to hire additional laboratory personnel (which will free a soil survey team currently filling-in at the soils lab); technicians for an additional soil survey team; and three soils correlators for interpretation of aerial photography and soil sample data. Field and laboratory equipment, materials and supplies and vehicles will be provided to support the field teams and bolster the laboratory capacity. Technical assistance (24 mm) will be continued to maintain the high level of professionalism of the current soil survey activities.

The project costs for the Soil Survey element totals $902,700. AID loan funds will pay for foreign exchange costs for laboratory and field equipment, technical assistance, and short-term training. The total AID input for the 5 year period will be $329,500. GOH counterpart funds will pay for the personnel, support and operating cost. The total counterpart will provide $562,700.

iii. Hydrology and Climatology Services

Several GOH agencies are involved in some sort of basic hydrological and climatological data collection and analysis. These include ENEE, COHDEFOR, SANAA and MNR. The DHC within the MNR's Water Resources Unit (WRU) is, however, the agency with the most comprehensive and broadly defined interest and responsibilities in this area. It currently maintains a network of 64 hydrological stations and 102 meteorological stations. The usefulness of the network is limited because of problems in station location, station maintenance, qualified station observers and insufficient numbers of stations.

The value of hydroclimatological data cannot be understated. In addition to its traditional importance in the design of agricultural, forestry, flood control and other infrastructure projects it is also necessary for rational land use planning. Without good climatological data the optimum potential land use can only be subjectively determined. In Honduras, where approximately 1,000 microclimates exist, the current limited number of stations leaves too great a margin for error for

adequate interpolation of data from one area to another. The margin of error increases in mountainous terrain where no stations are located above the 1,725 elevation.

The Project will strengthen the role and capability of the DHC as the lead data collection and analysis institution. The major output will be improved data from the existing stations and from the 65 additional meteorological stations and 38 additional hydrological stations that will be installed with project funds.

Emphasis will be placed on locating stations in upland areas which have be largely neglected in the past. Of the stations to be added, 48 will be simple raingaging stations. Some of these will be placed in mountain transects so that more may be learned about variations of rainfall with elevation and about windward-leeward rainfall patterns. Thirteen medium sized stations will be located in areas where data is scarce. These stations will include instrumentation for measuring basic climatological parameters: rainfall, temperature, relative humidity and evaporation. Four principal climatic stations will be located in priority areas for natural resources development. These have complete range of instrumentation which, in addition to the parameters mentioned above, include: solar radiation, daylight hours and wind velocity/direction.

The hydrologic network will also be strengthened in the mountains areas as well as priority areas for water resources development. Ten simple stream gaging stations equipped with water level scales will be placed in mountainous areas that are important runoff source areas. Another 21 secondary stream gaging stations, equipped with scales and water current meters, will be placed in areas where hydrologic data is scarce. Seven principal stream gaging stations will be located in areas where major infrastructure projects (dams, industrial plants, irrigation, etc) are planned. The principal station will include scales, water current meters and stream level recorders.

To support the station installation activities the project will provide: instrumentation, materials and supplies, construction tools and equipment, vehicles and additional field personnel to maintain station records.

The DHC's data analysis capability will be strengthened by a linkage with the PCN computer bank. The DHC will be given priority for use of two terminals described in the Data Processing Section. Data analysis programs will be developed by the technical advisors. The advisors will train two computer operators in data input and standard analysis routines. Mapping and graphing of hydrologic and climatologic data will be facilitated through the use of the additional inter-active graphics unit in the PCN.

Technical assistance will be provided to support hydrology and climatology data gathering and analysis. The technical advisors' responsibilities will include in-service training of personnel, program

development of a comprehensive national network of hydroclimatological stations, overseeing the modernization of data gathering, reduction, and analysis. Short term training for PCN specialists in hydrology and meteorology is also contemplated to augment their capacity to produce data analysis and reports.

The Project costs for the Hydroclimatic Data Services element total $983,000. AID loan funds will pay for foreign exchange, laboratory and field equipment, grants for technical assistance, vehicles, long and short term training, and some salaries for personnel during the first year of the Project. AID inputs for the 5 year period will be $559,900. GOH counterpart funds will pay for the balance of personnel, support, and operating costs. The total counterpart will provide $423,100.

iv. Ecology and Forest Classification

One of the basic requirements for natural resources management and planning is a knowledge of ecological life zones. At the same time, this must be paralleled with knowledge of the forest types. This information supplies the land use planner and natural resources manager with knowledge of the complex relationships that exist from the interactions of the biotic, hydroclimatologic and soil environments within the life zones.

Each life zone contains several ecological communities with their own special characteristics. As work progresses on identifying life zones, forests and communities, their relationships become more understood. Thus experience and knowledge from a life zone in one region or another country can be transferred to the same life zone in the region of interest where existing knowledge is scarce. This becomes important when predictions are to be made on the expected result of the introduction of significant change to the environment. For example, in the past the introduction of exotic species have been proposed without adequate assurance that they will survive. Diseases, insects and other pests will often reduce the viability of a species when it is taken outside its original life zone.

Information on a species' suitability can be obtained quickly and cheaply if a body of knowledge that identifies commercially valuable species and the life zone(s) in which they do well, can be accessed and applied to the area of interest. Life zone mapping of the country must first be available if this system is to be used.

The PCN has an ongoing program in the life zone mapping and forest classification under its Ecology and Forest Classification Department. However, the work has fallen behind because of insufficient personnel and technical support. The Project will accelerate the completion of life zone mapping in the remainder of the country and provide for the continuation of forest classification into the western and far eastern regions, and in Olancho.

The Project costs for the Ecology and Forest Classification element total $276,500. AID loan funds will be used to obtain technical assistance in life zone mapping, field equipment, and provide for personnel during 1980. AID inputs for this element will be $78,400 of loan funds. GOH contribution will pay for the balance of personnel, support and operating costs. The total counterpart will provide $198,100.

v. Forest Delineation

The progress of forestry as a pole for development has, in the past, been hindered by a lack of knowledge about the productive capacity of deforested lands as well as identification of tenency of forest lands. COHDEFOR, which has the mandate to determine forest management policy, would like to stimulate private investment in reforestation as well as carry out reforestation of national lands. To further reforestation, there is a pressing need to determine forest land tenure. In addition, the misuse of forest lands by agriculturists and cattlemen is difficult to prevent when the ownership of land is unknown or in question. Investments in reforestation and forest industry are expensive and foolish on lands where ownership is uncertain or on lands which may be taken over by either planned or uncontrolled agricultural settlement at any time. Investors in forest industry, including COHDEFOR, must have assurance that the resource upon which they base their investments will be there when they are ready to use it.

The PCN has only recently begun to work in determining tenure on forest lands. It is important that this work be accelerated to keep pace with forest development, forest exploitation and forest protection. The Project will provide funds to double the rate at which forest lands are currently being delineated. The PCN and COHDEFOR have agreed on the priority regions where forest land tenure needs to be determined: Olancho, Comayagua area and Yoro.

The Project costs for the Forest Delineation element total $339,000. AID loan funds will provide for ten new delineation teams and field equipment during the early period of the Project. These teams will supplement the ten more existing PCN delineating teams. AID loan funds will amount to $297,900. GOH contribution will pay for the balance of personnel, support, and operating costs. The total counterpart will provide $41,100.

vi. Actual/Potential Land Use Classification

A key element in the Project will be application of natural resources data/information to evaluate rural lands. To prepare potential land use classification it is necessary to have physiographic and socio-economic data for the area of interest. Physiographic data applies to the natural system: soils, land forms, climate, vegetative cover, hydrology. The socio-economic data includes: actual land use; size and nature of land

holding; agricultural practices; markets; demographic factors; etc. The two basic types of data, when combined and mapped over a common area, form a means for objective evaluation and a land use classification for recommendating land use potential.

The PCN has an ongoing, but small, actual land use program. The Project will expand this program to include a land use classification element. Physiographic data will be drawn from the PCN Natural Resources Department. Project funds will be used in carrying out potential land use classification evaluations in priority areas. Priority areas include prime agricultural land in valleys and forest lands where agriculture is having a significant impact. The socio-economic data will come from several sources: PCN for land tenure, Area Sampling Frame activities in the DGES for cost of agricultural production, CRIES in MNR for agricultural production potential, Census and Statistics (DGES) for demographic factors. The department will be responsible for actual land use determination and potential land use evaluation.

The Land Use Planning Technical Committee is to be established under the Comision de Politica Agricola. Their function is to organize and evaluate the land use classification information sets. They will forward recommendations for potential land use to the Agricultural Policy Commission for decision.

The Project costs for the Actual/Potential Land Use Classification element total $514,500. AID loan funds will be provided for equipment and supplies; long term training for a land use planner, and additional personnel during the early period of the project. Technical assistance will be drawn from the Land Use Policy and Planning project element. Assistance will be given to the Land Use Planning Technical Committee to construct the potential land use criteria. AID funds will provide $9[illegible],900. GOH contributions will pay for the balance of personnel, support, and operating costs. The total counterpart will provide $423,6[illegible].

vii. General Project Support

The PCN program requires general support items that are equally as important to several activity categories. For clarity in presentation these have been categorized apart rather than proportionately included in the specific sub-activities. They include orthophoto mapping, vehicles and a cartographic technical assistant.

The orthophoto mapping provides planar views at a 1:10,000 scale with photographic qualities of work areas. Delineation of property and physiographic boundaries a done directly on the orthophoto maps saving the time and expense of rectifying photography and manually drafting scale maps. In addition, the maps are

reproduced and made available at cost to other GOH agencies for their use. The project will provide funds to complete orthophotomapping for the remainder of the country.

Technical assistance for cartographic services is an important program-wide need. The National Geographic Institute has not produced the required number of maps and the PCN has had to do most of its own mapping. Because of the lack of highly skilled Honduran personnel in this field and the definite time limit for which this service will be needed to finish the mapping of the remainder of the country, Project funds will be used to fund a two year continuation of an existing contract for cartographic and photogrametric consulting services.

Vehicles are a critical need for the continuation of the PCN's activities. It is calculated that 20 vehicles will be required for the additional field teams contemplated in the Project. An additional 20 vehicles will be required to replace existing fleet vehicles, many of which are 5 or more years old and are uneconomical to maintain. This is a critical need if continuity of work and an increased pace is not to be disrupted.

For new and replacement vehicles, orthophotomapping, additional aerial photography and technical assistance, AID loan funds will provide $1,780,000. GOH contributions will pay for vehicle maintenance, and contingency totalling $189,600.

Choluteca Watershed Management and Rehabilitation Program

The specific activities envisaged under this part of the project, are designed to improve the basic socio-economic conditions of farmers living in the watershed as well as to protect the soil and improve soil productivity at the same time that the farmer's income is increased. For this to be accomplished, five project activities will be undertaken in five selected subwatersheds within the Choluteca River Watershed:

i) Soil and water conservation combined with intensive agricultural practices;
ii) Agro-forestry activities and fuelwood production;
iii) Reforestation activities;
iv) Range management and pasture improvement activities and;
v) Community nursery projects.

All of these activities are designed to provide the different GOH institutions with in-the-field experience which, besides producing short and long-term beneficial impacts in the watershed, will provide the experience which is required for a comprehensive national watershed management program.

The policy formulation for the program will be provided by the CPA. Direction of program execution will be implemented through a Natural Resources Executive Committeepresided, for these purposes by the Minister of Natural Resources and including: the Executive Secretary of CONSUPLANE; the Director of the National Agrarian Institute (INA) and the General Manager of COHDEFOR. Additional public sector institutions can be called on to discuss specific issues, such as SANAA, the Cadaster Program, the Ministry of Public Works, BANADESA or IHMA. Actual execution of program activities will be carried out by the Project Office which will be administratively adscribed to the Ministry of Natural Resources, although operating within clearly established independent guidelines. Credit-fund activities to farmers will be implemented through a Fiduciary fund to be administered by the newly reorganized Natural Agricultural Development Bank (BANADESA) under terms and conditions to be negotiated with BANADESA.

Actual in-the-field activities will be executed by one Watershed Management Unit (WMU) per subwatershed, for a total of five WMU in the five-year period of the project. Each WMU will have four teams formed by one agronomist, one silviculturalist, one social promoter and one cooperative expert. In addition, the teams will have the support of: community organization accountants to teach and supervise the keeping of the organization's books; land surveyors to assist the farmers in solving land tenure related problems; and paraprofessional or paratechnical agents who will serve as a continuous liason between the WMU and the community organizations to be established under the program. It is anticipated that about 264 community organizations, each with about 25 farmer participants will be established in the five year period. Grants will be made to each community organization for the establishment of

community owned nurseries for the production of the seedlings required for the agro-forestry, fuelwood and reforestation activities. Community participation in the design of project activities and self management is the critical condition needed to carry out the program.

Two basic criteria were used for the selection of the five subwatersheds where project activities will be implemented:

i) Each subwatershed had to offer different ecological conditions and different degrees of deterioration of the natural resource base; and

ii) The areas selected had to include sub-regions within the watershed which have a high density of rural poor farmers and are capable of being managed as clearly identified administrative units.

With these criteria in mind and analyzing the 1974 population information (revised in 1980) for the municipalities included in the watershed 1/, the five subwatersheds selected were the following:

(1) Headwaters (which include the municipalities of Tatumbla, Santa Lucia, Ojojona, Santa Ana, Lepaterique and Distrito Central);

(2) Orocuina (which includes the municipalities of Soledad, Liure, Orocuina, Apacilagua and Pespire);

(3) Texiguat (which includes the municipalities of San Buenaventura, Maraita, Nueva Armenia, Yauyupe, Texiguat, Vado Ancho and Moroceli);

(4) Namale (which includes the municipalities of El Paraiso, San Matias, Alauca and Oropoli); and

(5) Sampile (which includes the municipalities of El Corpus, Santa Ana-Yusguare and Namasigue).

Project activities within each of the selected sub-watersheds will be implemented gradually, starting with the Headwaters subwatershed, and increasing the level of effort, each year, until the five subwatersheds are finally covered at the end of the fifth year.

Exhibit 1 summarizes the most important aspects of the Choluteca Watershed Management and Rehabilitation Program. About 35,560 ha, which represent 50% of the total area under farming in the five subwatersheds will receive the direct benefits of the program. AID funds will total $10,701,500, of which $8,303,600 will finance direct costs of the program and $2,397,900 will cover institutional costs. Of these totals, AID will provide grant funds for $2,698,700, of which $491,500 will be for

1/ Appropriate adjustments have been made for the census figures available on the municipalities so as to make them compatible with the watershed's geographical limits.

EXHIBIT 1

CHOLUTECA WATERSHED PROJECT. ESTIMATED COSTS OF THE PROGRAM

Item	Target Area ha	Direct Costs	A I D Institutional Costs	Subtotal	GOH Total	Totals	Technical Assistance AID
I. Direct Costs Items 1. Soil and water Conservation and Int.Agr.Practices							
1.1 Less than 5 ha	5,256	491.5	142.0	633.5	259.4	892.9	84.1
1.2 More than 5 ha	12,661	1,102.8	318.7	1,421.2	581.9	2,003.1	188.5
II. Agro-Forestry and Fuelwood	8,360	2,926.2	845.0	3,771.2	1,544.2	5,315.4	500.4
III. Reforestation	4,233	1,481.4	427.8	1,909.2	781.7	2,690.9	253.3
IV. Range Management and Pasture Improvement	5,050	1,514.6	437.4	1,952.0	799.3	2,751.3	216.4
V. Community Nursery Project	-	787.2	227.3	1,014.5	415.4	1,429.9	134.6
GRAND TOTAL	35,560	8,303.6	2,397.9	10,701.5	4,381.9	15,083.4	1,420.0

fertilizer subsidies to the farmers and $787,200 will be grants for community nurseries as explained in detail below. $1,420,000 will be to cover the costs of foreign technical assistance. AID loan funds of $977,900 will provide for vehicles, equipment and other support costs. The GOH counterpart for this part of the project will be $4,381,900, for a total cost of the watershed program of $15,083,400. A summary of the target area to be covered by each of the different Project activities is presented in Exhibit 1A. The programming of funds for the different activities for the five year period of the project can be seen in detail in Exhibit 2.

In the following sections, a detailed description of each of the specific activities is shown:

i) Soil Conservation and Intensive Agricultural Practices

A number of factors, some of ecological origin but most from socio-cultural origin, contribute heavily to soil erosion, water loss and sediment yields within the Choluteca Watershed. The majority of small farmers in the hill lands use their small plots to reap only one subsistence crop per agricultural cycle as they are dependent upon rainfall for water. Poorly designed, unprotected roadways, cattle trails in pastures, systems of cultivation etc. also contribute to sediment yields. On the other hand, on-farm water and soil utilization and management, whether on small plots in the watersheds or in larger GOH sponsored irrigation systems in valley lands, is at a rudimentary stage.

Soil and Water Conservation and Intensive Agricultural Practices will involve a number of specific erosion and water control measures, in combination with improved agricultural production practices designed to:

- increase the productivity of the soil and the income levels of the farmers;
- control or prevent soil erosion, particularly in cultivated hillsides and in pasture lands; and
- promote more efficient use of available water resources throughout the year.

The specific activities contemplated under this part of the program include the construction or plantation of live barriers, retention walls or hillside ditches, in combination with improved cultivation and cropping practices and the provision of fertilizer and other agricultural inputs for improving the productivity of the soil. Other activities which have an important ingredient of soil conservation, are described under agro-forestry, reforestation and range management and pasture improvement.

The economic and social conditions under which the farmers in the five selected sub-watersheds eke-out a living are a consequence, in part, of the deteriorated situation of the watershed's soil and ecological conditions. The degree of deterioration has a close correlation to the slope of land; i.e. the steeper the slope, the lesser the quality of the soil and the less the farmer's income from the soil. Thus, the lack of

EXHIBIT 1-A

Choluteca Watershed Management and Rehabilitation Program

	Size of Farm and Treatment	Existing Area	Target Area	Percentage
1.	Farms of less than 5 Has.	17,232	8,616	50.0%
	1.1 Soil and Water Conservation and Improved Ag. Practices	10,452	5,226	50.0%
	1.2 Agro-Forestry and Fuelwood	3,446	1,723	50.0%
	1.3 Reforestation	3,274	1,637	50.0%
	1.4 Range Management and Pasture Improvement	-	-	-
2.	Farms from 5 to 20 Has.	28,492	14,246	50.0%
	2.1 Soil and Water Conservation and Improved Ag. Practices	12,878	6,439	50.0%
	2.2 Agr - Forestry and Fuelwood	7,180	3,590	50.0%
	2.3 Reforestation	2,906	1,453	50.0%
	2.4 Range Management and Pasture Improvement	5,528	2,764	50.0%
3.	Farms 20 to 50 has	25,396	12,698	50.0%
	3.1 Soil and Water Conservation and Improved Practices	12,444	6,222	50.0%
	3.2 Agro-forestry and Fuelwood	6,094	3,047	50.0%
	3.3 Reforestation	2,286	1,143	50.0%
	3.4 Range Management and Pasture Improvement	4,572	2,286	50.0%
4.	Total	71,120	35,560	50.0%
	4.1 Soil and Water Conservation and Improved Agr. Practices	35,774	17,887	50.0%
	4.2 Agro-forestry and Fuelwood	16,720	8,360	50.0%
	4.3 Reforestation	8,466	4,233	50.0%
	4.4 Range Management and Pasture Improvement	10,100	5,050	50.0%

EXHIBIT 2

CHOLUTECA WATERSHED PROJECT. PROGRAMMING OF ACTIVITIES AND DIRECT COSTS OF PROGRAM
(US$000)

ACTIVITY	1981 Target Area (Has.)	1981 Total Cost ($000)	1982 Target Area (Has.)	1982 Total Cost ($000)	1983 Target Area (Has.)	1983 Total Cost ($000)	1984 Target Area (Has.)	1984 Total Cost ($000)	1985 Target Area (Has.)	1985 Total Cost ($000)	TOTAL Target Area (Has.)	TOTAL Total Cost ($000)
I. Soil & Water Cons. & Intensive Agric. Practices	1792	159.4	2688	239.1	3583	318.8	4479	398.5	5375	478.1	17917	1593.8
1. Fertilizer (subsidy)	526	49.1	788	73.7	1051	98.2	1314	122.8	1577	147.4	5256	491.2
1.1 $60/Ha Subsidy	95	5.7	142	8.5	190	11.4	237	14.2	284	17.1	948	56.9
1.2 $80/Ha "	259	20.7	388	31.0	517	51.7	646	51.7	776	62.0	2585	206.8
1.3 $120/Ha "	103	12.4	155	18.6	707	24.8	259	31.0	310	37.2	1084	124.1
1.4 $150/Ha "	69	10.3	103	15.5	138	20.7	172	25.9	207	31.0	689	103.4
2. Fertilizer (Loans)	1266	110.3	1899	165.4	2532	220.5	3165	275.7	3798	330.8	12661	1102.6
2.1 $60/Ha Loans	602	36.1	904	54.2	1205	72.3	1506	90.4	18.7	108.4	6024	361.4
2.2 $80/Ha "	259	20.7	389	31.1	519	41.5	648	51.9	778	62.2	2593	207.4
2.3 $120/Ha "	243	29.1	364	43.7	485	58.2	607	72.8	728	87.3	2426	291.1
2.4 $150/Ha "	162	24.3	243	36.4	324	48.5	405	60.7	485	72.8	1618	242.7
II. Agro-Forestry & Fuelwood Prod. $350/Ha Establishment Loan	836	292.6	1254	438.9	1672	585.2	2090	731.5	2508	877.8	8360	2926.0
III. Reforestation $350/ha Establishment Loan	423	148.1	635	222.2	847	296.3	1058	370.4	1270	444.5	4233	1481.6
IV. Range Magmt. & Pasture Improv. $300/ha Establishment Loan	505	151.5	758	227.3	1010	303.0	1263	378.8	1515	454.5	5050	1515.0
V. TOTALS	3557	751.6	5335	1127.5	7112	1503.3	8890	1879.1	10668	2254.9	35560	7516.4
Subsidies	526	49.1	788	73.7	1051	98.2	1314	122.8	1577	147.4	5256	491.2
Loans	3030	702.5	4546	1053.8	6061	1405.0	7576	1756.3	9091	2107.6	30304	7025.2

soil and water conservation measures as well as the actual impoverished condition of the watershed's soils are negative factors with which the Project will necessarily deal.

Soil conservation measures, however, are not enough to stabilize the farmer's situation in the watershed. The construction or planting of live barriers, rock retention walls, or hillside ditches, will only assure the farmer that the land so treated will not continue to deteriorate. For this reason, the activities contemplated under this part of the project are designed not only to protect the soil from further erosion but also to enrich the nutrients in the soil so as to improve the productivity of the treated soil and increase the farmer's income from agricultural practices. In combination with these measures, simple water conservation works will be stimulated, such as catchment dams or the construction of small water reservoirs.

The economic and social analysis of the rural families living in the watershed indicates that a different approach will have to be followed for those farmers who have less than 5 ha of land (an average of 1.9 ha per farm family), than for those farms of more than 5 ha and less than 50 ha of land.

For the farmer with less than 5 ha the package to be offered will consist primarily of the following elements: a) a direct fertilizer subsidy whose total amount will be directly proportional to the quantity of soil and water conservation work done by the farmer; and b) soft term loans to stimulate the farmer to undertake one or several of the options included within the activities for agro-forestry and fuelwood production. In this part of the paper, only the first part of this package will be analyzed, leaving for the following section the analysis of the second part, on the understanding that both activities will be offered as a package. There is not enough economic incentive to the farmer with less than 5 ha to undertake any one of the activities separately.

The amount of fertilizer subsidy to be offered to the farmer will consist of one bag of fertilizer for every 100 meters of conservation work performed by the farmer on his farm for a total maximum amount of $60.00 per ha for lands with slopes from 0 to 15%; $80 per ha. for slopes from 15 to 30%; $120/ha for slopes from 30 to 50% whenever live-barriers are planted and $150/ha. for the same slope range wherever hillside ditches are constructed. Exhibit 3 presents a detail of the number of hectares to be covered in each slope category as well as the estimated cost of the subsidy for the five-year period of the project. The watershed management teams will be responsible for a detailed development of the technical conditions to be met to be eligible for the subsidy for the various soil and water conservation technologies contemplated under the Project.

The mechanisms for the granting of the subsidy will consist of credit notes, good for certain kinds of fertilizers which will be accepted by participating local fertilizer dealers. The Project will reimburse the dealers in accordance with the number of credit notes

EXHIBIT 3

SOIL AND WATER CONSERVATION AND INTENSIVE AGRICULTURAL PRACTICES

I. Soil and Water Conservation and Intensive Agr. Practices	Target Area (Has.)	Fertilizer Grants Per Ha.	Fertilizer Grants Total	Fertilizer Credit Loan Per Ha.	Fertilizer Credit Loan Total ($000)	Total Cost ($000)
Slope from 0 to 15%	6,972	-	$56.9		361.4	418.3
Less than 5 Has.	948	$60	$56.9	-	-	56.9
More than 5 Has.	6,024	-	-	$ 60	361.4	361.4
Slope from 15 to 30%	5,178	-	206.8		207.4	414.2
Less than 5 Has.	2,585	$80	206.8	-	-	206.8
More than 5 Has.	2,593	-	-	$ 80	207.4	207.4
Slope from 30 to 50%	5,767		227.5		533.8	761.3
Less than 5 Has.	1,723		227.5		-	227.5
More than 5 Has.	4,044		-		533.8	533.8
Treatment A	3,460		124.1	-	291.1	415.2
Less than 5 Has.	1,034	120	124.1	-	-	124.1
More than 5 Has.	2,426	-	-	$120	291.1	291.1
Treatment B	2,307	-	103.4	-	242.7	346.1
Less than 5 Has.	689	150	103.4	-	-	103.4
More than 5 Has.	1,618	-	-	$150	242.7	242.7
Sub Total	17,917		491.2		1,102.6	1,593.8

1/ Treatment A activities consist of planting of live barriers.
2/ Treatment B includes the construction of hillside ditches and planting of line barriers.

honored by the dealer. It is estimated that in the five-year period a total of about $491.2 thousand will be given in fertilizer subsidies under this scheme.

Since the returns to the farmer in this size category will depend on the combined measures of soil and water conservation treatments with agro-forestry and fuelwood production, the analysis of costs and returns to the farmer has been done in this fashion in the Economic Analysis section.

For the farmer with more than 5 ha of land and up to 50 ha instead of a fertilizer subsidy, the farmer will be offered a soft loan for the purchase of fertilizer in exchange for the amount of work performed in soil-and-water conservation treatments. The terms of the loan will be: 15 years, with a five year grace period and 8% interest per annum, with 10 years to repay principal and accumulated interest accruals. The rules and technical conditions to be eligible for this kind of loan will be similar to the ones developed for the smaller farmer. Fertilizer loans to farmers with more than 5 ha of land will amount to about $1.1 million for the five-year period of the project.

In this case also, the fertilizer loans will be offered in a combined package with either agro-forestry and fuelwood production or with range management and pasture improvement loans, or both depending on the actual size of the farm and the slope and other conditions of the soil.

Different experiments done in several areas of the watershed with fertilizer given to or purchased by the farmer, indicate that the expected improvement of soil productivity resulting from fertilizer application is relatively low, with small margins left to cover the cost of fertilizer and labor input. To stabilize the income situation of the farmers besides the agro-forestry activities, fuelwood production and pasture improvement, free technical assistance will be given for the cultivation of alternative crops, for the use of improved seeds and agricultural practices and for different means of making the best use of the scarce water supply.

Since one of the objectives of the project is to stabilize the farmer's situation in the watershed, each team will have a land support specialist whose responsibility will be to assist the farmer to get title to land through INA or to help them solve other land-tenancy related problems that might affect their stability and their decision to invest in soil conservation measures.

The total area to be covered under these kinds of activities is 17,917 ha of which 5,256 ha (29.3% of this area) are exploited by farmers with less than five ha of land; and 12, 661 ha (70.7% of this area) are exploited by farmers with between 5 ha and 50 ha of land. The total extension of land to be treated with some kind of soil and water conservation works and intensive agricultural practices, represent 50.4% of the total target area of the project (35,560 ha).

AID will provide $491,200 in loan funds for fertilizer subsidies to the farmers with less than 5 ha, plus Loan funds of $1,102,700 to cover loans to farmers in this catergory.

ii) Agro-Forestry and Fuelwood Production Activities

One of the basic causes for deforestation and degradation of soils is the practice of forest cutting for fuelwood consumption. As was stated in the background section of this paper, consumption of firewood for domestic use is estimated at one cubic meter per person per year. According to this estimate, then, the annual firewood consumption per family equals approximately the volume produced in natural pine forest per hectare per year. The national annual consumption of firewood is in the order of 4.4 million cubic meters, of which about 50%, that is, about 2.2 million cubic meters is for household consumption.

The specific activities contemplated in this part of the project will be oriented basically to the provision of financial incentives to the farmers to dedicate a part of their land to agro-forestry activities or fuelwood production, using one or several of the fastgrowing species which are suitable for the area (See Technical Analysis section).

Besides providing an additional source of income to the farmer -- in about six to eight years after planting -- agro forestry and reforestation provide one of the best known means to protect the soil against erosion, to stabilize water supply and to reduce sediment yields.

As was stated above, the farmer will be offered a package of soil and water conservation incentives and agro-forestry and fuelwood production loans. The loans for agro-forestry and fuelwood will be given for an 18 year period, with 8 years of grace and 10 years to repay principal and interest accruals. These loans will carry an annual interest rate of 6.0% during the grace period and 8% thereafter.

As can be seen in the Economic Analysis and, the studies made on the socio-economic conditions of farmers in the watershed, without soft-term conditions for loans, agro-forestry or fuelwood production will not be practical. In these kinds of activities the farmers forego land and present returns, in order to create a capital asset. Therefore, the loans to be provided should reduce the real initial establishment costs.

Agro-forestry activities and fuelwood production will be oriented to the planting of fast growing species, either in land currently in fallow or at wide-spacings between traditional or new crops.

The GOH will issue clear legal directives to assure ownership of the trees planted under this program to project beneficiaries, as a condition precedent to disbursement of credit funds. In addition, land-tenure related problems confronted by project beneficiaries will be solved so as to give them security of tenancy regarding the land to be treated with any of the activities contemplated in the project.

As can be seen in Exhibit 1, the total area to be covered with agro-forestry or fuelwood production activities is of 3,360 ha, for a total direct cost of $2,926,000 which will be AID Loan funded.

iii) Reforestation activities

In lands with slopes of more than 50%, where no possibility exists for agro-forestry practices or for fuelwood production with rapid growing species, reforestation with pine trees (*Pinus oocarpa*, *P. caribea* or *P. pseudostrobus*), will be promoted.

This activity will benefit farmers who have become established either on their own land, or in municipal or state lands. The main objective of the activity is to reforest the area, thus providing the watershed protection which has been lost throughout several decades of irrational timber exploitation and slash and burn agriculture.

As is the case with agro-forestry and fuelwood production, the watershed management units in coordination with INA, will give assistance in providing security of tenure to the beneficiaries of the process. The land support specialists on the teams will be responsible for this function.

In the areas where the fast growing species are unsuitable for reforestation purposes a different financial incentive system will have to be applied. For example, in the case of pine which takes about 40 years to reach maturity, the incentive will consist in covering the cost of labor input, seedlings and establishment costs, as a loan to the farmer on a 10 year basis, with a 5 year grace period and 8% interest. The GOH will repay the loan to the Watershed Management Credit Fund, beginning in year 6 and for the ten years that it takes for the loan to be fully paid, provided that in each year the farmer is complying with the reforestation requirements as stated in his loan-contract (determined by the subwatershed management teams).

As is the case for agro-forestry and fuelwood production, a basic issue, which will be resolved by the GOH prior to disbursement of funds for reforestation, is the issuance of regulations whereby management rights of trees planted under this scheme will be provided to the owner of the land. Actions will also be taken to solve land tenure related problems so as to assure security of tenancy to these project beneficiaries.

Approximately 4,233 ha have been classified as falling under the reforestation category. AID Loan funds will finance $1,481,500 of credit for reforestation.

iv) Range Management and Pasture Improvement

A total of about 5,050 ha of lands in the five subwatersheds will be treated with pasture improvement and range management practices in the five year period of the project. Better management practices for *jaragua* grass -- which is used extensively in the region -- as well as the substitution of this *jaragua* and other stump-grasses, for stoloniferous grasses (such as *Bracchiaria*) will be promoted.

Range and pasture management specialists within the WMU will be in charge of promoting better range management practices and pasture improvement. The objective of these practices is to increase the carrying capacity of the land for livestock, to augment the productivity of the cattle and to protect the land against soil erosion and further degradation.

The financial incentive to be provided to the cattle grower to adapt these practices will consist primarily in free technical help and in loans which will be provided for a 10 year period, with five years of grace and at 12% interest. The credit-funds could be used either for the establishment of new pastures under the supervision of the subwatershed management teams, for fence repairs, or for the adoption of other improved range management practices.

AID funds will finance $1,515,100 for the credit loans necessary for range management and pasture improvement.

v) Community-Nursery Organizations

In order to involve the Community directly into the developmental efforts contemplated under the project, as well as to facilitate the implementation of loan and production activities in the five selected subwatersheds, community organizations will be promoted by the Watershed Management Teams. Several alternatives are available for promoting community organizations. Wherever possible the watershed management teams will work with existing local organizations. The Patronato is one common organization that could serve as a basis for a community group. The Patronato can not function as a profit making organization, however, an auxilliary group that is not bound by the non-profit status could be formed. A considerable amount of time is required to obtain cooperatiave status, in addition, there are requirements for legal and accounting assistance that would place an extra burden on the community organization at the outset. It is better, then, to begin with an organization that is less difficult to form than a cooperative. Pre-cooperatives are one possibility. The regulations governing pre-coops are less demanding, but a timetable is required for forming the cooperative at some time in the future. Other organizations that have been used successfully in Honduras are Comites and Juntas Agricolas. These groups are less rigidly defined than coops or pre-coops. For Project purposes, the criteria for establishing a Comite or Junta can be adjusted to the level of cooperative interest in the recipient community. As the Project continues the group may decide to opt for pre-coop or coop status, to obtain a greater range of benefits than offered by the Project. In each of the teams, the social promoter and the community organization expert will be directly responsible for the promotional and training effort in group structures, as well as for the fulfillment of the legal requirements necessary to organize community organization units. In addition, the training of paraprofessional technicians, recruited from farmers in each community, will provide the basic link between the members of the community organization and the

watershed management units. It is anticipated that each community organization will have at least one paraprofessional to perform these functions. Since each community organization will have an average of 25 member-participants, each paraprofessional technician will be in direct contact with 25 farmers in his own community. Funds are included in the project to cover the cost of training as well as the costs of travel and per diem of these paraprofessional technicians, so that they could keep a schedule of visits to project beneficiaries on a minimum of 96 days per year, or 8 days per month.

The organizational effort in question will be preceded by an educational campaign through local radio stations regarding the eventual effects of the continued use of current agricultural practices which are detrimental to the environment in general. Although target farmers are aware of erosion, and especially of gulley erosion because it is easily perceived, they have no clear understanding of its causes, and of the effects of cultivating corn and sorghum on slope land using traditional technology. The educational campaign will establish the necessary causal relationships by dramatizing through radio serial and musical programs the eventual environmental and socio-economic impact of the current agricultural system. At the local level, the impact of the educational campain will be increased by obtaining the support of local opinion leaders to discuss in informal meetings the content of the broadcasted stories and songs. The work of social promoters to organize groups will be initiated once the problem awareness atmosphere has been created. The social promotion concept used in this Project is based on the idea of helping community members to expand their ability to identify problems and to act as a group. The social promoters will be motivating community members to use their resources creatively and dynamically so that through continued group activities general community living standards can be improved. Project beneficiaries will have an active role in the definition of community problems and in the selection of alternatives from the solutions that the Project will be offering.

The number of community organization units to be organized each year, increases from 26 for the first year to 53 the third year and to 79 in the fifth year, so that at the end of the fifth year of the project, 264 community organizations will have been established. A more detailed discussion about the feasibility of community organization units can be found in the Social Analysis.

The total amount of land to be treated either with agro-forestry, fuelwood production or reforestation, is 12,593 ha. An intensive effort, at the local level will be required to produce the seedlings required for these kind of activities. It is estimated that a total of 25.2 million seedlings will be used in the five year period.

In order to stimulate the production of seedlings at the community level, direct grants will be made to each community organization unit to establish a nursery. The grants will cover the costs of establishing the nurseries, including initial infrastructure, materials and supplies,

permanent labor, etc. The cooperative will be responsible for the actual operation of the nursery. Also, the seedlings will be sold at a reasonable price to allow some margin to be earned by the community organization in order to eventually pay for the continuing cost of nursery operations, the cost of accounting services required under the Cooperative Law and to permit further community oriented projects on the part of the cooperative. Depending on the existing community problems, encouragement will be given to undertake other conservation type activities which benefit the whole community such as repair and maintenance of trails. Grants for the purchase of tools will also be provided under this program.

Total grants under this part of the program will amount to $1,055,500 for the five-year period and will benefit 264 community organizations, each with 25 farm-families. This makes a total number of 6,600 farm-families or close to 40,000 persons as direct beneficiaries of the program.

AID loan funds will be used to finance the community nurseries and the purchase of community tools.

vi) Watershed Management Credit Fund and Grant Activities

The project will establish a Choluteca Watershed Management Credit Fund in the National Agricultural Bank (BANADESA) to provide a source of loans for farmers to undertake the activities included in the Project.

The loans will be made through a community organization structure to individual farmers who participate in the project. The credit will be offered for purchase of fertilizers, for introducing agro-forestry, fuelwood production, reforestation or range management and pasture improvement practices. Although it is possible that the target farmers with farms above 5 ha in size who participate could utilize loans for all the different treatments, in practice probably no more than 2 different treatments would be applied by any one farmer, e.g., soil and water conservation and agro-forestry.

It has been estimated that as high as 50% of the target farmers do not have valid titles to their land. Because of the difficulty under current regulations and banking practices of providing credit to these farmers, all loans will be made to farmers through community organizations. This approach not only expands the loan opportunities for farmers without clear title to their land but limits the number of transactions required to administer the loans. It also will provide a community-based structure for approving loan requests and through social pressure, hopefully, improve the prospects for repayments.

Loans requests as well as the grants for fertilizers will be based on individual farm plans which will be developed by participating community organization members with the assistance of the Watershed Management Unit. The farm plans will be consolidated by the community organization along with the schedule of loan and grants, approved by the

community organization membership and forwarded to the Project Office. The Project Office will, after technical and financial analysis, approve the community organization request and forward the loan schedule to the BANADESA. The Watershed Management Credit Fund will be established as a fiduciary fund. The bank will administer the loans and grants, disbursements and repayments, but the Project Office will substantively manage the loan program as it will the grants for fertilizer and nurseries.

Authorities, responsibilities, criteria, and procedures with respect to loan approvals and administration for both the Project Office and the Bank will be developed and implemented prior to any disbursements from this fund. Similarly, procedures and rules will be established for fertilizer and nursery grants and will be approved and installed prior to any such disbursements (Annex K).

CHOLUTECA WATERSHED MANAGEMENT AND REHABILITATION PROGRAM

ECONOMIC ANALYSIS

I. Introduction

In this Annex a detailed description of the actual economic and financial situation of project beneficiaries living in the five selected subwatersheds can be found. Based on these descriptions, quantitative farm models will be developed to analyze the economic and financial impact of each of the different activities contemplated under the Project using internal rate of return analysis for the different sizes of farms models. Also a financial analysis of the Choluteca Watershed Management Credit Fund, to be established to provide loans for the project beneficiaries, is included. Finally, an analysis of both the private and public costs and benefits of the project has been made in order to arrive at meaningful benefit/cost ratios for all project activities. With regards to this last point it is worth noting that the quantifiable benefit/cost ratio - while only taking into account the partial public benefits of the Project - is 1.11 at a 15% discount rate and 1.40 at a 12% discount rate, for Project benefits extended over a 22-year period. Appropriate explanations regarding methodology have been included either as footnotes to the different Exhibits included in this Annex or as part of the main body of the text.

II. Project Beneficiaries

Project beneficiaries of this Project can be classified in two types: the "Direct Beneficiaries" and the "Indirect Beneficiaries". The former are all of the farmers and cultivators who live within the watershed's selected sub-project areas and who will receive direct technical or financial assistance for the different production/protection activities contemplated in the project. The "Indirect Beneficiaries" are all the beneficiaries who reside outside of the project areas but who will obtain direct or indirect benefits from them.

The specific characteristics of the direct project beneficiaries will vary from subwatershed to subwatershed and must therefore be analyzed on that basis. Since human activities, such as traditional slash and burn agriculture and ranching are the major cause of deterioration of the renewable natural resource base, the first direct participants should be this sector of the population. The bulk of the project funds are channeled directly into the primary target group of the rural population within the selected subwatersheds.

On the other hand, strengthening the institutional mechanisms through which the GOH manages Honduras' renewable natural resources will ultimately benefit the entire population of Honduras. Eventually, benefits will derive from increases in the productivity of the land, from

stabilizing the farmers'situation within the watershed through higher employment and income opportunities and from ensured supplies of hydroelectric power and water.

Exhibit 1 presents a summary of the latest estimate of the number of farms, the total area and the average size of farms in the municipalities included within the geographical limits of the watershed. The total number of farmers living in the Choluteca Watershed Region is 20,805, of which 68.2% are farmers with less than 5 ha of land, and 28.4% are farmers with farm sizes in the range of 5 to 50 ha of land. Only 3.4% of the farmers in the region are classified in the above 50 ha range category.

The total area under farming in the Choluteca Watershed is about 298,777 hectares. However, only 8.9% of this land is cultivated by farmers with less than 5 ha; and 63.5% by farmers with more than 50 ha.

EXHIBIT 1

CHOLUTECA RIVER WATERSHED

Number of farms, Total area and Average Size of farms in the Municipalities included within the geographical limits of the Watershed.

Size of Farm (ha)	Number of Farms Total	Percent	Area in ha Total	Percent	Average Size (in ha)
1. Total	20,805	100.0%	298,777	100.0%	14.4
1.1 Less than 5	14,190	68.2	26,454	8.9	1.9
1.2 From 5 to 20	4,494	21.6	42,607	14.3	9.5
1.3 From 20 to 50	1,423	6.8	39,948	13.4	28.1
1.4 Larger than 50	698	3.4	189,768	63.5	271.9

Source: National Agricultural Census of 1974, as processed in detail by municipalities and adjusted to conform to the geographical limits of the watershed.

An examination of the actual use of land within the watershed (Exhibit 2) indicates that the majority of the land is pasture land dedicated to cattle grazing. A total of 172,162 hectares, which represent 58.9% of the total farming area, are covered either with natural pastures (15.9%); improved pastures (7.6%) or cultivated pastures (35.4%). Annual and permanent crops account for 47,307 hectares, which are 16.2% of the total. Land with pines and other trees account for 34,421 hectares, which represent 11.7% of the total.

It can be seen that the majority of the land in the Choluteca Watershed is dedicated to cattle. Significant proportions of their land are seriously degraded and are extremely marginal as pasture for grazing. To encourage acceptance of reforestation activities, and to allay potential reluctance on the part of the ranchers to give up "productive" pasture land to tree stands, the project will defray the cost of reforestation and provide credit and technical assistance to increase the carrying capacity of land appropriate for pasture use.

Pasture improvement activities, such as the introduction of stoloniferous grasses and rotation of cattle onto various grazing sites, will have the double benefit of improving the cattle's forage while at the same time maximizing soil conservation by improving and protecting the vegetative cover. By establishing commercially exploitable tree stands on their land, through agro-forestry, fuelwood production and reforestation, farmers will not only protect it through sound conservation practices, but will also develop an additional source of income.

A recent in-depth survey 1/ of the Choluteca watershed, part of a national survey on the conditions of income and employment in the poor rural sector, estimates a total supply of labor of 19.5 million man/days in the Southern region and 18.2 million man/days in the Central-Eastern region, for a total of 38.7 million man/days available <u>only</u> from the rural poor - defined in the survey as those farmers with less than 20 hectares of land. The unemployment situation in the area is alarming: an average of 50% of the available man/days are unemployed in the poor rural sector.

It is estimated that the initial agro-forestry, fuelwood plantation or reforestation of one hectare will require 43 man/days of non-specialized labor for the first year and about 15 man/days for each subsequent year of the project (for cleaning, thinning and pruning). Improved cattle management activities will also create jobs. Pasture improvement activities will create an additional estimated 10 days of labor per hectare, to be satisfied mainly by family labor.

The small and medium size farmers in the Choluteca watershed will also benefit from increased technical and financial assistance from the agro-forestry activities and the additional annual or permanent crops

1/ INVEST: Informe IV. <u>Las Condiciones de Empleo e Ingreso en el Sector Rural Pobre de Honduras. Vol-I</u>

which will be planted along with the reforestation effort. The different activities to be undertaken in the watershed will also contribute to better community organization and to a more stable water supply, which will benefit the entire region.

EXHIBIT 2

CHOLUTECA WATERSHED

ACTUAL USE OF THE LAND

		Number of Hectares	Percent
1.	Annual Crops	34,937	11.96
2.	Permanent Crops	12,370	4.24
3.	Fallow Land	9,076	3.11
4.	Pasture Land	172,162	58.94
	4.1 Natural Pastures	46,429	15.90
	4.2 Improved Pastures	22,253	7.62
	4.3 Cultivated Pastures	103,480	35.43
5.	Pines	27,354	9.43
6.	Other Trees	7,067	2.42
7.	"Guamiles" 1/	26,450	9.06
8.	Other	3,652	0.91
9.	T o t a l	293,068	100.00

1/ "Guamiles" are uncultivated lands kept with different species of tall grasses, bushes or forage crops = bush.

SOURCE: National Agricultural Census of 1974 as processed by Municipalities for AID.

The beneficiaries of the package of soil and water conservation and intensive agricultural practices, agro-forestry and fuelwood production and reforestation with improved pasture and cattle management will be the small cattle ranchers and farm laborers in the hillsides. Additional employment and probably higher wages will be a result of the improved pasture/cattle management activities since these activities are labor intensive.

The establishment of agro-forestry and fuelwood, as well as pine plantations in the selected areas of the watershed will provide benefits for practically the whole population of the region. It will have a substantial impact on the quality of human life and sustained productivity through the combined activities of conservation, protection, environmental education and research. Since the Choluteca watershed includes a network of major and minor watersheds, including the ones on which the capital city's water supply depends, their protection will help to ensure a steady water supply.

Awareness of the individual and his community regarding matters of conservation and protection of renewable natural resources is an important aspect of the project. The activities contemplated in the project in this area will contribute toward motivating individuals and communities to take positive action against environmental degradation.

The data and information gathering activities included in the project will also benefit the entire population. The rural poor in particular will receive direct and indirect benefits from the knowledge gained by this project inasmuch as the findings will provide pertinent information on the natural environment and its resources upon which all, and especially the poor, are dependent.

The direct productive activities included in the project will have substantial indirect benefits to "downstream beneficiaries", and those benefiting from follow-on activities. The experience gained in the different sub-project areas, when extended to other watersheds in Honduras, will benefit directly and indirectly a large percentage of the entire Honduras population. Furthermore, the activities to be undertaken in the Choluteca watershed will benefit, either directly or indirectly, a large part of the total watershed population, estimated at 707,384 persons for 1980 and at 850,079 persons for 1985, through additional production of foodstuffs (basic grains, milk and milk products, meat, etc.), an increased supply of fuelwood and timber products and through the environmental benefits associated with reforestation and soil and water conservation measures. This represents almost one fifth of the entire population of Honduras estimated at 3.7 million for 1980.

III. Farm Models for the Economic Evaluation of Project Activities

In Exhibit 3, a summary description of the farmers living in each of the five selected subwatersheds is presented. The total number of farm units is 13,614, covering a total area of 168,986 hectares. With

EXHIBIT 3

Choluteca River Watershed

Number of Farms and Total Farm Area, in the Fine-Selected Subwatersheds, by Size of Farm

Size of Farm (In Hectares)	Total Number of Farms	%	Area	%	Headwaters N of F	Headwaters Area	Nueva Armenia N of F	Nueva Armenia Area	Orocuina N of F	Orocuina Area	Namale N of F	Namale Area	Sample N of F	Sample Area
1. Total	13,614	100.00	168,986	100.00	3,562	57,271	2,665	26,993	3,514	29,616	1,639	25,294	2,214	29,812
2. Sub-total Less Than 5	9,345	68.64	17,231	10.20	2,678	4,795	1,717	3,436	2,342	4,386	1,003	1,967	1,605	2,647
2.1 Less than 1	2,786	20.46	1,760	1.04	835	526	446	285	747	468	261	178	497	303
2.2 From 1 to 2	2,743	20.15	3,678	2.18	809	1,121	482	608	612	855	292	407	548	627
2.3 From 2 to 3	2,182	16.03	5,304	3.14	603	1,470	443	1,080	557	1,361	263	628	316	765
2.4 From 3 to 4	776	5.70	2,705	1.60	232	802	134	471	190	663	87	304	133	465
2.5 From 4 to 5	858	6.30	3,784	2.24	199	876	212	932	236	1,039	100	450	111	487
3. Sub-total From 5 to 20	3,005	22.07	28,492	16.86	632	5,899	711	6,764	887	8,402	381	3,662	394	3,765
3.1 From 5 to 10	1,871	13.74	13,099	7.75	394	2,750	441	3,070	557	3,925	234	1,632	245	1,722
3.2 From 10 to 20	1,134	8.33	15,393	9.11	238	3,149	270	3,694	330	4,477	147	2,030	149	2,043
4. Sub-total From 20 to 50	834	6.13	25,396	15.03	140	4,243	192	5,837	213	6,466	153	4,723	136	4,127
5. Sub-total More than 50	430	3.16	97,867	57.91	112	42,334	65	10,956	72	10,362	102	14,942	79	19,273
5.1 From 50 to 100	221	1.62	14,896	8.81	46	3,149	36	2,387	53	3,608	50	3,276	36	2,476
5.2 From 100 to 200	112	0.82	14,939	8.84	37	5,057	14	1,777	9	1,263	28	3,699	24	3,143
5.3 From 200 to 500	64	0.47	18,971	11.23	15	4,532	9	2,261	7	1,723	20	5,807	13	4,648
5.4 From 500 to 1,000	18	0.13	10,685	6.32	7	4,892	4	2,316	1	116	4	2,160	2	1,201
5.5 From 1,000 to 2,500	7	0.05	7,867	4.66	1	1,400	2	2,215	1	152	-	-	3	4,100
5.6 Larger than 2,500	8	0.06	30,509	18.05	6	23,304	-	-	1	3,500	-	-	1	3,705

SOURCE: Processed from National Agricultural Census of 1974, from dissagregated data of municipalities as adjusted for geographical limits of the watershed.

the exception of the Headwaters subwatershed, where the largest amount of farm land can be found, the other four subwatersheds are very similar in size, although the density of farm families varies substantially, with the highest density to be found in the Orocuina subwatershed and the lowest density in the Namale subwatershed.

As has been described in detail in the Technical Analysis section of this paper, the target group of farmers chosen as direct beneficiaries of project activities are those farmers with less than 50 ha of land. There are 13,184 farming units representing one average family of 6.0 members each within this category, which account for 96.8% of the farm population in the selected areas, and cover a total area of 71,119 hectares, which represents 42.1% of the total area. Exhibit 4 presents a summary of findings regarding the slope characteristics of farm land for each of the subwatersheds by size of farm.

Since different financial incentive programs will be implemented depending on the size of farm of the project beneficiaries, it was appropriate to develop farm models within which the economic impact of different project activities could be evaluated. Recent in-depth surveys made for farmers in the less than 50 ha category, in the Southern and Central-Eastern Regions of Honduras, as part of a national survey on income and employment conditions for the rural poor, permit the development of micro-economic models with which the economic analysis of private costs and benefits from project activities can be evaluated.

In Exhibit 5, the basic economic data to be used for the farm models is presented. The source of this information and the corresponding detail by size of farm is presented in Exhibits 5A and 5B in Annex M-1.

In Exhibit 5, gross income by source, total production costs, the costs of family labor, net income from the farm, total income obtained from outside the farm and total family income, can be determined for the two large subregions within the Choluteca Watershed and for the two large farm groups defined as target groups for purposes of the project.

The worst case situation, in terms of actual level of income, has been chosen to analyze the impact of project activities. As can be seen in Exhibit 5, the worst case situation in both size groups of farms is found in the Central-Eastern region. It has been determined that the average gross income for farmers with less than 5 ha is about $433.70 a year, with average annual production costs of about $240.30, for a net farm income of $193.50 a year. The total income obtained by the farmer with less than 5 ha from work performed outside of his farm unit averages $156.50 a year, for a total family income of about $350.00 a year. Considering that an average farm family has 6 family members, this will indicate an annual per capita income of only $58.30, or a monthly income of only $4.90. - - - - - Traditional crops (corn, sorghum, beans) account for the bulk of farm produced income.

EXHIBIT 4

CHOLUTECA WATERSHED
SLOPE CHARACTERISTICS OF LAND WITHIN THE FIVE
SELECTED SUBWATERSHEDS BY SIZE OF FARMS

SLOPE	Less than 5 ha		From 5 - 20		From 20 - 50		More than 50		TOTAL	
	ha	%	ha	%	ha	%	ha	%	ha	%
1) 0-15%	1,895	11.0	5,698	20.0	6,349	25.0	32,191	32.9	46,133	27.3
2) 15-30%	5,169	30.0	7,123	25.0	5,841	23.0	18,537	18.9	36,670	21.7
3) 30 - 50%	6,892	40.0	10,827	38.0	9,396	37.0	34,565	35.3	61,680	36.5
4) Larger than 50%	3,274	19.0	4,844	17.0	3,809	15.0	12,407	12.7	24,334	14.4
TOTAL	17,231	100.0%	28,492	100.0%	25,396	100.0%	97,867	100.0%	168,986	100.0%

SOURCE: Figures derived from National Agricultural Census of 1974 and adjusted according to findings of Cataster (PCN) on slope categories.

EXHIBIT 5

CHOLUTECA WATERSHED
AVERAGE GROSS AND NET INCOME, TOTAL PRODUCTION COSTS AND COSTS OF FAMILY LABOR
(IN US$)

Concept	Farms from 5 - 20 ha		Farms from 0 - 5 ha	
	Southern Region	Central-Eastern Region	Southern Region	Central-Eastern Region
1. Gross Income	1,605.2	1,3[illegible].1	584.9	.7
1.1 Crops	887.4	990.4	319.0	340.1
1.2 Livestock	663.4	264.4	239.8	73.1
1.3 Forestry	54.4	62.4	26.2	20.6
2. Total Production Costs	993.0	635.7	388.5	240.3
2.1 Crops	668.7	479.1	238.7	186.1
2.2 Livestock	242.1	111.2	118.9	37.9
2.3 Forestry	82.2	45.4	30.9	16.3
3. Cost of Family Labor*	371.4	249.9	183.5	133.9
3.1 Crops	180.7	172.8	86.3	104.6
3.2 Livestock	146.9	45.1	73.7	18.8
3.3 Forestry	43.9	32.0	23.5	10.5
4. Net Income	612.6	681.4	196.5	193.5
4.1 Crops	218.8	511.3	80.3	154.0
4.2 Livestock	421.3	153.2	120.9	35.2
4.3 Forestry	-27.9	16.9	-4.8	4.3
5. Total Income from Outside the Farm	293.9	122.8	299.5	156.5
6. Total Family Income	906.1	804.1	495.9	350.0
7. Annual Per Capita Income	151.0	134.0	82.7	58.3

SOURCE: INVEST. Informe IV. Cuadro No. 51. Also see Exhibits 5A and 5B in Annex M-1 of this document.
*Included in total production costs.

EXHIBIT 5A

AVERAGE GROSS INCOME, TOTAL PRODUCTION COSTS
AND COSTS OF FAMILY LABOR CHOLUTECA WATERSHED
(IN LEMPIRAS)

Concept	SOUTHERN REGION				CENTRAL-EASTERN REGION			
	0-2 Has.	2-3 Has.	3-5 Has.	Average	0-2 Has.	2-3 Has.	3-5 Has.	Average
1. Average Gross Income	610.6	1,232.9	1,665.8	1,169.8	453.8	845.2	1,303.3	867.4
1.1 Crops	326.6	758.6	828.6	637.9	380.1	673.3	986.9	680.1
1.2 Livestock	238.8	418.3	781.8	479.6	56.0	132.8	249.9	146.2
1.3 Forestry	45.2	56.0	55.4	52.3	17.7	39.1	66.4	41.1
2. Total Production Costs	489.5	809.4	1,031.8	776.9	320.0	451.1	670.6	480.6
2.1 Crops	265.8	543.5	622.7	477.3	254.8	364.3	497.4	372.2
2.2 Livestock	174.9	198.0	340.6	237.8	40.7	64.4	122.4	75.8
2.3 Forestry	48.8	67.9	68.5	61.7	24.5	22.4	50.8	32.6
3. Cost of Family Labor*	285.6	298.9	516.5	367.0	178.6	262.9	362.0	267.8
3.1 Crops	131.4	126.1	260.0	172.5	137.8	218.3	271.6	209.2
3.2 Livestock	111.6	124.9	205.3	147.3	19.8	27.2	65.6	37.5
3.3. Forestry	42.6	47.9	50.2	46.9	21.0	16.8	24.8	20.9
4. Net Income	121.2	423.5	634.0	392.9	133.8	394.1	632.7	386.9
4.1 Crops	60.8	215.1	205.9	160.6	125.3	309.0	489.5	307.9
4.2 Livestock	63.9	220.3	441.2	241.8	15.3	68.4	127.5	70.4
4.3 Forestry	-3.6	-11.9	-13.1	-9.5	-6.8	16.7	15.6	8.5
5. Total Income from Outside the Farm	597.0	680.2	519.6	598.9	323.2	414.9	201.0	313.0
6. Total Family Income	718.2	1,103.7	1,153.6	991.8	457.0	809.0	833.7	699.9
7. Annual Per Capita Income	119.7	184.0	192.3	165.3	76.2	134.8	139.0	116.7

SOURCE: INVEST. Informe IV. Cuadro No. 51
*Included in total production costs.

EXHIBIT 5B

AVERAGE GROSS INCOME, TOTAL PRODUCTION COSTS AND COSTS OF FAMILY LABOR. CHOLUTECA WATERSHED (IN LEMPIRAS)

Concept	SOUTHERN REGION			CENTRAL-EASTERN REGION		
	5-10 Has.	10-20 Has.	Average	5-10 Has.	10-20 Has.	Average
1. Average Gross Income	2,804.2	3,616.3	3,210.3	2,635.9	2,632.2	2,634.1
1.1 Crops	1,656.1	1,893.5	1,774.8	2,173.3	1,788.0	1,980.7
1.2 Livestock	1,067.0	1,586.3	1,326.7	374.0	683.4	528.7
1.3 Forestry	81.0	136.5	108.8	88.6	160.8	124.7
2. Total Production Costs	1,773.4	2,198.4	1,986.0	1,296.2	1,246.6	1,271.4
2.1 Crops	1,166.4	1,508.2	1,337.3	1,010.3	906.1	958.2
2.2 Livestock	455.0	513.3	484.2	202.9	241.9	222.4
2.3 Forestry	152.0	176.9	164.5	83.0	98.6	90.8
3. Cost of Family Labor*	721.7	763.7	742.7	500.3	499.1	499.7
3.1 Crops	362.6	359.9	361.3	347.2	344.0	345.6
3.2 Livestock	281.5	305.8	293.7	95.3	85.1	90.2
3.3 Forestry	77.6	98.0	87.8	57.8	70.0	63.9
4. Net Income	1,030.7	1,417.9	1,224.4	1,339.7	1,385.6	1,362.8
4.1 Crops	489.7	385.3	437.5	1,163.0	881.9	1,022.5
4.2 Livestock	612.0	1,073.0	842.5	171.1	441.5	306.3
4.3 Forestry	-71.0	-40.4	-55.7	5.6	62.2	33.9
5. Income from Outside the Farm	660.8	514.9	587.9	253.7	237.4	245.6
6. Total Family Income	1,691.5	1,932.8	1,812.2	1,593.4	1,623.0	1,608.2
7. Annual Per Capita Income	281.9	322.1	302.0	265.5	270.5	268.0

SOURCE: INVEST. Informe IV. Cuadro No. 51
*Included in total production costs.

For farmers in the 5 to 20 ha category, the average annual gross income has been estimated at $1,317.1, with total production costs of $635.7, for a net farm income of $681.4. Income obtained from work performed outside the farm is $122.8 per year, for a total average family income of $804.1 per year. This will imply an annual per capita income of $134.0 and a monthly per capita income of $11.2. As is the case with smaller farms, traditional crops (corn, sorghum and beans) account for the bulk of farm income, although in the larger farms, cattle begins to play a relatively more important role. The average annual gross income of farms from 20 to 50 ha has been determined for the Central-Eastern Region to be on the order of $2,047.0. Since this represents about $341.2 annual per capita income, it was considered appropriate to include this size category of farms within the project beneficiaries. The economic model used for this size of farms is described in detail in the Range Management and Pasture Improvement section.

Exhibits 6 and 7 present a summary of data related to cash income and cash operating costs for farmers living in the two large regions within the watershed. Average cash income is derived from the sale of farm products and from work performed by the farmer off his farm. As before, the worst case situation, which is found in the Central-Eastern Region, has been chosen for purposes of the present analysis. In this region, the farmer with less than 5 ha has an average cash income of $281.7 per year and average cash operating costs of $106.40 (after deducting the costs of family labor of $133.9 from total production costs). The farmer in the range of 5 to 20 ha has, in that same region, an average cash income of $874.7, and average cash operating costs of $385.8.

These figures will now be used to evaluate the impact of project activities, using internal-rate-of-return and cash-flow analysis, with the understanding that this is only one of the approaches followed to determine long run profitability of operations and investments. Experience obtained in the Choluteca area in different programs dealing with soil conservation works such as hillside ditches and terraces and also with the planting of cashew nuts, indicates that the incentives offered by the different Project activities are much more attractive than the one offered for those programs. Farmers were stimulated to do the soil conservation works and also for the tree plantations were paid at an equivalent of $1.13 per day in food rations by a Food for Work program. Payment of labor inputs in cash at an average rate of $2.00 per day as contemplated in this project will be an attractive incentive for farmers to undertake the different Project activities, since their labor and work decisions are based not so much on the long term profitability or internal rates of return of those decisions, as on short term cash-flow results from the same activities.

EXHIBIT 6

AVERAGE CASH INCOME, COSTS OF FAMILY LABOR AND AVERAGE CASH OPERATING COSTS (IN LEMPIRAS)

Concept	SOUTHERN REGION 0-2 ha	2-3 ha	3-5 ha	Average	Average In US$*	CENTRAL-EASTERN REGION 0-2 ha	2-3 ha	3-5 ha	Average	Average In US$
	(In Lempiras)					(In Lempiras)				
1. Average Cash Income	724.3	1,064.6	1,047.2	945.4	$472.7	455.0	589.0	646.2	543.4	$281.7
1.1 From the Farm	129.1	417.4	553.5	366.7	183.4	136.3	218.5	449.1	268.0	134.0
1.2 From other work	595.1	647.2	493.7	578.7	289.4	318.7	370.5	197.1	295.4	147.7
2. Average Production Costs	489.5	809.4	1,031.8	776.9	388.5	320.0	451.1	670.6	480.6	240.3
3. Cost of Family Labor	285.6	298.9	516.5	367.0	183.5	178.6	262.9	362.0	267.8	133.9
4. Average Cash Operating Costs	203.9	510.5	513.3	409.9	$205.0	141.4	188.2	308.6	212.8	$106.4

*Converted at the rate of 1 US$ = 2 lps

EXHIBIT 7

AVERAGE CASH INCOME, COSTS OF FAMILY LABOR AND AVERAGE CASH OPERATING COSTS. (CHOLUTECA WATERSHED) (IN LEMPIRAS)

Concept	SOUTH REGION				CENTRAL-EASTERN REGION			
	5-10 ha	10-20 ha (In Lempiras)	Average	Average In US$	5-10 ha	10-20 ha (In Lempiras)	Average	Average In US$
1. Average Cash Income	2,009.1	2,431.0	2,220.1	1,110.0	1,892.9	1,605.9	1,749.4	874.7
1.1 From the Farm	1,357.6	1,850.9	1,604.3	802.1	1,619.5	1,423.3	1,521.4	760.7
1.2 From other Work	651.5	580.1	615.8	307.9	273.4	182.6	228.0	114.0
2. Total Production Costs	1,773.4	2,198.4	1,986.0	993.0	1,296.2	1,246.6	1,271.4	635.7
3. Costs of Family Labor	721.7	763.7	742.7	371.4	500.3	499.1	499.7	249.9
4. Average Cash Operating Costs	1,051.7	1,434.7	1,243.3	621.6	795.9	747.5	771.7	385.8

SOURCE: INVEST. Informe IV. Cuadro No. 57

a) Soil and Water Conservation and Intensive Agricultural Practices

The socio-economic survey made in the selected subwatersheds indicates that soil conservation works by themselves will not be enough to stabilize the farmer's situation in the watershed in the sense of assuring a permanent source of income, land tenure security and continuous residence in the area. Soil conservation works might be necessary to stop further deterioration of the land, but additional measures will have to be undertaken to increase the farmer's income from the land.

Average requirements of labor for soil conservation works differ depending on the length of work to be performed and the complexity of the soil conservation measure being undertaken. Labor requirements could go from 10 man-days per ha for the simplest jobs to about 80 man-days per ha for the more complicated soil conservation works. A conservative estimate of 40 man-days per hectare to be employed in soil conservation works has been used in this part of the paper. Since labor is unemployed for a large part of the year, the opportunity cost of labor of $1.13 per man/day has been used. This gives an average cost of $45.00 per ha for soil conservation works. 1/

As has been described in detail in other parts of the paper, an incentive system will be offered to farmers doing soil and water conservation work, consisting of a fertilizer grant for farmers with under 5 ha of land and soft-term loans for the purchase of fertilizers for farmers in the range of 5 to 50 ha of land.

For farmers with less than 5 ha of land, four different levels of fertilizer subsidies will be offered: $60/ha; $80/ha; $120/ha and $150/ha. The total amount will depend on the number of meters of soil conservation works performed and the complexity of that work. At current fertilizer prices, this means that the farmer-beneficiary could receive from 4 bags of fertilizer per ha up to 10 bags of fertilizer per ha. The actual number of bags of fertilizer to be used in a given year will depend on the specific technical recomendations made by the Watershed Management Team for the particular soil and crop in the farmer's land.

A wide diversity of fertilizer response has been encountered in actual practice in different regions within the Choluteca watershed where farmers use fertilizer either independently or as part of the MNR's agricultural extension programs.

1/ It could also be argued that the opportunity cost of labor at certain times of the year, when soil conservation works are to be done, is nil since real employment alternatives do not exist. The price of $1.13, however, has been selected because this is the minimum cost associated with soil conservation works in Honduras to induce farmers to participate in this kind of projects both by the FAO Watershed Project in Yojoa and Omoa as well as by Catholic Relief Fund in Choluteca. $1.13 is the average value of the amount of food per man/day offered in Food-for-Work Programs in Honduras.

Responses go from extremely low, where the farmer only gets as much additional income as the added expense for fertilizer, to very good, where the increases in production value are doble the amount of fertilizer applied. For purpose of this analysis, a conservative response of about 33.3% of the total value of fertilizer applied, above fertilizer cost, has been used. Actual response will depend on the quality of the soil, the quality of fertilizer used and the crop variety cultivated in the farm. Careful study of soil conditions and the use of improved varieties will be part of the Watershed Management Unit's functions.

The economic analysis indicates that soil conservation measures by themselves, even when combined with the application of fertilizer inputs and other intensive agricultural practices, are not enough to provide adequate returns to the farmers under 5 ha. For this reason, a package approach where both soil conservation works, fertilizer inputs, intensive agricultural practices and loans for agro-forestry and fuelwood production will be offered. The combined result of these practices can have an adequate internal rate of return to farmers under 5 ha as is explained in detail below, following the discussion on agro-forestry and fuelwood production.

For farmers with 5 ha of land, the same situation occurs in relation to soil conservation works. Loans for fertilizer inputs are not sufficient incentive for the farmer to adopt the conservation techniques.
For this reason, besides fertilizer loans, loans for agro-forestry and fuelwood production will be offered as an incentive package. In the case of large farms where range management or pasture improvement practices can be applied, a triple package loan will be offered. The particular components of the package loans will be determined by the farm plans which the Watershed Management Unit will develop for each community organization established under the program. The combined results of these practices do provide adequate returns to farmers as is explained below.

Most of the production increases to be obtained from this part of Project activities will be in the form of traditional crops: basic grains such as corn, beans, sorghum, etc., with which farmers have marketing experience and where no major marketing problems are anticipated.

b) Agroforestry and Fuelwood Production

For a large part of the Choluteca Watershed land, which is now either deforested, in pastures or used for traditional slash-and-burn agriculture, different activities will be undertaken to assure the planting of permanent vegetative cover. In addition to the ecological protection provided, agro-forestry activities and fuelwood production will provide a very productive economic alternative over both the short and long term, while helping to reduce the current trend toward the establishment of pastures on steeply sloped hillsides. Also, the expanded forest cover will reduce sediment deposists downstream.

Under the ecological conditions prevailing in the Watershed, fast growing species can be expected to grow at an average rate from a minimum of 7.0 m3 per ha/year for poor soils to a maximum of 15.0 m3 per ha/year for the better soils. A conservative estimate of an average rate of growth of 10 m3 per ha/year has been used for the calculation of costs and returns from this activity. For the farm models developed in this section, a rotation of 6 years is used, even though for some species known to grow well in the area a 4 year rotation period might be sufficient to yield positive economic returns.

The estimated cost of planting one hectare of the selected species is $350.00, a conservative estimate given the wide range of costs with which reforestation activites and planting of cashew nuts have registered in the area. A total of 8,360 ha are planned to be treated with these kinds of activities during the five year life of the Project at a total cost of $2.9 million.

Besides the incentives offered to farmers with the fertilizer-loans and subsidies for soil and water conservation works, the farmer will also be offered loans on attractive terms for the establishment of agro-forestry or fuelwood plantations. The loans will be given for an 18 year period, with 8 years of grace for amortization, interest at 6% per year and 10 years to repay principal plus accrued interest at 8% per annum. The socio-economic studies made for the farmers living in the five selected subwatersheds clearly indicate that without soft loan conditions such as the ones that will be offered, agro-forestry or fuelwood production will not be practical. In these kinds of activities the farmers forego land and immediate returns, in order to create a capital asset. Therefore, the loans to be provided should reduce the initial establishment cost. Also, the farmer should be provided with income at least equal to what he would receive from his current use of the land, especially during the first six to nine years that it takes for the trees to achieve some significant value.

Different studies made in Honduras on the price of fuelwood show that it could be up to $18.75/m3 (studies by Bianchi and Camino, 1977 and 1978), with average prices received by the farmer from $7.65/m3 to $11.35 m3. These prices do not take into account the cost of labor in cutting the fuelwood, which is very low anyway: in degraded forest, the cutting and loading of fuelwood takes an average of two man/days per m3 due to the wider spacings of wood, since a degraded forest like the ones in the Choluteca watershed can produce average yields as low as 10m3/ha. This cost of two man days/m3 is used as the opportunity cost of fuelwood for household consumption.

The average price used in this analysis for the evaluation of costs and returns to farmers from agro-forestry and fuelwood production is a low of $6.00/m3 for the worst-case situation, to a middle of the road $8.00/m3. A rotation of 6 years is used , with two regrowths which are possible with most of the species selected for this part of the Project, for a total cycle of 18 years.

The analysis made shows that agro-forestry and fuelwood production with species that do not regenerate bring more financial risks and costs than species that do regenerate after cutting. That is why all the fuelwood species selected for the Project have this latter characteristic in common.

Also, a 6 yr. rotation has been chosen since the Social Analysis indicates that farmers have a short-term horizon in most of their decisions. Their low level of income pressures them more for consumption than for saving.

As was stated above, the evaluation of costs and returns to the private farmer has been done on the basis of a combined package of soil conservation works, fertilizer subsidies (in the case of farms of less than 5 ha) or loans (in the case of farmers with more than 5 ha). In Exhibit 8, the costs and returns to the farmer with less than 5 ha is described for an 18 year period, under the conditions specified above. As can be seen, the internal rate of return to the farmer of 28.2% makes the combined activites of sufficient interest to the farmer. In Exhibit 9, the same situation is presented for the farmer with farms of 5 to 20 ha. In this case too the internal rate of return of 15.8% makes this an attractive proposition to this category of farmers, taking into consideration the short-term impact on his cash position resulting from Project loans and grants.

In Exhibits 10 and 11 the basic figures for an analysis of the cash situation of the farmers belonging to the two size categories discussed above are presented. The analysis made clearly suggests that the loans provided to the farmer should carry a relatively low rate of interest and a sufficiently long period of repayment that will not undermine his limited actual cash position in the short run.

The studies made regarding the market for fuelwood indicate that there is a substantial unmet demand for fuelwood in the capital city as well as in the other urban areas in the watershed. Population growth combined with the diminished availability of fuelwood from nearby sources leads to the conclusion that when the first trees planted under this Project reach maturity, sufficient demand for fuelwood will exist at the conservative projected prices used in this study. (See illustrative Tables in Annex M-1 of this document). However, some action will have to be undertaken to assure the optimum use of this valuable raw material from the national standpoint. This of course forms part of a wider policy issue dealing with the formulation of a national energy policy on which first steps have begun to be taken by the GOH. AID will initiate a project on national energy policy beginning in 1981/82 in which some of these policy issues will be addressed. There is a marketing expert assigned to the Project to analyze ways and means to improve access to the best available markets as well as to identify new market opportunities. No major marketing problems are anticipated regarding the products to be obtained from fruit trees (avocado, mango, orange, grapefruit, etc.) or from coffee.

Exhibit 8

CHOLUTECA WATERSHED MANAGEMENT PROJECT
Costs and Returns to a Typical Farm of Less than 5 ha in Size
from a Combined Package of Soil and Water Conservation Practices, and
Agro-Forestry and Fuelwood Production

Concept	Without Project	1	2	3	4	5	6	7	8	9	10-18
1. Production Value	433.7	433.7	473.7	518.7	518.7	518.7	598.7	598.7	598.7	598.7	598.7
1.1 Crops	340.0	340.0	380.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0
1.2 Livestock	73.1	73.1	73.1	78.1	78.1	78.1	78.1	78.1	78.1	78.1	78.1
1.3 Forestry	20.6	20.6	20.6	20.6	20.6	20.6	100.6	100.6	100.6	100.6	100.6
2. Operating Costs	240.3	240.3	245.3	250.3	255.3	260.3	260.3				
2.1 Crops	186.1	186.1	186.1	186.1	186.1	186.1	186.1				
2.2 Livestock	37.9	37.9	37.9	37.9	37.9	37.9	37.9	Values continue to year 18			
2.3 Forestry	16.3	16.3	21.3	26.3	31.3	36.3	36.3				
3. Investment Costs		162.5	117.5	87.5	87.5	15.0	15.0				
3.1 Soil and and Water Conservation Works		45.0									
3.2 Crop Production		30.0	30.0			15.0	15.0	Values continue to year 18			
3.3 Agro-Forestry and Fuelwood Plantation		87.5	87.5	87.5	87.5						
4. Less Government Subsidies		60.0									
4.1 Fertilizer subsidy		60.0									
5. Investment and Operating Costs		342.8	362.8	337.8	342.8	275.3	275.3				
6. Net Benefits	193.4	90.9	110.9	180.9	175.9	243.4	323.4	Values continue to year 18			
7. Net Incremental Benefits		(102.5)	(82.5)	(12.5)	(17.5)	50.0	130.0				

Internal Rate of Return = 28.17%

Exhibit 9

CHOLUTECA WATERSHED MANACEMENT PROJECT

Costs and Returns to a Typical Farm from 5 to 20 ha in size (Average Size: 10 ha), from a Combined Package of Soil and Water Conservation Practices and Agro-Forestry and Fuelwood Production.

Concept	Without Project	1	2	3	4	5	6	7	8	9	10-18
1. Production Value	1,317.1	1,317.1	1,367.1	1,417.1	1,467.1	1,517.1	1,967.1	1,967.1	1,967.1	1,967.1	1,967.1
1.1 Crops	990.4	990.4	1030.4	1,070.4	1,110.4	1,150.4	1,190.4	1,190.4	1,190.4	1,190.4	1,190.4
1.2 Livestock	264.4	264.4	274.4	284.4	294.4	304.4	314.4	314.4	314.4	314.4	314.4
1 3 Forestry	62.3	62.3	62.3	62.3	62.3	62.3	462.3	462.3	462.3	462.3	462.3
2. Operating Costs	635.7	635.7	655.7	675.7	695.7	715.7	735.7	735.7			
2.1 Crops	479.1	479.1	479.1	479.1	479.1	479.1	479.1	479.1			
2.2 Livestock	111.2	111.2	111.2	111.2	111.2	111.2	111.2	111.2	Values continue to year 18		
2.3 Forestry	45.4	45.4	65.4	85.4	105.4	125.4	145.4	145.4			
3. Investment Costs		425.0	425.0	425.0	425.0	425.0	75.0	75.0	75.0	75.0	75.0
3.1 Soil and Water Conservation Works		45.0	45.0	45.0	45.0	45.0					
3.2 Crop Production		30.0	30.0	30.0	30.0	30.0	75.0	75.0	75.0	75.0	75.0
3.3 Agro-Forestry and Fuelwood Plantation		350.0	350.0	350.0	350.0	350.0					
4. Investment and Operating Costs	635.7	1,060.7	1,080.7	1,100.7	1,120.7	1,140.7	810.7	810.7			
5. Net Benefits	681.4	256.4	286.4	316.4	346.4	376.4	1,156.4	1,156.4	Values continue to year 18		
6. Net Incremented Benefits		(425.0)	(395.0)	(365.0)	(335.0)	(305.0)	475.0	475.0			

Internal Rate of Return = 15.8%

EXHIBIT 10 (1)

CHOLUTECA WATERSHED CASH FLOW ANALYSIS FOR A TYPICAL FARM FROM 5 TO 20 HA IN SIZE, FROM A COMBINED PACKAGE OF SOIL AND WATER CONSERVATION WORKS AND AGRO-FORESTRY AND FUELWOOD PRODUCTION

(IN US$)

	Without Project	WITH THE PROJECT											
		1	2	3	4	5	6	7	8	9	10	11	12
1. Cash Inflow	874.7	1254.7	1304.7	1354.7	1404.7	1454.7	1524.7	1524.7	1524.7	1524.7	1524.7	1524.2	1524.2
1.1 Sales	874.7	874.7	924.7	974.7	1024.7	1074.7	1524.7	1524.7	1524.7	1524.7	1524.7	1524.2	1524.2
1.2 Fertilizer loan	-	30.0	30.0	30.0	30.0	30.0	-	-	-	-	-	-	-
1.3 Forestry loan	-	350.0	350.0	350.0	350.0	350.0	-	-	-	-	-	-	-
1.4 Government Payment	-												
2. Cash Outflow	385.8	765.8	785.8	805.8	825.8	845.8	560.8	560.8	560.8	560.8	560.8	560.8	560.8
2.1 Cash Operating Costs	385.8	385.8	405.8	425.8	445.8	465.8	485.8	485.8	485.8	485.8	485.8		
2.2 Cash Investment Costs		380.0	380.0	380.0	380.0	380.0	75.0	75.0	75.0	75.0	75.0		
3. Cash Balance before debt service	488.9	488.9	518.9	548.9	578.9	608.9	463.9	963.9	963.9	963.9	963.9	963.9	963.9
4. Debt Service	-	-	-	-	-	-	6.5	13.1	19.7	109.5	199.0	275.8	358.8
4.1 Fertilizer loan interest	-	-	-	-	-	-	3.5	6.8	9.8	12.7	14.9	13.5	11.9
4.2 Fertilizer loan amortization	-	-	-	-	-	-	3.0	6.3	9.9	13.7	17.8	19.3	20.8
4.3 Forestry loan interest	-	-	-	-	-	-	-	-	-	44.6	86.2	124.4	159.0
4.4 Forestry loan amortization	-	-	-	-	-	-	-	-	-	38.5	80.1	118.6	167.1
5. Cash Balance after debt Service	488.9	488.9	518.9	548.9	578.9	608.9	957.4	950.8	944.2	854.4	764.9	688.1	366.1

EXHIBIT 10 (2)

CHOLUTECA WATERSHED MANAGEMENT PROJECT CASH FLOW ANALYSIS FOR A TYPICAL FARM FROM 5 TO 20 HA IN SIZE, FROM A COMBINED PACKAGE OF SOIL AND WATER CONSERVATION WORKS AND AGRO-FORESTRY AND FUELWOOD PRODUCTION (IN US$)

	WITH THE PROJECT									
	13	14	15	16	17	18	19	20	21	22
1. Cash Inflow	1524.2	1524.2	1524.2	1524.2	1524.2	1524.2	1524.2	1524.2	1524.2	1524.2
1.1 Sales	1524.2	1524.2	1524.2	1524.2	1524.2	1524.2	1524.2	1524.2	1524.2	1524.2
1.2 Short term loan										
1.3 Long term loan										
1.4 Govt. Payment										
2. Cash Outflow	560.8	560.8	560.8	560.8	560.8	560.8	560.8	560.8	560.8	560.8
2.1 Cash Operation Costs										
2.2 Cash Invest. Costs										
3. Cash Balance before Debt Service	963.4	963.4	963.4	963.4	963.4	963.4	963.4	963.4	963.4	963.4
4. Debt Service	442.0	448.5	448.5	441.9	435.5	428.9	339.2	249.5	166.4	83.2
4.1 Fertilizer loan interest	10.3	8.5	6.6	4.5	2.8	1.4	0.5	-	-	-
4.2 Fertilizer loan amortizat.	22.4	24.2	26.2	21.7	16.9	11.7	6.1	-	-	-
4.3 Forestry loan interest	189.8	171.8	152.2	131.1	108.4	83.8	57.2	35.2	18.1	6.2
4.4 Forestry loan amortization	219.5	244.0	263.5	284.6	307.4	332.0	275.4	214.3	148.3	77.0
5. Cash Balance after Debt Service	521.9	515.4	515.4	522.0	528.4	535.0	624.7	714.4	795.5	880.7

EXHIBIT 11 (1)

CHOLUTECA WATERSHED MANAGEMENT PROJECT CASH FLOW ANALYSIS FOR A TYPICAL FARM LESS THAN 5 HA IN SIZE, FROM A COMBINED PACKAGE OF SOIL AND WATER CONSERVATION PRACTICES AND AGRO-FORESTRY AND FUELWOOD PRODUCTION (IN US$)

	Without Project	WITH THE PROJECT									
		1	2	3	4	5	6	7	8	9	10
1. Cash Inflow	281.7	399.2	439.2	154.2	154.2	366.7	446.7	446.7	446.7	446.7	446.7
1.1 Sales	281.7	281.7	327.7	366.7	366.7	366.7	446.7	446.7	446.7	446.7	446.7
1.2 Fertilizer loan											
1.3 Forestry loan	-	87.5	87.5	87.5	87.5	-	-	-	-	-	-
1.4 Fertilizer Subsidy	-	30.0	30.0	-	-	-	-	-	-	-	-
2. Cash Outflow	106.4	223.9	228.9	203.9	208.9	126.4	141.4	141.4	141.4	141.4	141.4
2.1 Cash Operating Costs	106.4	106.4	114.4	116.4	121.4	126.4	126.4	126.4	126.4	126.4	126.4
2.2 Cash Invest. Costs	-	117.5	117.5	87.5	87.5	15.0	15.0	15.0	15.0	15.0	15.0
3. Cash Balance beforee Debt Service	175.3	175.3	210.3	250.3	245.3	240.3	305.3	305.3	305.3	305.3	305.3
4. Debt Service	-	-	-	-	-	-	-	-	-	20.8	41.6
4.1 Fertilizer loan interest											
4.2 Fertilizer loan amortization											
4.3 Forestry loan interest	-	-	-	-	-	-	-	-	-	11.2	21.6
4.4 Forestry loan amortization	-	-	-	-	-	-	-	-	-	9.6	20.0
5. Cash Balance after Debt Service	175.3	175.3	210.3	250.3	245.3	240.3	305.3	305.3	305.3	284.5	263.7

EXHIBIT 11 (2)

CHOLUTECA WATERSHED MANAGEMENT PROJECT CASH FLOW ANALYSIS FOR A TYPICAL FARM LESS THAN 5 HA IN SIZE, FROM A COMBINED PACKAGE OF SOIL AND WATER CONSERVATION PRACTICES AND AGRO-FORESTRY AND FUELWOOD PRODUCTION IN (US$)

	11	12	13	14	15	16	17	18	19	20	21
1. Cash Inflow	446.7	446.7	446.7	446.7	446.7	446.7	446.7	446.7	446.7	446.7	446.7
1.1 Sales	446.7	446.7	446.7	446.7	446.7	446.7	446.7	446.7	446.7	446.7	446.7
1.2 Short term loan											
1.3 Long term loan											
1.4 Govt. Payment											
2. Cash Outflow	141.4	141.4	141.4	141.4	141.4	141.4	141.4	141.4	141.4	141.4	141.4
2.1 Cash Operating Costs											
2.2 Cash Invest. Costs											
3. Cash Balance before Debt Service	305.3	305.3	305.3	305.3	305.3	305.3	305.3	305.3	305.3	305.3	305.3
4. Debt Service	62.4	83.2	83.2	83.2	83.2	83.2	83.2	83.2	12.3	41.5	20.7
4.1 Fertilizer loan interest											
4.2 Fertilizer loan amortization											
4.3 Forestry loan interest	31.2	39.9	36.4	32.6	28.5	24.1	19.4	14.4	8.8	4.5	1.5
4.4 Forestry loan amortization	31.2	43.3	46.8	50.6	54.7	59.1	63.8	68.8	53.5	37.0	19.2
5. Cash Balanace after Debt Service	242.9	222.1	222.1	222.1	222.1	222.1	222.1	222.1	243.0	263.8	284.6

c) Reforestation Activities

Some 4,233 hectares of land have been selected, as described in the technical section of this paper, as the target area where reforestation measures will be applied due to slope characteristics (above 50%) and other conditions of the soils. The total amount of land to be reforested with rapid-growing species for fuelwood or with timber producing species will be determined by the Watershed Management Units in accordance with the ecological conditions of the area, the type of soil and the species which are known to grow well in the area.

In the case of reforestation activities it is anticipated that all of the land belonging to this category (i.e., with slopes greater than 50%) will be planted with trees. For the small number of farmers where all of their land is of slopes greater than 50%, loans will be made for a combination of agro-forestry and soil conservation work as described above. However, it is anticipated that only a very small proportion of farmers will fall in this category. Most likely there will be found farm lands where some portion of land is in slopes greater than 50% in combination with other slopes.

In those cases where, according to the farm plans developed by the Watershed Management Units, rapid-growing species for fuelwood production can be grown, loans will be made on the same basis as for agro-forestry activities, as previously described.

For the areas where only pine will grow well, a different system of incentives will have to be offered. This system will consist of a loan made for 15 years, with 5 years of grace for amortization of principal and interest and 10 years to repay principal and accrued interest, at an annual rate of interest of 8%. If the farmer complies with the reforestation policies as determined by the WMU, once the trees have become solidly established, the GOH will repay the loan, beginning in year 6, until the loan has been repaid in full, provided that in each year, the WMU certifies that the farmer has been complying with the terms of the reforestation agreement.

This type of incentive is a necessary requirement to induce the farmers to plant slow-growing trees, since otherwise his cash position could become seriously undermined.

The planting of pine, on the other hand, as can be seen in Exhibit 12, offers an attractive rate of return to the beneficiary, given that the land has no other acceptable uses.

COHDEFOR's wide experience in the marketing of timber and timber products also leads to the conclusion that no significant marketing problems will arise regarding this part of the Project.

d) Range Management and Pasture Improvement

The analysis of census data, as well as the socio-economic survey made at the farm level in the Southern and Central-Eastern regions, indicate that there exists a wide variation in cattle carrying capacity from farm unit to farm unit. Some of the farms, particularly in the Southern region include improved pastures of Jaragua grass, African Star grass and some sugar cane. The estimated carrying rate of these farms is up to 2 animal units (A.U.) per hectare. 1/ In areas where thinning of pines has taken place either by management or by fire, the carrying rate may be 1 A.U. on 2-3 ha. Without addition of improved pastures and forage supplements, the carrying capacity of these farms would be on the order of 0.33 A.U./ha.

The farms in the Southern region have low calving percentages, varying from 20 to 60% with an average of 45%. Low levels of nutrition in breeding cows, high levels of disease and infestation, generally inadequate management or breeding plans, poor health and nutritional status of herd sires, inadequate culling procedures to eliminate the non-breeder, etc., are factors which contribute to the low calving rate in the region. Exceptionscan be found in some of the large cattle farms in the valleys which are better managed and where more modern methods are used.

Confirming some previous studies made on this subject in other areas of the country, it was found that in the Choluteca Watershed, a large segment of the farmers keep cattle for the social status that is associated with owning increasing numbers of cattle, without due regard to quality or management practices. This factor accounts to a large extent for the low culling rates since any animal may be kept for another year for non-economic reasons.

About 50% of the farmers in the region milk their own cows and sell either milk or milk products. The estimated average daily production per cow varies from a very low 0.5 litre per cow/day, up to 5 litres per cow/day during the period of greatest lactation.

The average price for milk, as fixed by the State, is $0.30 per litre, even though during the rainy season, prices of about $0.22 per

1/ An Animal Unit is defined as follows: 1 cow = 1 A.U.; 1 calf = 0.6 A.U.; 1 yearling = 0.8 A.U.; 1 two-year old and older = 1.0 A.U. and 1 bull = 1 A.U.

EXHIBIT 12

CHOLUTECA WATERSHED MANAGEMENT PROJECT

Estimated Costs and Returns from Pine Reforestation in a Typical 10 Ha. Farm

Year	Production Value	Investment and Operating Costs	Reforestation Subsidy	Net Benefits	Net Incremental Benefits
1	-	700.00	700.00	-	-
2	-	740.00	700.00	(40)	(40)
3	-	780.00	700.00	(80)	(80)
4	-	820.00	700.00	(120)	(120)
5	-	860.00	700.00	(160)	(160)
6	-	200.00		(200)	(200)
7	-	-		-	-
8	-	-		-	-
9	-	-		-	-
10	-	-		-	-
11	-	-		-	-
12	-	-		-	-
13	-	-		-	-
14	-	-		-	-
15	400.00	180.00		220	220
16	400.00	180.00		220	220
17	400.00	180.00		220	220
18	400.00	180.00		220	220
19	400.00	180.00		220	220
20	-	-		-	-
21	-	-		-	-
22	-	-		-	-
23	-	-		-	-
24	-	-		-	-
25	4,000.00	300.00		3,700	3,700
26	4,000.00	300.00		3,700	3,700
27	4,000.00	300.00		3,700	3,700
28	4,000.00	300.00		3,700	3,700
29	4,000.00	300.00		3,700	3,700
30	-	-		-	-
31 to 39	-	-	-	-	-
40	13,000.00	500.00		12,500	12,500
41	13,000.00	500.00		12,500	12,500
42	13,000.00	500.00		12,500	12,500
43	13,000.00	500.00		12,500	12,500
44	13,000.00	500.00		12,500	12,500

Internal Rate of Return (IRR): Appr ximately 19.5%

liter have been observed. There is substantial pressure from the farmers to increase the fixed price of milk, since the actual price is not considered adequate for stimulating milk production. A more encouraging price might be $0.40 per liter. During the rainy season an important proportion of the milk produced is manufactured into cheese, which is sold at an average price of $2.00 per pound, even though some seasonal price variation is observed.

The offtake from the herd for beef sales consists of 1-3 year old bulls or steers in some cases and old cows. The latter sell for $100.00 to $200.00 per head, with an average price of about $150.00 per head on an average weight of about 240 kg.

In summary, poor pastures and forages, low level of animal health and generally inadequate range management techniques account for the fact that a large margin for improvement exists for range management in the Choluteca Watershed. For these reasons, the improved pasture and range management practices involve not only the promotion of better pastures but also technical assistance to improve the management of the farm.

Cattle farming combined with forest exploitation may be pursued simultaneously, provided certain precautions are taken to protect the trees, including the construction and maintenance of a fence around the perimeter of the reforested area, with a firebreak next to the fence. The cost of 400 meters of new fence would be about $250.00, with the cost of fence repairs for the same length estimated at $100.00. Since most of the farms to be beneficiaries of the range improvement practices already have fences in varying conditions, only $100.00 for fence repair has been included as part of this project.

As has been discussed in the Technical Analysis, the substitution of jaragua grasses for stoloniferous grasses will be promoted; the cost of establishment of one hectare of this kind of grasses varies from $180 to $300 per ha. An average cost of $200 per hectare has been used for this activity. For renovation of existing pastures, an estimated cost of $30.00 per ha has been used, to include mowing and hand chopping, and grass seed.

The average cost of fertilization for the establishment of stoloniferous grasses is estimated at $70.00 per/ha, while the maintenance cost (mainly fertilizer) is estimated at $20.00 per hectare for subsequent years. From 1 to 2 kg of selected seed per hectare will be required, at a cost of $33.00 for a kg of Bracchiaria decumbens.

Added maintenance costs, in addition to fertilizer, will consist primarily of mineralized salt at $5 per head and depreciation of establishment cost for an added total cost of maintenance of about $40.00 per hectare/year.

The benefits to be obtained from improved fertilized pastures can

be evaluated by a comparison with probable average results from unfertilized pastures, as follows:

	Unfertilized Pasture	Bracchiaria decumbens
Weaning at 9 mo	125 kg	125 kg
Rate of gain (to 250 kg)	200 grams/day	350 grams/day
Age Steer reaches 250 kg	2.45 years	1.7 years
Rate of gain (250 to 400 kg)	425 grams/day	450 grams/day
Age Steer reaches 400 kg	3.4 years	2.7 years

Unfertilized Pasture

- Assuming one animal per hectare
- A steer requires 2.65 years to fatten (3.4 years, less .75 years of weaning)
- Then a steer would use 2.65 ha/year of pasture to increase from 125 to 400 kg.
- Weight gain per year: 275 kg gain divided by 2.65 = 104 kg/ha gain
- Value at $0.55/kg is $57.20
- Value at $0.70/kg is $72.80

With Improved, Fertilized Pasture

- Assuming two animals per hectare.
- A steer requires 1.95 years to fatten (2.7 years less .75 years of weaning).
- Then a steer would use 1 ha/year to increase from 125 to 400 kg.
- Weight gain = 275 kg/ha/yr.
- Value at $0.55 is $151.25 per year
- Value at 0.70 is $192.50 per year

Increased Income

- Per year per hectare is $99 at $0.55 kg. or $120 at $0.70 kg.

Exhibit 13 presents in summary form the basic data for an average small sized farm in the Southern region both in terms of what exists now without the Project and the parameters that could be obtained with the application of range management and pasture improvement practices.

In Exhibit 14, the costs and returns from improved pasture and range management are presented. The resulting average internal rate of return of 27.19% from these activities makes it an attractive proposition to the farmer especially when considering that herd size has increased substantially at the end of the fifteen year period.

A large unmet demand for milk and milk products as well as a substantial national and international demand for meat and meat products leads to the conclusion that no significant marketing difficulties are to be found in this part of Project activities.

EXHIBIT 13

BASIC DATA FOR AN AVERAGE SMALL SIZED FARM IN THE SOUTHERN REGION, FOR THE FIRST TEN YEARS OF A RANGE MANAGEMENT/PASTURE IMPROVEMENT PROGRAM

ITEM	Without Project	1	2	3	4	5	6	7	8	9
1. Calving %	45	48.0	51.1	54.5	58.1	61.9	66.0	70.0	75.0	80.0
2. Mortality										
2.1 Calves %	5	4.7	4.4	4.1	3.9	3.6	3.4	3.2	3.0	2.8
2.2 Other Stock %	3	2.9	2.7	2.6	2.4	2.3	2.2	2.1	2.0	1.9
3. Average daily milk production per cow (litres)	1.5	1.8	2.1	2.5	3.0	3.6	4.2	5.0	6.0	7.1
4. Average annual milk production per ha (litres)	25.0	36.2	52.3	75.7	109.5	158.5	229.3	331.8	480.0	500.0
5. Average liveweight 3 year old steers (pounds)	500.0	538.1	579.1	623.3	670.8	722.0	777.0	836.2	900.0	968.6
6. Carrying capacity per hectare A.U.	0.4	0.5	0.6	0.7	0.9	1.1	1.3	1.6	2.0	2.0

SOURCE: Table adapted for typical farms in the Southern Region, from "Report of Range Management Economist Consultancy". UNDP/FAO/Project HON/78/005, 1979.

EXHIBIT 14

CHOLUTECA RIVER WATERSHED. COSTS AND RETURNS FROM IMPROVED PASTURE AND RANGE MANAGEMENT (SMALL-SIZED FARM)*
(IN US$000)

	Without Project	1	2	3	4	5	6	7	8	9	10-15
Production Value (Lifestock, Milk and Milk Products)	1.1	1.3	1.5	2.3	2.8	3.7	4.0	4.4	4.6	4.8	5.1
Operating Costs	0.9	1.1	1.2	1.4	1.7	1.7	1.9	2.0	2.0	2.0	2.0
Family labor	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
Hired labor	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Vet. services	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4
Maint. and Misc.	0.4	0.5	0.5	0.6	0.9	0.9	1.0	1.0	1.0	1.0	1.0
Investment Costs	-	1.2	1.2	1.2	1.2	1.2	-	-	-	-	-
Investment and Operating Costs	0.9	2.3	2.4	2.6	2.9	2.9	1.9	2.0	2.0	2.0	2.0
Net Benefit	0.2	(1.0)	(0.9)	(0.3)	(0.1)	0.8	2.1	2.4	2.6	2.8	3.1
Net Incremental Benefit	-	(0.8)	(1.7)	(2.0)	(2.1)	(1.2)	2.5	2.8	3.0	3.2	3.5

Internal Rate of Return = 22.7 %

* Typical farm is described as a traditional farm, having 20 hectares in natural pasture; 15 hectares in land currently yielding no return due to slope and soil characteristics and where no modern cattle management techniques are applied at all. Pasture improvement occurs at the rate of 4 ha per year for the first five years. For other characteristics of farm see Exhibit 13.

e) Community Nursery Projects

As has been discussed before, a total of about 25.2 million seedlings will be required during the five year period of the Project for the planting of trees required by agro-forestry, fuelwood production and reforestation activities. These seedlings will be produced by 264 community organizations as per the schedule presented in Exhibit 15.

Each community organization will be responsible for providing enough seedlings for an average extension of 45 to 50 hectares of land. This means an average production of 90,000 to 100,000 plants per community organization. It is estimated that on the basis of 10 "Las Lajas" model nursery tables, at a cost of $100.00 each and a total capacity of 9,540 plants per table, a total of 95,400 seedlings could be produced by each community for a total investment in nursery tables of $1,000. Additionally, about $3.00 per thousand plastic bags, and $14.00 for seeds, fertilizers, pesticides, etc., will be required per thousand plants. A total of $360.00 per community has also been included to cover the cost of land acquisition, purchase of tools, and land preparation, for a total of $2,981.80 per nursery.

The socio-economic studies made in the area of the Project indicate that grants will have to be offered to the newly formed community organizations to encourage them to establish the nurseries. The very limited financial situation of the farmers will make it practically impossible to obtain the necessary capital required for this activity. In addition, in order to promote community organizations and the use of local entrepreneurial talent for community projects, grant funds will be required. The grants will cover the costs of establishment of the nursery, i.e., about $2,982 per community. All additional operating costs, mainly in the form of labor inputs will be covered by the community itself. All cash returns from the sale of seedlings, both to members and non-members, will belong to the community organization and will be used to promote other community projects with the assistance of the local Watershed Management Units.

In Exhibit 16, different levels of operations for the community nurseries have been assumed in order to determine the optimum operating point for the nursery after the first year. It is to be noted that during the first year, the nursery will be used at 100% capacity in order to meet the demands of the Project. Thus, the break-even analysis is made to evaluate alternative economic results after the initial demands have been met. Since the agro-forestry, fuelwood production and reforestation budgets have established a price level of $0.115 per plant, the community nursery uses this price per unit for projections of operations. The break-even point for nursery operations is therefore situated at about 17.0% of the total installed capacity of the nursery, that is, at about 16,218 plants per year. At 30%, the nursery will make an annual net income of $1,275.1, or $0.0446 per plant. At 50%, the level of annual net income will be $2,926.0 or $0.0613 per plant. These income levels will help the community organization to ensure the consolidation of the nurseries as an ongoing enterprise to serve the communities' needs for plants, not only for their own members but also for other farmers who are not direct beneficiaries of the Project.

EXHIBIT 15

CHOLUTECA WATERSHED PROJECT

Community Nursery Program, Total Cost of Grants

	Item	1980	1981	1982	1983	1984	1985	TOTAL
A.	Area to be Treated with Agro-Forestry, Fuelwood Production or Reforestation	-	1,259	1,889	2,519	3,148	3,778	12,593
	1. Agro-Forestry and Fuelwood	-	836	1,254	1,672	2,090	2,508	8,360
	2. Reforestation	-	423	635	847	1,058	1,270	4,233
B.	Nurseries to be Established	1	26	40	53	66	79	264
C.	Number of Plants to be Produced (000's) 1/	1260	2,518	3,778	5,038	6,296	7,556	26,440
D.	Costs of Establishment	-	78.2	118.6	157.7	196.8	235.9	787.2
	1. Infrastructure 2/	-	26.0	40.0	53.0	66.0	79.0	2634.0
	2. Materials and Supplies 3/	-	42.8	64.2	85.6	107.0	128.5	428.2
	3. Other Costs 4/	-	9.4	14.4	19.1	23.8	28.4	95.0
E.	Demonstration/Training Nursery	38.1	50.2	-	-	-	-	88.3
F.	Communities' Tool Grants	-	17.7	27.3	36.1	45.0	53.9	180.0
G.	Total Community Grants	38.1	146.1	145.9	193.8	241.8	289.8	1055.5

1/ Calculated on the basis of 2,000 plants per hectare.

2/ Calculated on the basis of 10 "Las Lajas" model nursery tables, at a cost of $100.00 each, and a total capacity of 9,540 plants per table, for a total of 95,400 plants per nursery. One nursery per community organization.

3/ Calculated on the basis of $17.00 per thousand plants: $3.00 per thousand plastic bags; $14.00 for seeds, fertilizers, pesticides, etc., per thousand plants.

4/ An average of $360.00 per nursery to cover other costs such as tools, land preparation, rentals and miscelaneous costs.

EXHIBIT 16

Community Nursery Projects
Establishment of Break-Even Point for Nursery Operations

Capacity Utilization

	10.0%		15.0%		20.0%		25%		30%		50%		100%	
	Total	Per Plant	Total	Per Plant	Total	Per Plant	Total	Per Plant	Total	Per Plant	Total	Per Plant	Total	Per Plant
Total Number of plants to Produced:	9,540		14,310		19,080		23,850		28,620		47,700		95,400	
Total Income 1/	1,097.1	$0.115	$1,645.7	$0.115	$2,194.2	$0.115	$2,742.8	$0.115	$3,291.3	$0.115	$ 5,485.5	$0.115	$10,971.0	$0.115
Total Costs (In US$)	1,471.5	0.1542	1,608.1	0.1124	1,744.7	0.0914	1,881.3	0.0789	2,016.2	0.0704	2,559.5	0.0537	3,921.8	0.0411
1. Fixed Cost 2/	1,200.0	0.1258	1,200.0	0.0839	1,200.0	0.0629	1,200.0	0.0503	1,200.0	0.0419	1,200.0	0.0252	1,200.0	0.0126
2. Variable Cost	271.5	0.0285	408.1	0.0285	544.7	0.0285	681.3	0.0285	816.2	0.0285	1,359.5	0.0285	2,721.8	0.0285
2.1 Labor 3/	80.0		120		160		200		240		400.7		800.0	0.0084
2.2 Plastic Bags 4/	28.5		42.9		57.3		71.7		85.8		143.1		286.2	0.0030
2.3 Nursery Inputs 5/	133.0		200.2		267.4		334.6		400.4		667.8		1,335.6	0.0140
2.4 Other Costs 6/	30.0		45.0		60.0		75.0		90.0		147.9		300.0	0.0031
Net Income	$(374.4)	(0.0392)	$(37.6)	(0.0026)	$449.5	0.0236	861.5	0.0361	$1,275.1	0.0446	$2,926.0	0.0613	$7,049.2	0.0739

1/ At $0.115 per plant
2/ A cooperative nursery supervisor at $100 a month
3/ About 5.6 man/days for each thousands plants, at $1.50 per man/day
4/ At $3.00 per thousand plastic bags
5/ Seeds, pesticides, fertilizers, etc, at an estimated costs of $14.00 per thousand plants.
6/ Miscellaneous costs: water, electricity, materials and supplies at $3.14 per thousand plants.

The investment cost associated with the establishment of the demonstration/training nursery, is $39,100, as can be seen in Exhibit 17. An estimation of production costs for this nursery is presented in Exhibit 18. From these figures it can be inferred that a total cost of $0.0398 per plant will be obtained. These plants will be provided free to the community units organized under the Project whenever they are destined for community nursery establishment. When they are destined for direct plantation under the agro-forestry/reforestation program they will be sold to the beneficiaries at the same price estimated for this part of the Project activities.

The demonstration/training nursery is viewed only as an initial, experimental nursery established to accelerate Project activities in reforestation, agro-forestry, fuelwood production and community nurseries. Once its initial function has been accomplished, a decision will be made on whether to transfer the nursery's installations to another Project location or to preserve the nursery as an ongoing enterprise.

The grants for community nurseries include a component for the purchase of tools required for the establishment and operation of the nurseries such as wheelbarrows, shovels, hammers, crowbars etc. However, implementation of the different Project activities will also require additional tools for soil conservation works, digging of holes, earth moving, fence repairs, etc. Experience with similar projects in other parts of the country, especially in Yojoa, Omoa and Las Lajas, indicates that the lack of simple tools could be a limiting factor for some activities to be performed on the farmer's land. For this reason, the Project provides for grants to the community organizations for the purchase of tools to be used for those purposes. Exhibit 19 contains details of the different items to be purchased with these grants. The idea is for the community to rent these tools to its members and possibly to non-members at nominal rates.

EXHIBIT 17

COMMUNITY NURSERIES. ESTIMATED PRODUCTION COSTS FOR A 1,260,000 PLANT NURSERY
(IN US$)

ITEM	Number of Plants	Months in Nursery	Total Fixed Costs 1/	Variable Costs					Total Costs	Total Cost Per Plant
				Total	Labor 2/	Materials		Other Costs 5/		
						Classified	Non Classified			
1. Plants in plastic containers	300,000	6	$1,327.79	$9,788.7	5,228.68	900.00	3,500	160	11,116.47	0.0371
2. Pseudo-stakes	960,000	9	4,248.80	34,786.3	16,731.30	-	17,455	600	39,035.10	0.0407
TOTAL	1,260,000		$5,576.59	$44,574.98	21,960	900.00	20,955	760	50,151.57	0.0398

1/ Annual accrual changes.
2/ One nursery supervisor at $250/mo., and an assistant nursery worker at $150/mo., 5,720 man/days of unskilled labor at $3.00 a day.
3/ Plastic bags at $3.00 per thousand.
4/ Seeds, fertilizers, etc.
5/ Electrical energy: 35,000 kw at $0.025.

EXHIBIT 18

COMMUNITY NURSERIES
ESTIMATED INVESTMENT FOR A 1,260,000 PLANT NURSERY

	Item	Investment
1.	Land (at $750/ha)	$6,000.00
2.	Living quarters and warehouse	4,500.00
3.	Living quarters for nursery supervisor	5,600.00
4.	Electrical installations	3,200.00
5.	Water installations	1,200.00
6.	Wood and other materials	3,200.00
7.	Irrigation pump	6,500.00
8.	Pump materials and spare parts	2,300.00
9.	Water pipes	450.00
10.	Equipment and tools	1,600.00
11.	Fixed pump maintenance costs	1,800.00
12.	Miscellaneous and contingencies	2,750.00
	TOTAL	$ 39,100.00
	Annual Accrual Charge $ 5,576.59	

SOURCE: Investments costs elaborated, with appropriate adjustments for size, from COHDEFOR's investment costs in Chamelecon Nursery. PNUD/FAO/HON/77-006 pg. 31.

EXHIBIT 19

GRANTS FOR COMMUNITY TOOLS
Itemized detail of Tools per Organization

Item	Quantity	Price per Per Unit (US$)	Total Valu (US$)
1. Wheelbarrows	6	30.00	180.00
2. Shovels	10	8.00	80.00
3. Crowbars	6	12.00	72.00
4. Pikes	10	9.00	90.00
5. Handsaws	8	12.00	96.00
6. Hammers	8	8.00	64.00
7. Wire Cutters	5	10.00	50.00
8. Miscellaneous	-	-	50.00
TOTAL	-	-	682.00

IV. Financial Analysis of Choluteca Watershed Management Credit Fund

As is stated in the Project description, to cover the different loan programs included within the various Project categories, a "Choluteca Watershed Management Credit Fund" will be established. This fund will be administered by the National Agricultural Development Bank (BANADESA) as a fiduciary fund, regulated by a fiduciary contract to be entered into between the MNR and BANADESA. It is anticipated that the administrative cost of this Project will not exceed 0.5% of the loans to be given under the Project. These costs are already included as part of the different activities of the Project.

According to the loan programs developed for the Project, the total loans to be provided to farmers from this Fund, will increase gradually from $702,500 for 1981, to $1,756,300 for 1984 and to $2,107,600 for 1985, for a total of $6.8 million for the five-year period of the Project. In order to maintain the level of loan effort close to the ones experienced either n 1983 or 1984, additional credit funds will be needed for subsequent years to expand the Project to new beneficiaries.

In Exhibit 20 the yearly cash inflows from the different activitiy-loan programs are presented, with alternative cash inflows shown for the cases of 100%, 95%, 90% and 80% recovery of loans. Given previous experiences in Honduras with credit programs for small farmers, it seemed appropriate to use an 80% recovery rate.

If the level of activity obtained in 1983/84 is used as the target level for subsequent years after 1985, the GOH will have to build up the Fiduciary Fund with yearly contributions of $1.2 million, for the period 1986/1990, for a total contribution of credit funds from GOH sources of $6.0 million for that period. Exhibit 21 shows the GOH reforestation loan payments to be made as an incentive to beneficiaries of this kind of activity, plus the GOH institutional costs for 1986/1990. The total GOH costs of maintaining Project activities at the estimated levels increase therefore from $2.8 million in 1986 to $3.4 million in 1990, although of these amounts, $1.6 million in 1986 and $1.9 million in 1990, are credit funds to be provided to maintain the Fiduciary Fund.

EXHIBIT 20

CHOLUTECA WATERSHED MANAGEMENT CREDIT FUND
CASH INFLOWS FROM LOAN PROGRAMS

	1	2	3	4	5	6	7	8	9	10	11	12	13 to 15	16 to 18
1. Fertilizer Loans 1/	-	-	-	-	-	24.2	60.4	108.7	169.1	241.5	241.5	244.5	241.5	-
2. Agro-Forestry and Fuelwood 2/	-	-	-	-	-	-	-	-	69.5	173.8	312.8	486.6	695.1	695.1
3. Reforestation 3/	-	-	-	-	-	32.4	81.1	146.0	205.2	302.5	302.5	302.5	302.5	-
4. Range Mangement and Pasture Improvement 4/	18.2	45.5	81.9	127.4	181.9	190.5	203.4	220.6	242.1	268.0	268.0	268.0	268.0	-
TOTAL	18.2	45.5	81.9	127.4	181.9	247.1	344.9	475.3	685.9	985.8	1124.8	1298.6	1507.1	695.1
Minus 5% loss	17.3	43.2	77.8	121.0	172.8	234.7	327.7	451.5	651.6	936.5	1068.6	1233.7	1431.8	660.4
Minus 10% loss	16.4	41.0	73.7	114.7	163.7	222.4	310.4	427.8	617.3	887.2	1012.3	1168.7	1356.4	625.6
Minus 20% loss	14.6	36.4	65.5	102.9	145.5	197.7	275.9	380.2	548.7	788.6	899.8	1038.9	1205.7	556.1

1/ Loans at 8% interest; 15 years, 5 years of grace for amortization and interest payments; 10 years to pay principal and interest.
2/ Loans at 18 years; 8 years of grace for amortization and interest payment at 6%; 10 years to pay principal and interest at 8% per annum.
3/ Loans at 8% interest; 15 years, 5 years of grace for amortization and interest payments; 10 years to pay principal and interest.
4/ Loans at 12% interest; 15 years, with 5 years grace during which only interest will be paid; 10 years

EXHIBIT 21

CHOLUTECA WATERSHED MANAGEMENT CREDIT FUND
SUMMARY OF CASH INFLOWS FROM LOAN PROGRAMS AND RECURRENT GOH COSTS
FOR 1986 TO 1995
(IN $000)

YEAR	100% Recovery Yearly Inflow	80% Recovery Rate* Yearly Inflow	Loan-effort and Loan Funds to be provided: Loan-Effort	Loan-Funds to be provided	GOH Costs	GOH Reforestation Loan Payments	Total GOH Contributions after 1986
1981	18.2	14.6	702.5	(702.5)	157.2	-	-
1982	45.5	36.4	1,053.8	(1,039.2)	739.5	-	-
1983	81.9	65.5	1,405.0	(1,368.6)	985.9	-	-
1984	127.4	101.9	1,756.3	(1,690.8)	1,231.7	-	-
1985	181.9	145.5	2,107.6	(2,005.7)	1,483.5	-	-
	Subtotal 1981-1985		7,025.2	6,806.8	4,597.8		
1986	247.1	197.7	1,397.7	1,200.0	1,557.7	32.4	2,790.1
1987	344.9	275.9	1,475.9	1,200.0	1,635.6	81.1	2,916.7
1988	475.3	380.2	1,580.2	1,200.0	1,717.3	146.0	3,063.3
1989	685.9	548.7	1,748.7	1,200.0	1,803.2	205.2	3,208.4
1990	985.8	788.6	1,988.6	1,200.0	1,893.4	302.5	3,395.9
	Subtotal 1986-1990		8,191.1	6,000.0	8,607.2	767.2	15,374.4
1991**	1,124.8	899.8	1,988.6	1,088.8	1,998.0	302.5	3,389.3
1992	1,298.6	1,038.9	1,988.6	949.7	2,087.4	302.5	3,339.6
1993	1,507.1	1,205.7	1,988.6	782.9	2,191.8	302.5	3,277.2
1994	1,507.1	1,205.7	1,988.6	782.9	2,301.4	302.5	3,386.8
1995	1,507.1	1,205.7	1,988.6	782.9	2,416.5	302.5	3,501.9
	Subtotal 1991-1995		9,943.0	4,387.2	10,995.1	1,512.5	16,894.8

* This includes both unrecoverable loans as well as refinancing.
** Same level of loan effort of 1980 is maintained from 1981 on.

V. Analysis of Global Costs and Benefits of the Project

Using basically the same farm models explained in previous sections, projections of costs and benefits for each of the watershed management activities included in the Project have been made.

The summary results of these projections are presented in Exhibits 22 and 23. In Exhibit 22, the subtotal of direct costs of activities is presented, and also the institutional costs associated with the Project for the first five years. After year 5, it is assumed that the institutional organization set up specifically for this Project will move on to other watershed management activities either in the same areas or in other areas in the country. However, 30% of the institutional costs incurred in year 5 are assumed to be needed in subsequent years just to provide technical assistance and to assure the recovery of loans made to farmers. In this way, total costs of the Project reflect not only the direct costs incurred to carry out the activities but also the associated institutional costs necessary for Project implementation.

In Exhibit 23 only the direct benefits associated with Project activities are presented, while in Exhibit 24 the present value of Project costs and benefits, discounted at an opportunity cost of capital of 15%, has been calculated. The total discounted value of Project costs for 44 years is $19.1 million, while total discounted benefits amount to $21.2 million. This gives a positive benefit/cost ratio of 1.11 for that period. If a more conservative period of time is selected for the life of the Project, such as 20 years, the present value of Project costs will be 18.2 million, while the present value of direct benefits will be $18.8 million, for a benefit/cost ratio of 1.03. When the discount rate is reduced to 12%, the benefit/cost ratio increases to 1.31 for a 44-year period and to 1.17 for a 20-year period.

The Project, therefore, has a positive benefit/cost ratio even without the inclusion of the indirect benefits of Project activities which are substantial, even though appropriate quantitative estimates are difficult to make. Reduced sedimentation in the Los Laureles reservoir that supplies water for Tegucigalpa is one case in point. Also the reduced sedimentation in downstream Choluteca River will make it more economically feasible for the construction of a hydroelectric and irrigation dam in the Choluteca Valley. The gradual reduction of further soil deterioration, plus the added benefits of ecological protection and environmental improvement provided by forest plantations can not be quantified.

Project activities will, additionally, generate new employment and income opportunities for all of the farm families to be benefited by the Project. As was stated before, agricultural labor is unemployed for about 50% of the time in the farm-sizes selected for the Project. In Exhibit 25 a summary estimate of new employment generated by Project activities is presented. For the first ten years, these new employment opportunities will represent about 2.1 million man-days which, when gainfully employed, will mean additional labor income of about $3.4 million. The first five years of Project activities, when most of the

Exhibit 22

CHOLUTECA WATERSHED MANAGEMENT PROJECT

TOTAL COSTS OF PROJECT
($000)

YEAR	Soil Conservation and Improved Agr. Practices	Agro-Forestry and Fuelwood Plant	Reforestation (Pine)	Range Management and Pasture Impr.	Nursery Projects	Subtotal Direct Costs	Institutional Costs	Total Costs
1	53.1	292.6	148.1	151.5	130.2	775.5	1,199.2	1,974.7
2	132.8	455.6	230.7	247.5	250.6	1,317.2	1,377.4	2,694.6
3	248.0	627.0	317.5	357.5	395.7	1,945.7	1,537.7	3,478.4
4	350.1	806.7	408.5	473.7	566.8	2,605.8	1,418.4	4,024.2
5	470.1	994.8	503.8	599.9	763.9	3,332.5	1,572.2	4,904.7
6	543.0	167.2	84.7	206.0	528.0	1,528.9	445.7	1,974.6
7	467.8	167.2	84.7	206.0	528.0	1,453.7	445.7	1,899.4
8	268.1	167.2	84.7	206.0	528.0	1,254.0	445.7	1,699.7
9	268.1	167.2	84.7	206.0	528.0	1,254.0	445.7	1,699.7
10	268.1	167.2	84.7	206.0	528.0	1,254.0	445.7	1,699.7

Values continue up to year 44

11
12
13
14
15
16
44

EXHIBIT 23 (1)

CHOLUTECA WATERSHED MANAGEMENT PROJECT
TOTAL DIRECT BENEFITS OF PROJECT
($000)

	Soil Conservation and Improved Agr. Practices	Agro-Forestry and Fuelwood Production	Reforestation (Pine)	Range Management and Pasture Impr.	Nursery Projects	Total Direct Benefits
1	-	-	-	7.6	85.8	93.4
2	71.7	-	-	24.1	217.8	313.6
3	250.8	-	-	59.5	392.7	703.0
4	573.4	-	-	120.2	610.5	1,304.1
5	1,003.4	-	-	222.4	871.2	2,097.0
6	1,540.9	-		359.0	871.2	2,771.1
7	1,935.0	401.3	-	559.8	871.2	3,767.3
8	2,150.0	601.9	-	834.1	871.2	4,457.2
9	2,150.0	802.6	-	1,148.6	871.2	4,972.4
10	2,150.0	1,003.2	-	1,463.1	871.2	5,487.5
11	2,150.0	1,203.8	-	1,738.6	871.2	5,963.6
12	2,150.0	-	-	1,924.3	871.2	4,945.5
13	2,150.0	401.3	-	1,938.2	871.2	5,360.7
14	2,150.0	601.9	-	1,945.8	871.2	5,568.9
15	2,150.0	802.6	84.6	1,945.8	871.2	5,854.2
16	2,150.0	1,003.2	127.0	1,945.8	871.2	6,097.2
17	2,150.0	1,203.8	169.4	1,945.8	871.2	6,340.2
18	2,150.0	-	211.6	1,945.8	871.2	5,178.6
19	2,150.0	-	254.0	1,945.8	871.2	5,221.0
20	2,150.0	-	-	1,945.8	871.2	4,967.0

EXHIBIT 23 (2)

CHOLUTECA WATERSHED MANAGEMENT PROJECT

TOTAL DIRECT BENEFITS OF PROJECT...(2)
($000)

Year	Soil Conservation and Improved Agro Practices	Agro Forestry and Fuelwood	Reforestation (Pine)	Range Management and Pasture Improvement	Nursery Projects	Total Direct Benefits
21 to 24	Total direct benefits per year					4,967.0
25			846.0			5,831.0
26	Values continue up to year 44		1,270.0	Values continue up to year 44		6,237.0
27			1,694.0			6,661.0
28			2,116.0			7,083.0
29			2,540.0			7,507.0
30 to 39	Total direct benefits per year					4,967.0
40			2,643.8			7,610.8
41			3,968.8			8,935.8
42			5,293.8			10,260.8
43			6,612.5			11,579.5
44			7,937.5			12,904.5

EXHIBIT 24 (1)

CHOLUTECA WATERSHED MANAGEMENT PROJECT

ANALYSIS OF COSTS AND BENEFITS OF THE PROJECT...(1)
($000)

Year	Total costs of Project	Present Values of Project Costs	Direct Benefits of Project	Present Values f Project Benefits
1	1,974.7	1,974.7	93.4	93.4
2	2,694.6	2,343.1	313.6	272.7
3	3,478.4	2,630.2	703.0	531.6
4	4,024.2	2,646.0	1,304.1	857.5
5	4,904.7	2,804.3	2,097.0	1,199.0
6	1,974.6	981.7	2,771.1	1,377.7
7	1,899.4	821.2	3,767.3	1,628.7
8	1,699.7	639.0	4,457.2	1,675.6
9	1,699.7	555.6	4,972.4	1,625.5
10	1,699.7	483.2	5,487.5	1,559.9
11	1,699.7	420.1	5,963.6	1,474.1
12	1,699.7	365.3	4,945.5	1,063.0
13	1,699.7	317.7	5,360.7	1,002.0
14	1,699.7	276.3	5,568.9	905.1
15	1,699.7	240.2	5,854.2	827.4
16	1,699.7	208.9	6,097.2	749.3
17	1,699.7	181.6	6,340.2	677.5
18	1,699.7	158.0	5,178.6	481.2
19	1,699.7	137.3	5,221.0	421.9
20	1,699.7	119.4	4,967.0	349.0
	Subtotal (at 15%)	18,303.8	(1.03)	18,772.1
	Subtotal (at 12%)	18,683.2	(1.17)	21,914.3
21	1,699.7	103.9	4,967.0	303.5
22	1,699.7	90.3	4,967.0	263.9
23	1,699.7	78.5	4,967.0	229.5
24	1,699.7	68.3	4,967.0	199.6
25	1,699.7	59.4	5,831.0	203.7

EXHIBIT 24 (2)

CHOLUTECA WATERSHED MANAGEMENT PROJECT

ANALYSIS OF COSTS AND BENEFITS OF THE PROJECT...(2)
($000)

Year	Total cost of Project	Present Value of Project Costs	Direct Benefits of Project	Present Values of Project Benefits
26	1,699.7	51.6	6,237	189.5
27	1,699.7	44.0	6,661	176.0
28	1,699.7	39.0	7,083	162.7
29	1,699.7	34.0	7,507	150.0
30	1,699.7	29.5	4,967	86.3
31	1,699.7	25.7	4,967	75.0
32	1,699.7	22.3	4,967	65.2
33	1,699.7	19.4	4,967	56.7
34	1,699.7	16.4	4,967	49.3
35	1,699.7	14.7	4,967	42.9
36	1,699.7	12.8	4,967	37.3
37	1,699.7	11.1	4,967	32.4
38	1,699.7	9.7	4,967	28.2
39	1,699.7	8.4	4,967	24.5
40	1,699.7	7.3	7,610.8	32.7
41	1,699.7	6.4	8,935.8	33.4
42	1,699.7	5.5	10,260.8	33.3
43	1,699.7	4.8	11,579.5	32.7
44	1,699.7	4.2	12,904.5	31.7
	Subtotal at 15%	19,072.4		21,225.6
	Subtotal at 12%	19,897.6		26,059.9

Benefit/Cost Ratio at 15% = 1.11
Benefit/Cost Ratio at 12% = 1.31

EXHIBIT 25

SUMMARY: DIRECT EMPLOYMENT GENERATED BY PROJECT ACTIVITIES
(Thousands of man/days and Thousands of US$)

Year	Soil Conservation and Agric. Practices		Agro-Forestry and Fuelwood		Reforestation		Range Mgmt. and Pasture Improvement		Community Nurseries		TOTALS	
	man/days	US$ 1/	man/days	US$ 2/	man/days	US$ 2/	man/days	US$ 2/	man/days	US$ 2/	man/days	(US$)
1	71.7	81.0	50.2	100.3	25.4	50.8	7.6	15.2	7.8	15.6	162.7	262.9
2	107.5	121.5	74.7	149.4	28.1	76.2	11.4	22.8	12.0	24.0	243.7	393.9
3	143.3	162.0	100.3	200.6	50.8	101.6	15.2	30.4	15.9	31.8	325.5	526.4
4	179.2	202.5	125.4	250.8	63.5	127.0	18.9	38.0	19.8	39.6	406.8	657.9
5	215.0	243.0	150.5	301.0	76.2	152.4	22.7	45.4	23.7	47.4	488.1	789.2
6	35.8	40.5	25.1	50.2	12.7	25.4	10.3	20.6	11.9	23.8	95.8	160.5
7	35.8	40.5	25.1	50.2	12.7	25.4	10.3	20.6	11.9	23.8	95.8	160.5
8	35.8	40.5	25.1	50.2	12.7	25.4	10.3	20.6	11.9	23.8	95.8	160.5
9	35.8	40.5	25.1	50.2	12.7	25.4	10.3	20.6	11.9	23.8	95.8	160.5
10	35.8	40.5	25.1	50.2	12.7	25.4	10.3	20.6	11.9	23.8	95.8	160.5
										Total	2,105.8	3,432.8

1/ Using the opportunity cost of labor of $1.13 per man/day
2/ At an average cost of $2.00 per man/day.

initial work will be carried out, will generate 1.6 million man/days, i.e. an average annual new employment of 325.4 thousand man/days. After initial labor absorption, maintenance activities will absorb about 95.8 thousand man/days per year. Even though the benefits from increased employment opportunities are included as part of the private benefits, there is no doubt that the more intensive utilization of unemployed and underemployed labor in the agricultural sector will have direct public benefits, not only in additional income generated by farmers but also from the standpoint of reduced social pressures in the area of influence of the Project.

Other indirect benefits which have not been included in the global analysis, arise from the reduced rate of deforestation which will occur once the fuelwood and agro-forestry plantations come into production. At present, forest cutting for fuelwood consumption is advancing at an alarming rate (consumption per family is estimated to equal approximately the volume produced in national pine forest per hectare per year). Fuelwood cutters have to travel progressively increasing distances to find fuelwood sources. Slow growing oak (Quercus) forests are being depleted, since this is the favorite fuelwood for most of the consumers in the area. After year 8, when the first hectares planted with fuelwood come into production, it is anticipated that at least sixty percent of traditional sources will be substituted by the new supply sources. A quantitative estimate of these benefits is presented in Exhibit 26. For the 18 year cycle of agro-forestry and fuelwood production, approximately 20,000 hectares will be indirectly protected. If this area had to be reforested, this would imply a total cost of $7.0 million. The discounted value of these benefits is $1.4 million at an opportunity cost of capital of 15.0%,and $1.6 million t 12.0%

Soil and water conservation works, and agro-forestry, reforestation and improved pasture and cattle management will also produce important public benefits from the standpoint of reducing soil erosion and protecting the productivity of the soil. The extent of soil erosion in the Choluteca Watershed has been intensively studied (Kramer, 1978-1980). It is estimated that, on the average, with existing agricultural practices, about 22 tons per hectare per year are lost through erosion. Soil formation factors generally account for an annual production of about 2 tons of soil per hectare. Thus, a net loss of about 20 tons per hectare/year is actually occurring in the watershed's agricultural lands. Given the fact that one cm of soil on one hectare has an estimated volume of 100 m3, about 150 metric tons will be the average weight of one cm of soil. Thus, it might take about 7.5 years t lose one cm of soil through erosion. It is known that the first three cms of soil are the most useful from a fertility/soil productivity point of view. Thus, if no protective measures are taken it is estimated that it would take about 22 years to lose these valuable three cms. of soil.

This degree of soil erosion can be partially averted by the activities contemplated in the Project. The amount of soil thus protected is therefore a direct public benefit from the Project. In Exhibit 27, the discounted value of these benefits, using a 15% discount

EXHIBIT 26

Estimated Benefits from Reduced Fuelwood Cutting

Year	Has.	Production from Project (In 000 M3) 1/	Estimated Reduced Fuelwood Cutting (In 000 M3) 2/	Estimated Benefits of Hectares Number of ha 3/	Protected Costs of Reforestation 4/
8	836	50.2	30.2	1,006.7	352.3
9	1254	75.2	45.1	1,503.3	526.2
10	1672	100.3	60.2	2,006.7	702.3
11	2090	125.4	75.2	2,506.7	877.3
12	2508	150.5	90.3	3,010.0	1,053.5
13	-	-	-	-	-
14	836	50.2	30.2	1,006.7	352.3
15	1254	75.2	45.1	1,503.3	526.2
16	1672	100.3	60.2	2,006.7	702.3
17	2090	125.4	75.2	2,506.7	877.3
18	2508	150.5	90.3	3,010.0	1,053.5
			TOTAL	20,066.8	7,023.4

Discounted Value at 15% = $1,357.0
Discounted Value at 12% = $1,628.3

1/ At an average production of 60 m3/Ha, or 7.5 m3/ha/Year.
2/ Assuming a substitution of 60% from project sources.
3/ Calculated on the basis of 30 m3/ha.
4/ For a complete reforestation effort at $350.00/ha.

EXHIBIT 27

ESTIMATION OF BENEFITS FROM SOIL PROTECTION

	Soil and Water Conservation Works			Agro-Forestry and Reforestation			Range Management Pasture Improvement			TOTAL		
Year	Hectares Protected	Soil Loss 1/ Averted	Value of Soil 2/	Hectares Protected	Soil Loss Averted 1/	Value of Soil 2/	Hectares Protected	Soil Loss Averted 1/	Value of Soil 2/	ha Prot.	Soil Loss Averted 1/	Value of Soil 2/
1	-	-	-	-	-	-	-	-	-	-	-	-
2	1,792	35.8	26.9	-	-	-	-	-	-	1,792	35.8	26.9
3	4,480	89.6	67.2	-	-	-	505	10.1	7.6	4,985	99.7	74.8
4	8,063	161.3	120.9	-	-	-	1,263	25.3	18.9	9,326	186.5	139.9
5	12,542	250.8	188.1	-	-	-	2,273	45.5	34.1	14,815	296.3	222.2
6	17,917	358.3	268.8	3,148	63.0	47.2	5,050	101.0	75.8	26,115	522.3	391.7
7	17,917	358.3	268.8	3,148	63.0	47.2	5,050	101.0	75.8	26,115	522.3	391.7
8	17,917	358.3	268.8	5,667	113.3	85.0	5,050	101.0	75.8	28,634	572.7	429.5
9	17,917	358.3	268.8	8,815	176.3	132.2	5,050	101.0	75.8	31,782	635.6	476.7
10	17,917	358.3	268.8	12,593	251.9	188.9	5,050	101.0	75.8	35,560	711.2	533.4
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
TOTAL	-	6,628.6	4,971.5	-	3,652.5	2,739.4	-	1,767.6	1,325.7	-	12,048.7	9,036.5
Discounted Value (15%)	-	-	1,203.4	-	-	456.0	-	-	291.9	-	-	1,951.3
Discounted Value (12%)												2,559.9

Values are assumed to continue up to year 22

1/ Calculated using an average value of net loss of soil of 20 tons per ha. Figures are in thousand tons.
2/ Calculated using an opportunity cost of soil of $15.00 per ha or $0.75 per metric ton of soil. Values in $000.

rate is presented. The opportunity cost of the soil has been estimated at $15.00 per hectare, which is equivalent to $0.75 per ton of soil. This seems a reasonable value to use in view of the fact that the actual price of soil for gardening purposes is about $6.00/ton, and that the price of one bag of fertilizer is about $15.00. Another criterion used to estimate the opportunity cost of soil is the lost value of gross agricultural production from the farm. This has an average value of about $160.0 per hectare. At the present rates of soil erosion it might take from 8 to 20 years to make the land unproductive: i.e. an average annual reduction in the value of production from $20 to $8 per hectare.

Using the indicated value of $15.00 per hectare ($0.75/ton), the discounted value of the public benefits resulting from soil protection at 15% is $1,951,300, of which $1,203,400 is from soil and water conservation measures, $291,900 from range and pasture improvement practices and $456,000 from agro-forestry, fuelwood plantations and reforestation activities. Using a 12.0% discount rate the present value of these benefits is $2.5 million.

Besides the direct benefited impacts, Project activites are all directed to increasing the GOH's capability to plan and manage the development of Honduras' land resources in a manner consistent with the conservation and efficient utilization of these resources. As presented in the background section of this paper, this area of concern warrants ever increasing attention as population pressure on the land increases and the country's forested areas give way to denuded slopes.

The GOH is now beginning to deal with these problems, as are international lending agencies; however, the key institutions involved in water and land use development are not adequately prepared to undertake the large-scale programs required. This Project is also an institution strengthening effort - with a substantial on-the-job training element - which will provide necessary technical assistance and training to implement an approach dealing with the basic problems confronted by the small farmer.

Without a project of this nature which deals with the major constraints to watershed/land resources development as a whole, future investments in this area will not realize their potential return. In fact, many potential investments already in various stages of analysis and design will not go forward for lack of institutional capacity in the public sector and inadequately prepared user groups, particularly the small-farm sector.

By the end of the Project, the GOH will have a well rounded cadre of professionals with experience in the most important areas of watershed management, water control and related land use development. The capability of key public institutions to expand and improve the effectiveness of their programs will also be increased not only through the process of on-the-job training in the Choluteca Watershed, but also through improved logistical support, a computer based analysis and data

bank facility, reference libraries, expanded budgets, new delivery systems approaches and better information upon which policy and operational decisions can be made.

During the process of helping the farmers in the Choluteca Watershed - through the agro-forestry, fuelwood production, reforestation, pasture improvement and cattle management, and improved soil conservation and agricultural practices - valuable information on social, economic and cultural factors will become available. Methods to increase small farmers' participation in managing their land and water resources will be developed as will effective programs to ameliorate land use problems created by campesinos living and working in the Choluteca Watershed.

The Project will generate a significant amount of employment - and new income opportunities - for those rural dwellers within the watershed where adaptive field trials in hillside agriculture, fuelwood plantations and reforestation and range management are established. Aside from the much needed income resulting from improved agro-forestry and fuelwood development schemes, the farmers involved will gain first hand experience with the techniques employed and become involved in Project activities. Most importantly, the Project will establish the bases upon which effective full scale operational programs - both within the Choluteca Watershed as well as in other watersheds - can be implemented.

EXHIBIT 28

Estimated Costs of Establishment of One Hectare of Agro-Forestry, Fuelwood or Reforestation Plantation. (In US $)

1.	Plants (2,000) plants per Ha, at $0.115 each in plastic bags)	$230.00
2.	Plant Transportation (From nursery to final planting site)	13.00
3.	Land Preparation and Clearing (20 man days at $2.00 a day)	40.00
4.	Trail and Fence Repairs (8 man days at $2.00 a day)	16.00
5.	Plantation (20 man days at $2.00 a day)	40.00
6.	Tools and Miscellaneous Supplies	11.00
7.	Total Direct Costs per Hectare	$350.00

ANNEX M-1

ECONOMIC ANALYSIS: SUPPLEMENTARY TABLES

EXHIBIT M-1A

Average Conversion Indexes from Fuelwood to Charcoal

Fuelwood	Charcoal
2.125 st.	1 m3
8.5 st	1 Ton
1.7 m3	1 m3
6.8 m3	1 Ton

Notes: Based on charcoal bulk density of 250 kg/m3; average weight of dry wood of 470 kg/st or 590 kg/m3 (solid); and solid volume of st of 0.8 m3.

Conversion Factors from Charcoal to Energy

1 Ton of Fuelwood Charcoal	=	8,000 kwht
	=	2 Tons of Lignite
	=	0.67 Tons of Petroleum
	=	27,300,000 btu
	=	6,880,000 kcal
	=	750 m3 of natural gas
	=	at 1 atm and 15 deg. C.

EXHIBIT M-1B

Summary Findings of Characteristics of a Typical Load of Fuelwood*

Sample No.	Length of Wood (Cms)	Diameter of Wood (Cms)	Number of Pieces	Solid Volume in M3
1	65.0	2.5	180	0.057
2.	75.0	4.0	50	0.047
3.	80.0	6.0	80	0.181
4.	70.0	4.0	50	0.044
5.	75.0	5.0	50	0.074
6.	98.0	5.0	50	0.096
7.	85.0	5.0	100	0.167
8.	64.0	4.0	100	0.080
9.	80.0	5.0	50	0.079
10.	80.0	5.0	50	0.079

SOURCE: PNUD/FAO/HON/77-006/P.39

*A load of fuelwood is equivalent to 0.129 m3. To convert a cord to solid cubic meters, a factor of 0.69 is used. One cord is equivalent to about 28 loads, for which 4 man days are required.

EXHIBIT M-1C

Average Per Capita Consumption of Fuelwood in Different Parts of the Word

	Cubic Meters per Person/Year
Central America	1.10
Brazil	1.15
Upper Volta	2.70
Burundi	3.20
Nianey	0.63
North Nigeria	0.67
Siregal	1.11
Tanzania	2.30
Sudan	1.04

SOURCE: PNUD/FAO/HON/77-006/P.38

EXHIBIT M-1D

FUELWOOD AVERAGE VALUE OF HOUSEHOLD CONSUMPTION OF FUELWOOD

Item	Value
1. Size of Family Unit	6.4 persons
2. Load-Volume	0.0904 m3
3. Daily Family Consumption	0.0240 m3
4. Per Capita Daily Consumption	0.0037 m3
5. Annual Per Capita Consumption	1.332 m3
6. Annual Family Consumption*	8.761 m3

SOURCE: Preliminary data based on field surveys. PNUD-FAO-HON/77-006/p.36
*Annual family consumption is similar to figures used by COHDEFOR, to preserve "fuelwood forest reserves" in Santa Cruz de Yojoa, Choloma and Petoa, at a rate of 8-10 m3 per family/year.

ANNEX M-2

FINANCIAL-VIABILITY-AND RECURRING BUDGET-ANALYSIS TABLES

EXHIBIT M-2A
CHOLUTECA WATERSHED MANAGEMENT PROJECT
PROJECT BUDGETARY REQUIREMENTS COMPARED
TO PROJECTED BUDGETS OF MINISTRY OF NATURAL RESOURCES
(In $000)

Year	National Funds Budget	GOH Operating Costs Contribution			GOH Contribution as % of Budget
		DCH*	CWMP**	Total	
1976	17,396.8				
1977	24,393.3				
1978	30,851.6				
1979	39,766.8				
1980	44,114.4	3.5	38.8	42.3	**0.10**
1981	50,731.6	49.0	157.2	206.2	**0.41**
1982	58,341.3	65.8	739.5	805.3	**1.38**
1983	67,092.5	76.3	985.9	1,062.2	**1.58**
1984	77,156.4	98.0	1,231.7	1,329.7	**1.77**
1985	88,729.8	90.5	1,483.5	1,574.0	**1.77**

*Hydrological and Cl mat l gical Directorate, MNR.
**Operating Costs associated with the Choluteca Watershed Management Project.

EXHIBIT M-2B

Natural Resource Data and Analysis
Project Budgetary Requirements Compared to
Projected Budgetary Requirements of CONSUPLANE ($000)*

Year	CONSUPLANE's Operating Costs	GOH Operating C sts Contribution	Percentage
1976	3,288.1	-	-
1977	4,672.6	-	-
1978	6,342.9	-	-
1979	6,721.8	-	-
1980	6,721.8	12.3	0.18
1981	7,393.9	77.8	1.05
1982	8,133.3	467.2	5.74
1983	8,946.7	524.4	5.86
1984	9,841.3	524.4	5.33
1985	10,825.5	302.8	2.80

*Includes CONSUPLANES' operating budgets as well as technical assistance and economic studies' coordination which includes the National Cadaster Program.

EXHIBIT M-2C

Additional Loan Funds to be Provided Compared with
Projected Capital Investments of Ministry of Natural Resources ($000)*

Year	Capital Investment Budget*	Additional GOH Loans Additional GOH Loan-Funds Required	Funds as Percentage of Capital Budget
1976	17,048.8	-	-
1977	38,924.6	-	-
1978	52,383.4	-	-
1979	55,383.4	-	-
1980	61,919.5	-	-
1981	69,349.9	-	-
1982	77,671.9	-	-
1983	86,992.5	-	-
1984	97,431.6	-	-
1985	109,123.4	-	-
1986	120,035.7	1,200.0	1.00
1987	132,039.3	1,200.0	0.91
1988	145,243.2	1,200.0	0.83
1989	159,767.5	1,200.0	0.75
1990	175,744.3	1,200.0	0.68

*MNR's capital investment budget includes the GOH capital contributions to INA, BANADESA and others.

CHOLUTECA WATERSHED MANAGEMENT AND REHABILITATION PROGRAM

Technical Analysis

1. Alternative Project Designs

The GOH National Economic Planning Council (CONSUPLANE), has prepared a "National Environmental Plan" as part of the five year development plan (1979-1983). In this document, the Secretariat to the Council proposes, as an alternative, the creation of a ministerial "Commission for Environmental Protection", which would be responsible for regional zoning, evaluating projects in terms of their environmental impact, and coordinating intersectoral environmental programs.

The document also proposes the creation of a National Institute on the Environment, whose director will be the Executive Secretary of the above named Commission. This Institute, probably an autonomous institution within the government, would integrate all the agencies involved with environmental protection and improvement.

The GOH has analyzed these proposals and has decided that for the present, policy formulation and coordination can best be accomplished through the Agricultural Policy Commission (CPA) which, for purposes of natural resource programs, has been widened to include the General Manager of the Honduran Forestry Corporation (COHDEFOR). The CPA is represented by the MNR, INA, the Secretariat of CONSUPLANE and the Ministries of Economy and Finance. The Technical Secretariat of the CPA has sufficient professional capacity to act as a technical coordinating body of this heterogeneous membership.

The GOH has decided that before proceeding to the creation of a new institution to deal with the economic and social issues related to the management of watersheds for the country as whole, additional on the job experience should be acquired by the different agencies involved in these kind of activities. Thus, the Choluteca Watershed Management Program envisaged in this Project, would be a means not only of acquiring necessary field experience, but also for creating the required inter-institutional coordination previous to any innovations within the public sector of Honduras.

The amplified CPA has the necessary powers to carry out the different activities contemplated in the Project. The main executive office of the Project will be the Project Office, headed by a Project Director, which will be responsible for all Project activities. Through delegated authority from the MNR the Project Office will be able to enter into specific contracts, either with private persons or with autonomous institutions such as the PCN and will also have the authority to establish the special credit fund and subsidy mechanisms contemplated in the Project.

While the necessary steps are adopted for the creation of a permanent body to deal with the broad issues of natural resource use, land classification and utilization, watershed management and environmental protection the CPA will act as the superior policy making agency for all of the activities included in the Project. The GOH, through the Ministry of Finance and the MNR, will delegate authority for the uses of funds to the Project Office.

Another issue which was thoroughly analyzed by the GOH was whether or not the Project Office should be organized to carry out all of the loan activities to farmers included in the Project. This would have implied a complete organizational scheme whereby the Project Office had the necessary personnel to deal not only with credit evaluations but also with all the legal and administrative matters related to credit management. The selected alternative was to establish a Watershed Management Credit Fund as a fiduciary fund in the National Agricultural Development Bank (BANADESA). The BANADESA will be responsible for all legal and administrative matters related to granting of credit and loan collections. The fiduciary contract with BANADESA will establish the terms and conditions by which the credit funds will be managed.

2. Technical Discussion of Project Components

The natural resource conservation technologies to be implemented within the Choluteca watershed are simple technologies, in most cases adaptations of technologies already tested in Honduras, or in environments similar to Honduras such as Costa Rica or Panama.

The chosen technologies can be applied in the sub-regions selected within the Choluteca Watershed with slight modifications to allow for ecological variations. The experience which will be derived from this process will permit the extension of these technologies to much larger areas of degraded land and endangered forests. It is already known that these technologies are technically feasible, since all of them can be found in the Project areas although in limited numbers. Their application within the Choluteca Watershed will permit testing of their economic and social feasibility.

Exhibit 1 presents a summary of the actual distribution of land within the geographical limits of the Choluteca Watershed, by size of farm. It can be immediately seen that almost 97% of the farmers in the area own or possess lands in extensions of less than 50 ha, with 68% of them owning land of less than 5 ha in size. These size categories of farmers account for 36.5% of the total farm area in the Choluteca Watershed, while the remaining 3.4% of farmers account for 63.5% of the land area.

Exhibit 2 is a summary of the slope characteristics of farms by size of farm. More than 50% of the land area within the Choluteca Watershed has slopes greater than 30%. The proportion of small farms (with less than 20 ha) is smaller in the slope categories of 0 to 15% and 15 to 30%, than the larger farms. Thus the problem of size of farm and the degree of potential deterioration of the soil are closely interrelated.

EXHIBIT 1

CHOLUTECA RIVER WATERSHED

Number of farms, total area and average size of farms in the municipalities included within the geographical limits of the watershed.

Size of Farm (in Hectares)	Number of Farms Total	Percent	Area in ha Total	Percent	Average Size (in ha)
1. Total	20,805	100.0%	298,777	100.0%	14.4
1.1 Less than 5	14,190	68.2	26,454	8.9	1.9
1.2 From 5 to 20	4,494	21.6	42,607	14.3	9.5
1.3 From 20 to 50	1,423	6.8	39,948	13.4	28.1
1.4 Larger than 50	698	3.4	189,768	63.5	271.9

Source: National Agricultural Census of 1974, as processed in detail by municipalities and adjusted by geographical limits of the watershed.

EXHIBIT 2

SLOPE CHARACTERISTICS OF LAND WITHIN THE CHOLUTECA FIVE SELECTED SUBWATERSHEDS BY SIZE OF FARMS

SLOPE	Less than 5 ha		From 5 - 20		From 20 - 50		More than 50		TOTAL	
	Area (ha)	%	Area (ha)	%	Area(ha)	%	Area(ha)	%	Area(ha)	%
1) 0-15%	1,855	11.0	5,698	20.0	6,349	25.0	32,191	32.9	46,133	27.3
2) 15-30%	5,169	30.0	7,123	25.0	5,841	23.0	18,537	18.9	36,670	21.7
3) 30 - 50%	6,892	40.0	10,822	38.0	9,396	37.0	34,565	35.3	61,680	36.5
4) Larger than 50%	3,274	19.0	4,844	17.0	3,809	15.0	12,407	12.7	24,334	14.4
TOTAL	17,231	100.0%	28,492	100.0%	25,396	100.0%	97,867	100.0%	168,986	100.0%

SOURCE: Figures derived from National Agricultural Census of 1974 and adjusted according to findings of Cataster (PCN) on slope categories.

Exhibit 2 is a summary of the slope characteristics of farms by size of farm. More than 50% of the land area within the Choluteca Watershed has slopes greater than 30%. The proportion of small farms (with less than 20 ha) is smaller in the slope categories of 0 to 15% and 15 to 30%, than the larger farms. Thus the problem of size of farm and the degree of potential deterioration of the soil are closely interrelated.

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1. Total	20,805	100.0%	295,777	100.0%	14.4
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1.2 From 5 to 20	4,494	21.6	42,607	14.3	9.5
1.3 From 20 to 50	1,423	6.8	39,948	13.4	28.1
1.4 Larger than 50	698	3.4	189,768	63.5	271.9

Source: National Agricultural Census of 1974, as processed in detail by municipalities and adjusted by geographical limits of the watershed.

EXHIBIT 2

SLOPE CHARACTERISTICS OF LAND WITHIN THE CHOLUTECA FIVE SELECTED SUBWATERSHEDS BY SIZE OF FARMS

SLOPE	Less than 5 ha		From 5 - 20		From 20 - 50		More than 50		TOTAL	
	Area (ha)	%	Area (ha)	%	Area(ha)	%	Area(ha)	%	Area(ha)	%
1) 0-15%	1,895	11.0	5,698	20.0	6,349	25.0	32,191	32.9	46,133	27.3
2) 15-30%	5,169	30.0	7,123	25.0	5,841	23.0	18,537	18.9	36,670	21.7
3) 30 - 50%	6,892	40.0	10,827	38.0	9,396	37.0	34,565	35.3	61,680	36.5
4) Larger than 50%	3,274	19.0	4,844	17.0	3,809	15.0	12,407	12.7	24,334	14.4
TOTAL	17,231	100.0%	28,492	100.0%	25,396	100.0%	97,867	100.0%	168,986	100.0%

SOURCE: Figures derived from National Agricultural Census of 1974 and adjusted according to findings of Cataster (PCN) on slope categories.

The five subwatersheds selected for the Project offer a different set of ecological conditions where different technologies can be applied and where a wide variety of crops and forest species can be grown.

The chosen technologies are designed to deal with the basic ecological and socio-economic problems of the watershed's rural population. In brief, these problems are either directly or indirectly related to the size of farm and to slope and soil characteristics of the farm. The target group selected as direct beneficiaries of the Project is formed by all the farms established within the subwatersheds with an area of less than 50 hectares of land, because it is in this particular size category where the majority of the slash and burn practices of migratory agriculture are found; also because the income levels obtained by these farms is extremely low and it is where potential for subtantial improvements are known to exist.

The applicable technologies have been chosen to deal with the particular problems posed by the slope characteristics of the farms as well as by the socio-economic objective of increasing farm incomes.

Practical experience obtained in the Choluteca Watershed, as well as the socio-economic surveys made for purposes of the Project, have reduced the wide spectrum of possible technologies to the following four:

i) Soil and water conservation and improved agricultural practices, which will be applied primarily in farms with slopes up to 30%.

ii) Agro-forestry practices and fuelwood production, which will be applied in lands with slopes from 30 to 50%.

iii) Reforestation practices which will be applied primarily in lands with slopes greater than 50%; and

iv) Pasture improvement and cattle management practices, which will be applied in the larger farms within the target group with slopes from 30% and up to 60%.

Of the approximately 300,000 ha of farm land in the Choluteca Watershed within the target areas in the five subwatersheds there are 71,119 ha which require live barriers, hillside ditching, pastureland treatment, agro-forestry practices or reforestation.

The project will directly benefit 50% of the area selected within the five subwatersheds, for a total of 35,560 ha of treatment. In Exhibit 3, the target areas to be covered by the selected technologies are shown, by size of farm. For farms under 5 ha, 5,226 ha will be treated with one or more of the soil and water technologies selected, according to the slope characteristics within the farm units; 1,723 ha will be treated with agro-forestry and fuelwood production practices, and 1,637 ha with reforestation measures. In total, 8,616 ha will be treated within this size category of farm.

In the range of farms from 5 to 20 ha a total of 14,246 ha will be treated. Of these 6,439 ha will receive the benefit of agricultural and conservation practices; 3,590 ha of agro-forestry and fuelwood; 1,453 ha of reforestation and 2,764 ha of pasture improvement and range management.

Within the farms in the range of 20 to 50 ha, a total of 12,698 ha will be treated. Of these 6,222 ha will be treated with agricultural and conservation practices; 3,047 ha with agro-forestry and fuelwood; 1,143 ha. with reforestation and 2,286 ha with range management and pasture improvement.

Previous experiences obtained in the Choluteca Watershed region, especially in the planting of cashew nuts and agricultural extension activities, indicate that the level of effort required to accomplish the goals stated in the Project is reasonable and that it can be accomplished with Honduran technicians with the foreign technical assistance contemplated in the Project. Specific technical aspects of each of the Project activities are discussed below.

EXHIBIT 3 (1)

Choluteca Watershed Management Project

Activities and Target Areas by Group of Farm and Slope Category of Land

Farm Size and Slope	Total Area (ha)	Agricultural and Conservation Practices Total Area(ha)	Agro-Forestry, Fuelwood and Reforestation Total Area(ha)	Range Management and Pasture Improvement Total Area(ha)
I. Less than 5 ha				
2. Slope from 0-15 %				
2.1 Existing	1,895	1,895	-	-
2.2 Target group	948	948	-	-
2.3 Percentage covered	50%	50%	-	-
3. Slope from 15-30%				
3.1 Existing	5,169	5,169	-	-
3.2 Target group	2,585	2,585	-	-
3.3 Percentage covered	50%	50%	-	-
4. Slope from 30-50%				
4.1 Existing	6,892	6,892	6,892	-
4.2 Target group	3,446	1,723	1,723	-
4.3 Percentage covered	50%	25%	25%	
5. Slope greater than 50 %				
5.1 Existing	3,274	3,274	3,274	-
5.2 Target group	1,637	-	1,637	
5.3 Percentage covered	50%		50%	
6. Total Number of Farms				
6.1 Existing	17,231	17,231	17,231	-
6.2 Target group	8,616	5,226	3,360	
6.3 Percentage covered	50%	30.5%	19.5%	

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EXHIBIT 3 (2)
Choluteca Watershed Management Project
Activities and Target Areas by Group Size of Farm
and Slope Category of Land

Farm Size and Slope	Total Area(ha)	Agricultural and Conservation Practices Total Area(ha)	Agro-Forestry, Fuelwood and Reforestation Total Area(ha)	Range Management and Pasture Improvement Total Area(ha-
II. From 5 to 20 ha				
2. Slope from 0-15%				
2.2 Existing	5,698	5,698	5,698	5,698
2.2 Target group	2,849	2,849	-	-
2.3 Percentage covered	50%	50%	-	-
3. Slope from 15-30%				
3.1 Existing	7,123	7,123	7,123	7,123
3.2 Target group	3,562	1,425	1,425	712
3.3 Percentage covered	50%	20%	20%	10%
4. Slope from 30-50%				
4.1 Existing	10,827	10,827	10,827	10,827
4.2 Target group	5,414	2,165	2,165	1,083
4.3 Percentage covered	50%	20%	20%	10%
5. Slope greater than 50%				
5.1 Existing	4,844	4,844	4,844	4,844
5.2 Target group	2,422	-	1,453	969
5.3 Percentage covered	50%	-	30%	20%
6. Total Number of Farms				
6.1 Existing	28,492	28,492	28,492	24,492
6.2 Target group	14,246	6,439	5,043	2,764
6.3 Percentage covered	50%	22.6%	17.7%	9.7%

EXHIBIT 3 (3)

Choluteca Watershed Management Project

Activities and Target Areas by Group Size of Farm and Slope Category of Land

Farm Size and Slope	Total Area(ha)	Conservation Practices Total Area	Agro-Forestry Fuelwood and Reforestation Total Area	Agricultural and Range Management and Pasture Improvement Total Area
III. From 20 to 50 ha				
2. Slope from 0-15%				
2.1 Existing	6,349	6,349	6,349	6,349
2.2 Target group	3,175	3,175	-	-
2.3 Percent.covered	50%	50%	-	-
3. Slope from 15-30%				
3.1 Existing	5,841	5,841	5,841	5,841
3.2 Target group	2,920	1,168	1,168	584
3.3 Percent.covered	50%	20%	20%	10%
4. Slope from 30-50%				
4.1 Existing	9,396	9,396	9,396	9,396
4.2 Target group	4,698	1,879	1,879	940
4.3 Percent.covered	50%	20%	20%	10%
5. Slope greater than 50%				
5.1 Existing	3,809	3,809	3,809	3,809
5.2 Target group	1,905	-	1,143	762
5.3 Percent.covered	50%	-	30%	20%
6. Total No. of Farms				
6.1 Existing	25,396	25,396	25,396	25,396
6.2 Target group	12,698	6,222	4,190	2,286
6.3 Percent.covered	50%	24.5%	16.5%	9.0%

a) Soil and Water Conservation and Improved Agricultural Practices

The basic technology to be applied in lands with slopes of up to 30% consists in the construction/plantation of live barriers with native grasses known to grow well in the region like zacate limon, guinea Jaragua grass, pimuela or similar species. A variation of this practice will consist in the construction of rock retention walls, with which a large number of farmers in the area are very familiar.

The construction of these live barriers is a relatively easy technology which might be easily adopted by the farmers in the region. In several areas within the Choluteca watershed this technology has already been tried successfully. It consists primarily in the plantation of contour rows of selected species at spacings which will vary with the degree of slope of the land: from about 20 m spacings for slopes from 0 to 15%, to 8 m for slopes from 15 to 30% and to 6 m for slopes from 30 to 50%. It is estimated that a 100 meter contour row will require up to six man days of labor. Since in an average hectare it might be required to have 5 rows (for slopes from 0 to 15%), 10 rows (for slopes from 15 to 30%) and 15 rows (for slopes from 30 to 50%), the total manpower which will be required for the application of these practices might go from 30 man-days up to 90 mandays per hectare of land.

In lands with slopes from 30 to 50% live barriers might not be sufficient to cope with the potential degree of soil erosion. On these lands the construction of contour ditches (hillside ditches) is contemplated. The experience acquired with this practice in other parts of the country (Yojoa and Omoa, principally) indicate that it could be adopted by the farmer, though with relatively more difficulty than the live barriers. Hillside ditches will also be constructed with labor intensive technologies. It is estimated that in this kind of slope, up to 900 meters of hillside ditches will have to be constructed for an average hectare, with a possible labor requirement of 80 man/days per hectare.

Soil conservation practices alone, however, will only address one of the problems of the watersheds. In addition, improved agricultural practices will be necessary to take advantage of the soil treatments for increasing agricultural incomes and making the soil conservation measures economically viable from the point of view of the farmer. For this reason, fertilizer, improved seeds, pest control and other agronomic practices suitable to the crops grown in the region (basically maize, sorghum and beans) will be provided.

In each of the five subwatersheds, a Watershed Management Unit (WMU) will be established, headed by a coordinator (agronomist, silviculturalist or watershed management specialist). Each WMU will have, in addition, four social promotors, four agronomists, four silviculturalists (dasonomists), four cooperative experts and two land support specialists.

The soil conservation program will be initiated after the Project Office undertakes a comprehensive publicity and educational campaign at the local level to enlist maximum participation of target farmers, first in the Headwaters and then in the other four subwatersheds.

The soil conservation and intensive agricultural practices will follow the pattern shown below:

i) Social promotion agents and soil conservation agents from the local development team will introduce the farmer to the advantages of live barriers and hillside ditches, as well as of fertilizer and other agricultural inputs.

ii) Follow-up activities by the technical team with the farmer will establish soil conditions, continous cropping patterns, cultivation methods and choice of crops optimal for his situation.

iii) The land support specialist will survey the land and stake it according to the agreed upon soil conservation patterns.

iv) The soil conservation agent will calculate the total cost of treating the farmer's land. In conjunction with the farmer the social promotion agent and the agricultural specialists he will develop an individual five year farm plan which will establish the total package of activities to be carried out on the farm and the grant, loan and payment terms proposed for these activities.

As discussed in detail in the Economic Analysis, incentives to be given to farmers differ according to the size of their farm. Farmers with under 5 ha of land will receive fertilizer subsidies in proportion to the amount of soil conservation works performed. For farmers in this size category, four types of subsidies will be given: $60/ha; $80/ha; $120/ha, and $150/ha, depending on the amount of soil conservation work performed per hectare of land (See Exhibit 4). After the WMU experts have determined that work has been done according to the technical specifications required, the subsidies will be given to the farmer in the form of credit notes, with which he can purchase fertilizer from a participating local dealer.

EXHIBIT 4

SOIL AND WATER CONSERVATION AND INTENSIVE AGRICULTURAL PRACTICES

Soil and Water Conservation and Intensive Agr. Practices	Target Area (ha)	Fertilizer Grants Per ha	Fertilizer Grants Total	Fertilizer Credit Loan Per ha	Fertilizer Credit Loan Total ($000)	Total Cost ($000)
Slope from 0 to 15%	6,972	-	$56.9		361.4	418.3
Less than 5 ha	948	$60	$56.9	-	-	56.9
More than 5 ha	6,024	-	-	$ 60	361.4	361.4
Slope from 15 to 30%	5,178	-	206.8		207.4	414.2
Less than 5 ha	2,585	$80	206.8	-	-	206.8
More than 5 ha	2,593	-	-	$ 80	207.4	207.4
Slope from 30 to 50%	5,767		227.5		533.8	761.3
Less than 5 ha	1,723		227.5		-	227.5
More than 5 ha	4,044		-		533.8	533.8
Treatment A	3,460		124.1	-	291.1	415.2
Less than 5 ha	1,034	120	124.1	-	-	124.1
More than 5 ha	2,426	-	-	$120	291.1	291.1
Treatment B	2,307	-	103.4	-	242.7	346.1
Less than 5 ha	689	150	103.4	-	-	103.4
More than 5 ha	1,618	-	-	$150	242.7	242.7
Sub Total	17,917		491.2		1,102.6	1,593.8

1/ Treatment A activities consist of planting of live barriers.
2/ Treatment B includes the construction of hillside ditches and planting of line barriers.

Special arrangements will be made with participating local fertilizer dealers so as to facilitate the tasks of delivery and transporation of the fertilizer as well as the paperwork required for the redemption of the credit notes converted by the dealer. No technical difficulties are anticipated in this activity, although some problems of transportation to inaccesible areas have already been identified, such as the need for animal transportation from the nearest road.

Actual delivery of fertilizer to the farm will also be carefully scheduled by the WMU in such a way that the farmer only acquires as much fertilizer as is necessary for his farm and the particular needs of his crop. Farmers who have done large soil conservation works and who are therefore eligible for large amounts of fertilizer might be required to schedule the actual delivery of the fertilizer for 3 and up to 5 years.

For farmers with land above 5 ha, loans will be made for the purchase of fertilizer, in the same fashion as fertilizer subsidies are granted. The difference, of course, will be that in this case, loans and not grants will be given to the farmer. No technical difficulties are anticipated in this part of the program.

As stated in the Economic Analysis, farmers organized in community units of 25 members each will receive the benefits of a package approach: in other words, farms will be treated with soil conservation, improved agricultural practices, agro-forestry, fuelwood production and, in cases where conditions so warrant, with pasture improvement and range management practices or with reforestation activities. These will be carried out over a period of time as determined by the farm plan.

The recommended improved agricultural practices which will be done by the WMU's experts, will be promoted through educational campaigns, through demonstration plots and paraprofessional technicians to be trained specifically for the project, as described in the community nurseries section. Sufficient experience has been acquired by Honduran personnel on this kind of activity to be able to anticipate only minor technical problems regarding this part of the program.

In summary, it is considered that Honduras has had enough experience in soil conservation practices as well as on improved agricultural practices to conclude that the single techniques chosen for this part of the project are technically feasible and can be readily absorbed by the farmers in the area.

b) <u>Agro-Forestry Practices and Fuelwood Production</u>

There is no doubt that permanent vegetative cover would be a more appropriate land use for much of the selected areas of the Choluteca watershed that has been deforested and is now in pastures or used for traditional slash and burn agriculture. The agro-forestry practices and the production of fuelwood proposed for inclusion in the project are therefore an essential component of the strategy to rationalize land use in the watershed.

In addition to the ecological protection provided, agro-forestry activities and fuelwood production will provide a very productive economic alternative over both the medium and long term for a large segment of the Choluteca Watershed's rural population, while helping to reduce the current trend toward the establishment of pastures in steeply sloped hillsides. Also, the expanded forest cover will reduce sediment yields.

One of the most important issues that determines the private internal rate of return from forest plantation is the species that are selected for a particular area or sub-area within the watershed, and the ecological conditions on which the selected species will grow.

Depending on the ecological conditions prevailing in the five subwatersheds selected for the project, the predetermined areas will be planted with one or several of the following species with which COHDEFOR, or private institutions in Honduras have already have had some experience. Teca (Tectona grandis), Laurel (Cordia alliodora), Macuelizo (Tabebuia pentaphylla), Melina (Gmelina arborea), Eucalipto (Eucalyptus; canaldulensis, citriodora; grandis; robusta; scaligna; tereticornis, etc), Guaje (Leucaena leucocephala), Madrecacao (Gliricidia sepium), Guanacaste (Enterobium cyclocarpum), Guama (Inga vera), San Juan Primavera (Cybistax donnell-smithii) etc. Also, depending on the communities' preferences, other trees will be promoted such as coffee, orange, grapefruit, avocado, mango, or cashew nut.

No major technical problems are anticipated in the selection and planting of the species for agro-forestry or fuelwood production. The National Forestry School (ESNACIFOR) manages more than 4,200 ha of forest lands in Siguatepeque and since 1970 has been establishing small plantations. ESNACIFOR has also experimented with different methods of reforestation. At present Pinus oocarpa has been used for the plantations since that is the native species more adapted to the area. They have been experimentating, though to a lesser extent, with Pinus pseudostrobus, Liquidambar styraciflua and some Quercus spp, and are planning the introduction of other species, specially Eucalyptus spp and other Pinus. COHDEFOR on the other hand, has been experimenting in the North Coast with most of the other species mentioned above.

The majority of these species already grow in the Project area and are therefore adaptable to the ecological conditions in the area. Experimental plots will be used, however, for species and varieties new to the zone. Also the knowledge and experience gained by ESNACIFOR and the Center for Tropical Agriculture (CATIE) in new varieties will be utilized for selection based on soil, climate, hydrology and slope conditions.

In addition, substantial experimenation with Eucalyptus spp. has been undertaken in the Agalteca region, north of Tegucigalpa under the direction and technical supervision of ACESITA, a world known Brazilian firm with wide experience in eucalyptus for charcoal production. Some

experimentation has already been carried out for Leucaena in Agalteca also under the supervision of ACESITA, and in the Respire area within the Choluteca Watershed by the "Save the Children Foundation" under an AID OPG.

Technical information is also available for some of the native species which grow in different ecological areas within the Choluteca Watershed, particularly Madrecacao (Gliricidia Sepum), Guaje (Leucaena sp), Melina (Gmelina arborea), Guanacaste (Enterobium cyclocarpum) and Guama (Inga vera). These are fast growing species, which could be easily adaptable for fuelwood production.

Different species of Leucaena have been identified to grow well in the Choluteca Watershed. Leucaena, a versatile legume used some 2,000 years ago by Mayas and Zapotecs in Central America is not only adequate for fuelwood production, but also for cattle feeding, reforesting hillslopes, shade tree, organic fertilizer and as a windbreak or firebreak. These species are particularly appropriate for agro-forestry and fuelwood production because in addition to the above mentioned uses, the stumps readily regrow (coppice), therefore, "they defy the woodcutter". It is known that Leucaena adapts badly to acid soils, but a significant percentage of the soils in the five selected subwatershed is classified as basic soil where Leucaena will grow well.

However, Leucaena seedlings grow slowly at first and this complicates plantation establishment; aggresive weeds or adverse climate conditions can lead to total failure of the planting. For this reason, whenever Leucaena is to be planted in the Choluteca Watershed, appropriate maintenance measures will be undertaken to take good care of the seedlings.

Another promising species, native to the Choluteca area, and easily adaptable to steep slopes, in marginal soils and in areas with extended dry seasons, like Leucaena, is the Madrecacao, Madre de Agua or Cacahuananse (Gliricidia sepium) of which different varieties, which have not as yet been taxonomically identified, have been reported to grow widely and well in the Choluteca region.

Much more experimentation has been made in Honduras with the genus Eucalyptus spp in areas similar to the Choluteca watershed. For reasons of low water consumption (or higher water consumption in the periods of water availability), FAO recommends the use of this genus for reforestation in arid and semi-arid regions, where annual precipitation is no more than 300 to 700 mm per year. Also, Eucalyptus gives back to the soil pratically the same amount of organic material as a native tropical forest in the form of leafs, branches, residues, etc.

For fuelwood production as well as for charcoal production, Gliricidia, Leucaena, and Eucalyptus can be used with success. These species can have an estimated growth from a low of 7.0 m3 per hectare per year for poor soils to about 15 m3 per hectare year for better soils which, as is shown in the Economic Analysis , are acceptable ranges of growth for adequate economic returns to the farmer. The average cost of

planting for any of the species mentioned above has been estimated at $400.00 per hectare, using labor intensive techniques.

Traditional slash and burn farmers will be encouraged to plant seedlings of fast growing native species at widely spaced intervals (7 x 7 meters) on their corn, sorghum, coffee, or other crop plots. A variation of the system will involve the planting of new annual crops (coffee, yucca, corn or beans) with tree seedlings. The farmer will be provided with materials (seedlings, fertilizers) as well as technical assistance. They will also be paid for their labor input for planting seedlings and for weeding and pruning in subsequent years. The advantages of this system are that the farmer will receive a food crop and some income while he waits for the trees to grow; also the annual crop will help to reduce the problem of weeds and grasses. Another objective which will be achieved with this system is the breaking of the pattern of planting jaragua grass after cultivating corn or other annual crops. The system to be introduced by the Project does not require substantial changes in technology by traditional farmers who continue to use slash and burn techniques, but it is one in which they obtain additional income by participating in a minor modification of their traditional activity. There is also the possibility that the use of fire resistant species will permit the land to be cleared again using traditional agricultural techniques before the trees are harvested.

The introduction of this agro-forestry system will provide substantial savings in relation to plantation forestry, since clearing and weeding, which represent a substantial labor cost, are done by the farmer in any case and the only addition to labor cost is tree planting.

Finally, the promotion of this activity will generate important external economies to the Choluteca Watershed, because the reforestation which occurs concurrently with the traditional agriculture of the farmer in the area, not only will increase the productive potential of the land, but also will provide significant protection against erosion.

A variation of this system which will also be introduced by the local development teams is the planting of permanent tree or bush crops under the shade of commercially exploitable trees such as Leucaena or Gliricidia.

Under this system, the participating farmer would clear from one half(1/2) to one (1) hectare per year and plant rapid growing native species shade trees and traditional crops (corn, beans or rice). The following year, coffee, bananas or another tree crop would be planted with sufficient technical supervision to assure that proper planting and cultivation procedures are followed.

The incentive to be provided to the farmer for agro-forestry and fuelwood production will consist basically of the following mechanism:

The BANADESA will manage a credit fund which will be used to finance the establishment and maintenance cost of the forest plantation. The loans will be approved and supervised by the Project Office under the

advice of the Watershed Management Units, and on the basis of a farm plan approved by the WMU team.

For promoting agro-foresty, fuelwood production and reforestation, financial incentives are essential. In these kind of activities the farmers forego land and immediate returns in order to create a capital asset. To make these activities attractive to the farmer incentives must be provided which reduce the initial establishment cost and provide the farmer with income at least equal to what he would receive from the current use of his land, especially during the first six to nine years that it takes for the trees to achieve some significant value. The Social Analysis indicates that without those incentives agro-foresty, fuelwood production or reforestation will not be practical.

Among the alternatives analyzed for financial incentives, one would consist of a direct loan to the farmer and the other of a combination of provision of labor payments, tree seedlings and other inputs, in subsidized form and formally accounted for as a loan to the farmer. The analysis of costs, returns and cash flows for illustrative reforestation and fuelwood production activities reveal, however, that loans to the farmers will have to be on relatively easy terms, because of the size and timing of the stream of benefits and income foregone. For this reason, the second alternative has been selected: i.e. the farmer will be paid for the cost of labor in cash and the tree seedlings will be purchased from cooperative nurseries, of which the farmer himself will be a member. All of these costs will be computed as a loan to the farmer.

The credit scheme proposed for the forest plantations for fuelwood production might be modified in actual practice according to the experience obtained by the Project Office on this part of the program. These loans will be at 8%, with an eighteen year life and an eight year grace period of amortization during which interest of 6% will be capitalized. The GOH will make all payments on the forest plantation loans, provided that the participating farmer complies with the terms of the contract.

c) Reforestation activities

Reforestation with rapid growing species, like the ones described in the preceeding section, will be done by farmers in the five subwatersheds in selected areas with slopes greater than 50% which are currently in natural pastures. Only where the fast growing species are not adaptable, pine plantations will be encouraged. The latter will provide an important base for commercical timber activities within the watershed.

Though most of the reforestation activities will be carried out on privately owned land, it is expected that some municipal and state owned land which is presently held by individual farmers, will also be reforested directly by the Project.

In addition, the cooperatives already organized by COHDEFOR within the Social Forestry System would be induced to participate in this part of the project. An interinstitutional arrangement will be worked out to assure that the expertise of COHDEFOR in reforestation activities, particularly with pine, will be made available for the Project.

In areas where fast growing species are not adequate, reforestation will be done with Pinus oocarpa or P. caribea with which COHDEFOR has had ample experience. In this case, the average cost of reforestation is also estimated at $350.00 per hectare.

In the case of pine, given the slope and soil characteristics of the land selected for pine plantation, about 40 years to the harvest for high quality timber is anticipated. However, by years 14/15 the first pre-commercial thinnings are expected to yield from 12 to 15 m3/ha of fuelwood or poles. By year 25, the second commercial thinning is expected to yield from 80 to 100 m3/ha of poles and construction timber. A variation of this system which has also been tried in different pine forests in Honduras might allow another thinning between years 20 to 24 and years 30 to 34 would yield from 40 to 60 m3/ha of poles and timber. The system more generally used however, consists in planning final cutting by years 35 to 40 at which time it is expected to produce from 120 to 135 m3/ha of high quality timber. Techniques for pine reforestation are well known in Honduras and no technical problems are anticipated in this part of the project. Regarding forest management techniques considerable advances have been made by COHDEFOR although some technical assistance is contemplated to assist the GOH in improving their efforts in this regard.

Loans for reforestation will be managed directly by the Project Office. The GOH will begin to repay the farmer's forest plantation loan in year six, once the local development team performs an inspection called for by the farmer's loan agreement to verify that the farmer has taken proper care of the plantation. As long as the local team certifies that the farmer is adequately maintaining the trees, the GOH will continue to repay the loan, until year ten when the loan will be paid off.

The credit scheme proposed for reforestation with pine might be modified in actual practice according to the experience obtained by the program. These loans will be at 8%, have a fifteen year life and a five year grace period of amortization during which interest will be capitalized.

Legal measures are already being discussed by the GOH to provide additional incentives for private reforestation, as well as to assure the owner of the land complete property rights for the trees produced through private reforestation efforts.

d) Pasture Improvement and Range Management Practices

A large percentage of the farms within the Choluteca Watershed are planted with natural grass or with jaragua grass (Hyparrhenia rufa), a grass characterized by a low protein content.

Jaragua is a bunch type grass; it grows in clumps and spreads by seeding rather than shooting out runners. If not managed properly, as is the case with farmers in the watershed, jaragua not only does not provide enough nutrients to the soil, but also it does not protect against soil erosion in steeply sloped lands.

Because of its characteristics, even during the rainy season a pasture of jaragua grass has 40 to 50% of its surface exposed to erosion. This is the reason why the Project contemplates either a better management of existing jaragua pastures or the introduction of stoloniferous grasses (primarily Brachiarea) to replace native bunch grasses.

Most of the improved grass species which could be appropriate for the area are most readily propagated by transplanting stems rather than by use of seed. This requires that grass nurseries be available to provide the necessary planting material.

The Project contemplates the establishment of grass nurseries at each subproject location where grass planting will be required. Initially, this will consist of bringing in planting material and establishing nurseries in each of the farms selected for these activities by the WMU.

In relation to the grass nurseries, the MNR has had experience with several grass species which could be included in the initial nurseries: Brachiaria radicans; Brachiaria decumbens; Cynodon plectostachyus, Digitaria decumbens, etc. The planting material will be obtained from the best available nearby sources (such as Zamorano) or imported from countries which have these varieties available. Local cattle growers also could be an important source, if not the most important, for these kind of materials.

In the case of grass, since a half ton to a ton of grass must be harvested and planted for each hectare, it is desirable that the farm nursery be established about a year in advance of the planting program to reduce cost of transporting the planting material. Individual farm plans will be developed with the assistance of the WMU's experts to keep the implementation program in line with program activities.

The local WMU team specialist will teach the farmers cattle management, pasture rotation methodology, the use of mineral supplements, dry season supplemental feeding (corn, sorghum), sanitation measures and other pasture and herd management techniques, which will permit the carrying capacity of the farm to be increased.

This in turn will liberate some land thus allowing the farmer to plant some commercial forest species from 20 to 30% of his farm at the same time that he increases his herd size and the income he gets from livestock activities.

Additional income producing conservation practices which will be promoted include multiple use living fences and the planting of forage trees and shade trees with lumber or fuelwood value.

The Project will provide loans to the farmers at 12% interest for 15 years with a five year grace period on amortization. The average cost of pasture improvement, including a component for fence repair, is $300.00 per hectare.

e) Community Nursery Projects

In the Economic Analysis a detailed description of community nursery projects can be found. The idea is to provide each community organization with grant funds to allow them to establish a tree nursery with a total capacity between 90,000 to 100,000 plants per year. This will be used both as a source of seedlings for the agro-forestry, fuelwood and reforestation activities, as well as a source of income for the community organization.

The nurseries will be established in accordance with the farm plans developed by the local WMU so as to have a clear schedule of activities from nursery establishment to transplanting and final planting in the farms subject to agro-forestry or reforestation activities. One nursery supervisor will be appointed by the cooperative to supervise and coordinate all nursery operations.

The experience acquired in Honduras with tree nurseries is extensive. COHDEFOR, either directly or through local participating farmers has experience with different kinds of organizations and technical plans. For purposes of the Project, the "Las Lajas" model has been chosen as the most suitable.

COHDEFOR has an intensive reforestation program for the "Las Lajas" project in Comayagua, where a special nursery has been established. Special "tables" have been developed whereby seeds planted in plastic bags are protected from direct contact with the ground, thus eliminating many of the causes of seedling losses (ants, insects, fungus diseases, etc.) The techniques required for the establishment of this type of nursery are very simple. No major problem for their adoption by the communities is anticipated.

Members of the WMU will be trained in the best methods to encourage the adoption of the selected practices, as well as for the continous operation of the nurseries. They will in turn train the selected members of the community organization in all matters related to nursery establishment, maintenance and operations.

To accelerate the process of nursery establishment in accordance with the programming of Project activities, a demonstration and training nursery will be established to serve farmers in the headwaters beginning in early 1981. This nursery will have a total capacity of 1.3 million plants, out of which it is anticipated that 300,000 will be grown in plastic bags and close to 1.0 million will be grown in the form of stakes or pseudo stakes.

Seed and stake planting will be done at the latest during the month of January 1981. From three to six months and in some cases up to 9 months for pseudo-stakes will be required in the nursery previous to transplanting and final planting operations. Planting at the selected farmers' sites will be done during the months of May and September. Planting operations will be programmed so as not to interfere with periods of peak labor demand in the watersheds.

Seedlings and stakes from the demonstration nursery will be used both for direct planting, as well as for the establishment of the community nurseries programmed under the Project. In this fashion the establishment time required for these nurseries will be considerably reduced. A total investment of $39.1 thousand has been included to cover establishment costs of the demonstration/training nursery, plus $50.2 thousand to cover first year operational costs. Depending on the results of operations and the demand for seedlings from sources other than Project beneficiaries, a decision will be adopted either to continue nursery operations as a self operating entity or to move the installations to other Project subwatersheds.

SOCIAL ANALYSIS

1. General Socio-Economic Characteristics of the Project Area

1.1 Population and Migration

The total population living in the municipalities to be affected by the Project, excluding Tegucigalpa, is 137,063 1/. About 80% live in communities with less than 2,000 inhabitants which are characterized by the absence of infrastructure and utilities. Population density per municipality varies from 8.3 to 157 persons/km², with a mean of 47.3 for the whole region. The highest density exists in the lower areas of the watershed especially in the Orocuina and Nueva Armenia subwatersheds.

The rural area of two of the Departments to be affected by the Project, Francisco Morazan and Choluteca, is experiencing a net emigration, while the third department, El Paraiso, is experiencing a net immigration (Invest, 1979). Land concentration, population density, soil characteristics, low rainfall and the attraction of two large urban centers in the zone are the factors which have promoted the rural exodus from the most southern area of the watershed. In the case of El Paraiso Department seasonal immigrations are a result of the labor demand for coffee harvesting, while semi-permanent and permanent immigrations are most likely a consequence of greater availability of cultivable land.

1.2 Land Holdings

The economy of the Project region is predominantly agricultural. Within the Choluteca River watershed there are over 20,000 farms. About 70% of the farms have less than five ha with an average of 1.86 ha which amounts to only 9% of the total amount of farm land. About 4% of reported farms have more than 50 ha, with an average size of 271.8 ha, and they occupy 63.5% of all farm land. Thus land concentration is an important characteristic of the whole watershed area with the highest concentration in the Nueva Armenia subwatershed.

Most people own their own farms. However, cultivation on land for which only usufruct rights are held is more common in the municipalities of Ojojona, Santa Ana, Namasigue, Texiguat, Soledad, El Paraiso, and Alauca. Most of the privately owned farm land belongs to the more than 50 ha farm category while a substantial number of farms under five hectares are held as rented parcels. Average farm size for privately owned land is 16.08 ha; and it is 2.15 ha when it is rented.

1/ Population and agricultural statistics are from the census of 1974.

1.3 Land Use

Smaller farmers, especially renters, use the land primarily for annual cultivation of basic grains for subsistence, and the larger farms use the land for pasture. The larger the farm, the more likely that the pastures are improved. Smaller farms are more likely to use natural pasture.

In the Project area, the traditional, the modern, and the cooperative farmer are found. The traditional farmer's production is consumption oriented while the modern and cooperative farmers are market oriented.

In the traditional sector, there is a distinction between large farm owners, and sharecroppers and independent peasants. The large farm owner is more concerned with the rentability of his land than with its agricultural productivity. Renters/sharecroppers usually pay their rent in kind and are obligated to allow grazing of the owner's cattle on the maize and sorghum stubble that is left after harvest. After a two or three year cultivation cycle, the fields abandoned by the share cropper are usually converted into pasture by the owner. Sharecroppers as well as small farmers who rent the land are generally dependent on other larger land owners for access to the land. Independent peasants, although working on relatively small parcels, have legal rights to the land and since they do not have to pay rent or crop shares, they are more likely to produce surpluses for the market.

Since most farmers fall into the traditional sector, the number of modern and cooperative farmers is very small. The latter group, whether producing crops or livestock, are highly market oriented (usually for export), use the land intensively and use modern technologies including some mechanization.

Predominant land use patterns of the region are traditional. The traditional sector has two outstanding characteristics (Hughes-Hallett, 1980). The farms within this sector tend to incorporate an increasing amount of land into production, with capital and labour remaining static. After allocation of the piece of land for the family's consumption needs of basic grains, "extra" land is used for cattle grazing. The basic land use cycle begins by sowing the land with basic grains, especially maize. This land is converted into pasture at a second stage of the process, and is left "fallow" during the third and last stage of the cycle.

Basic grains and cattle management are the more important economic activities of the traditional sector. Both activities, however, tend to be carried out on an extensive basis. Due to the level of technology used and natural soil conditions, basic grain patches have to be left fallow for certain periods in order to restore fertility.

2. General Traditional Cultivation Practices and Erosion

Corn and sorghum production is a two phase process. There are one planting and two harvesting periods during the year. Land preparation for the first planting is carried out during the dry season (December through April) especially when parcels to be used have not been recently cultivated. These fallow plots usually have a dense growth of shrubs which also is an indication that the land has recovered some of its fertility. About November the brush is cut down manually. By March the cut brush has dried out and it is burned. Planting takes place right before the early rains in May. This is done manually on very sloping areas since the farmer cannot use a plough. Corn may be intercropped with sorghum or beans. Sorghum is usually sown at a small distance from corn plants. During the month of June, well into the rainy season, corn fields must be weeded manually with a curved machete or with a hoe. In August, corn plants are bent over and broken. This permits the cobs to dry out in the fields. Harvesting is done when the farmer has time. After the corn harvest a rapid weeding is carried out to protect the remaining sorghum plants. Sorghum is harvested in January and February.

In certain areas, beans are sown in August or September, and are harvested by the end of the dry season in March - April. Bean production requires more investment and risk than corn and sorghum production; seed is much more expensive and the plants are more susceptible to insect attack.

The agricultural practices which are of importance in connection with erosion are the land clearance methods, land scraping connected with weeding, and the poor soil cover that results from plant spacing techniques.

Burning is rational in traditional agriculture. It takes less labor, the burned vegetative matter is converted into easily assimilated plant nutrients and burned shrubs and weeds do not compete for water and nutrients with the crop. Nevertheless, it has a negative impact on the soil since it destroys all soil cover, leaving the soil susceptible to wind and soil erosion and thereby reducing the land's water holding capacity. In addition, because of poor fire control practices, fire quite often spreads to forested areas causing damage to the trees and on occasion to animal life.

The heaviest weeding in late May and into June also has an economic rationale. It is the time when money is least available for small farmers to invest in herbicides. The use of labor intensive weeding practices becomes a necessity. Weeding by scraping the land with machetes or hoes, loosens the soil and as a result of the rain storms characteristic of the period, the degree of slope of the land dedicated to basic grains and the limited development and extension of the roots of corn plants, the loosened soil is partially washed away.

Finally, the method of fairly extensive spacing between the corn plants is rational since the plants do not compete as well for nutrients in poor and eroded soils. However, the spacing provides only limited coverage of the soil by the corn plants, thus leaving more open ground for the rain water to erode.

3. Traditional System of Cattle Management and Erosion

In the traditional sector, due to the expansion of land holdings by larger farmers through inheritance, legalization of usufruct parcels and land purchases, the larger farmer has an increasing percentage of farm dedicated to pasture.

In the Choluteca Watershed area, the most common types of forages are natural and jaragua pastures. Improved types such as guinea, elephant and star-grass, although known, are not used because they have more critical fertility and water requirements; because their advantages are not well known by farmers; or because investment funds for pasture improvement are unavailable.

The cattle management system is determined by the climate. The type and amount of fodder varies according to the season. During the rainy period, animals are well nourished on jaragua or natural pasture. At this time, there is undergrazing because of the low cattle/hectare ratio and the lack of pasture rotation. During the dry season, however, there is overgrazing because of the low natural pasture yields, the poor quality of overgrown jaragua plants caused by wet season undergrazing, and the fact that animals are let loose to wander causing grass trampling and cutting of paths. In such situations, supplementary fodder is a necessity and corn and sorghum stubble is used as an alternative. The stubble patches used are the parcels abandoned by sharecroppers.

At the end of the dry season, because of the tendency of jaragua to overgrow into inedible plant material, it is common to burn the grass in order to generate new growth. Natural pasture on the other hand, is not burned so often.

Traditional cattle and range management practices are harmful to the soil and increase erosion. Gulley erosion occurs as a consequence of the cattle trails which result from open grazing in the dry season and sheet erosion occurs as a consequence of overgrazing and of burning the land for jaragua pasture sowing. These traditional practices are "rational" for large farms. Cattle is usually considered a sound and low capital investment which needs little special care. It is often considered a savings account "on the hoof". In the case of the larger farmers, land concentration, lack of pressure to become more capital oriented, and ignorance about other technologies, have provided the basis for continuation of traditional extensive cattle management. These practices, as well as the strategy of increasing land holdings, have been emulated by medium and small cattle farmers.

1/ For a detailed description of the process of land take over by the rural elite see Del Cid (1977), Stares (1972) and White (1976).

4. Characteristics of Target Groups and their Impact on the Soil

Most families within the Choluteca Watershed area are nuclear families having an average of six members and three economically active persons. There is usually one family per farm. Houses have an average of two rooms with no water installations or latrines. Among small farmers, current protein intake is about 83% of needed values, while calorie intake is only about 66% of needed values. The literacy rate for adults in this area is 50.5%, slightly higher than the national average of 48% for small farmers and significantly higher than the overall literacy rate of 41% for the rural areas. The average educational level of adults is one and a half years. However, better living conditions and higher health and educational status can be encountered in those groups with more resources.

The social structure of the traditional sector in the area has been described in a study conducted in selected communities of the Choluteca Watershed among farmers working on plots under 50 hectares (Hughes-Hallet 1980). The groups included were sharecroppers, small and medium size farmers, and cattlemen.

4.1 Sharecroppers

Sharecroppers constitute a relatively mobile agricultural population. Land is usually rented on slopes from cattlemen or large farm owners for approximately three years. Sharecroppers pay one-third of their crop to the landowner without receiving any assistance from the owner for inputs. After slash-and-burn techniques have been used for clearing the land, they plant the entire parcel with corn and sorghum. The planting is widely spaced. The weeding in June during the rainy season produces the greatest amount of erosion. Herbicides and fertilizers are hardly ever used. There is also a total absence of mechanical soil conservation techniques since the land is rented. During the dry season many sharecroppers work as laborers in nearby larger farms, picking cotton or harvesting coffee or sugar cane.

4.2 Small Farmers

Small farmers constitute the largest group in the Choluteca Watershed. Their agricultural practices are relatively similar to those of the sharecroppers, although there is some use of herbicides, retention walls and live barriers for soil protection. Small farmers tend to work on parcels up to five hectares in size. Corn and sorghum usually are intercropped on these plots and in some cases corn with beans. Fifty percent of the land is generally used for grain, less than twenty percent for pasture and the remaining lies fallow.

In some areas, small farmers earn additional income from pine resin collection. This secondary activity is usually carried out during the dry season, the slack period of the agricultural cycle. The value of the resin collection activity induces campesinos to practice forest fire protection such as firebreaks. The resin extraction keeps the trees alive for a longer period and the protected trees in turn limit soil erosion.

A secondary income source for some small farmers is vegetable production, especially in the high areas of the watershed and in those closest to Tegucigalpa. Corn and beans are produced for family consumption, while the vegetables are cash crops. These farmers use relatively large amounts of organic fertilizers to increase yields of their small vegetable gardens. Such practices, however, have little effect on soil conservation and erosion due to the slope of the lands they usually cultivate.

4.3 Medium-Small Farmer

Medium-small farmers own from 5 to 20 ha. Their crop cycle is sorghum - maize - sorghum during the first two years. The third year the land is dedicated to pasture, and from the fourth to the sixth year it lies in fallow. There may be variations of this pattern depending on ecological conditions. In some cases the only crop cultivated is corn and the fallow period may be limited to one year. These farmers use the land less intensively, using herbicides as a substitute for hand-labor during the highest labor using period of the year. The use of retention walls for erosion prevention is more widely practiced. Cattle is more important with an average of eight head per hectare, but grazing occurs following the traditional range management described earlier. The erosion impact of traditional range management is less obvious because of the smaller proportion of farm area dedicated to pasture.

4.4 Medium-Size

Medium-size farmers own plots from 20 to 50 ha in size and their land use is similar to the medium-small farmer, with some differences i.e., the wider use of fertilizer on their corn and more extensive use of the range. As compared to medium-small farmers, mechanical soil conservation practices are less common if not totally absent, and grazing has a greater detrimental effect on soils.

4.5 Cattlemen

Farmers with more than 50 ha cultivate less than 5% of their land with corn, and about 60% is dedicated to pasture. Reduction of labor costs for basic grain production is an important characteristic of this sub-group. They cultivate flatter land using ploughs for sowing and herbicides for weeding. Generally the larger ranches are made up of holdings owned by members of the same family and are used in common.

There are no important differences in range management practices as compared to smaller farmers owning cattle. The only differences seem to be: supplementary feeding of sugar cane or banana stems on a small scale; vaccination against septicimia; sporadic vitamin injections to treat undernourishment; and tick control through animal bathing and field burning.

Cattle raising in the southern region of the watershed is considered a low risk investment because production costs are minimal.

5. General Project Impact

5.1 Technological Packages and Production Intensification

The strategy of the Project is to provide several modifications to current practices or provide packages of new practices which fit the variety of farm situations and ecological conditions in the watershed. The goals are to modify those practices which contribute most to erosion and to increase the income of the target groups.

The development strategy is oriented toward the intensification of production. The land's carrying capacity and its productivity will be increased and the methods for intensification of production will yield direct soil conservation benefits. The Project will also increase the amounts of labor and capital invested in the production process.

The information developed from the Economic Analysis leads to the following conclusions. Independent of the size of the farm, soil conservation practices are the most labor intensive of the activities proposed and the agro-foresty practices are the most capital intensive. If farms are to carry out all practices in accordance with farm size and slope characteristics, total labor inputs required for are equal to 162 man-days for small, 876 man-days for medium small and 2521 man-days for medium farms.

About 50% of the available man-days in farms under twenty hectares within the Choluteca Watershed are unemployed (see Economic Analysis). With an average of 3.1 economically active persons per farm and 280 annual working days per person, there is an annual average of 438 unemployed man-days per farm. Thus, by dedicating all unemployed labor to Project activities, small farmers can execute them in five months, while medium-small farmers would require 23 months. If the same figures are applied to medium size farmers, Project execution would imply 70 months of work. The labor investment requirements of the Project activities will create employment opportunities and could absorb a large proportion of currently unemployed man-days in the Project areas. It is likely that small and medium-small farmers, together with family members of working age, will have the opportunity not only to work their own farms to implement the Project, but will also be hired by the medium size farmers. The larger farmers will need to hire off-farm labor to execute the Project activities within the implementation period contemplated.

The Project will be offering employment opportunities to those permanently unemployed family members on the farm. However, Project participation among target groups will be enhanced if two conditions are met. One is related to the period within the agricultural cycle when Project activities will be carried out. The second is related to the cash income advantages that the Project will offer.

Farmers will not accept the Project if the new practices conflict with sowing basic grains, or if they have to forego family income earned by off-farm harvesting of export crops. It would be contradictory to ask farmers to participate in a project to improve their

agricultural yields and at the same time ask them to give up those already reduced yields in order to concentrate efforts on soil conservation activities. In such a situation, reducing production would increase the farmer's burden. In the same manner, it would be contradictory to ask farmers, and particularly smaller farmers, to temporarily give up cash incomes obtained by off-farm employment in order to carry out Project activities.

The Project's strategy is based on making remuneration for labor inputs. Project implementation will be carried out during the slack period of the agricultural cycle, from November into March, and it will be spread out over that time to avoid conflicting with off-farm employment. Family members usually rotate in their seasonal migratory employment; women, adolescents and older adults participate in coffee picking from November to January, and men pick cotton and harvest sugar cane from January to March. Thus, different family members can assume responsibilities in Project activities at different times. The divisibility of the Project's elements will allow for women and younger family members to participate in land preparation for tree planting from Janurary to March, and men to carry out the soil conservation measures, which requires more physical effort, from November to January.

From the standpoint of capital inputs, the following comments are in order. According to 1979 figures developed by Invest for the country's poor rural sector, net average annual family incomes for small and medium-small farmers were $350 and $804, respectively. Without assistance small farmers would require two years of their total net income to carry out all Project activities, while medium-small farmers would require five years. Investing their own funds would represent an unacceptable burden for the target groups. It would imply assuming high risks and binding the farmer's capital accumulation in land improvement investments. By so doing, important investments in farm installations, housing, family education and family welfare would have to be put aside. Credit is imperative for farmer participation in the Project. Nevertheless, credit will have to be on different terms than those available to farmers from local money lenders. The acceptability of credit for Project activities will be determined by two factors: interest rates and loan payment periods. Credit experience among the Choluteca Watershed sub-groups is such that it is common to obtain short term loans at very high interest rates (6% per month) during the periods of scarcity in order to meet basic needs. During the dry season, when self-grown grain is scarce, peasants in the Project area borrow from the local money lender to buy goods and services. These money lenders also are used when cash is needed to hire farm employees to prepare the land, to weed or to harvest crops. Credit funds to be invested in non-urgent activities, such as soil conservation measures and the planting of fuelwood and pine trees, will be accepted only if farmers perceive that risk taking is minimal. This can only be achieved if loans are offered on soft terms. The reduction of risk levels can be achieved by allowing gradual adoption of techniques. If all practices had to be adopted at the same time and all capital investments made in the first year, the Project would be viewed as too high a risk, outweighing the benefits. Thus the Project strategy for credit which involves grace periods and loan forgiveness is appropriate to minimize the risk aversion of the potential participants.

The competitiveness of the Project technologies with current practices will be an important factor in promoting Project participation. Innovation will be easier if prospective technologies are compatible with local socio-cultural values and can be easily understood and learned by target groups. Greater acceptability of the Project is expected by those sub-groups where fertilizer and vegetation maintenance and protection are known and proved to have had an impact on their basic grain production yields. These sub-groups, together with the small farmers who have found resin extraction to be a profitable secondary activity will be most receptive to the proposed innovations. These farmers constitiute excellent promoters for the Project because of their awareness and openness to new technology. It is important that they participate in the initial social promotion campaign for the Project, especially among their peers. The labor and capital investments required by the Project will seem "rational" to peers once the impact of the new practices has been explained by the "experienced" users.

It is possible that smaller cattlemen will show some reluctance to participate in the Project. Unwillingness to adopt improved pasture, range and cattle management techniques may result because many of these farmers have already optimized returns based on a least cost - least risk non-market strategy.

Cattlemen owning less than 50 ha need to be encouraged to participate in the Project by following a two-step process. In spite of the low value attributed to cattle raising within the target group, there are small ranchers who have begun to improve their practices and who are more open to technological innovations. In this group jaragua pasture sowing already exists and natural pasture is less common. These are more market oriented ranchers. The first strategy step will consist of identifying such farmers in order to initiate Project implementation. They will be identified when the social promoters begin forming the community based organizations described elsewhere. It is expected that entrepreneurial and market oriented small farmers will more easily adopt innovations than those who practice the traditional system of pasture and range management.

By selecting opinion leaders among such entrepreneurial cattlemen, the demonstration of their adoption should positively effect those who will be late adopters. The selection of these leaders will be initiated in those communities considered as priority for the implementation of the Project. Project diffusion among smaller cattlemen will also result from the promotion activities of the Project's personnel. This promotion constitutes the second step of the mentioned strategy.

In addition, the effect of this process will be further enhanced by a different set of factors. Extensive range management is made possible partially because landless tenants rent land from bigger landlords and allow the owner's cattle to graze on the corn and sorghum stubble patches after harvest. Landless tenants constitute a part of the labor force of the traditional cattle raising system. The Project will be offering actual and prospective tenants permanent and semi-permanent job opportunities in resin collection cooperatives and reforestation programs. It will also be creating employment opportunities for tenants once implementation of soil conservation measures begins particularly in medium-small and medium-size farms. This strategy will allow tenants to

improve their living standards. Net incomes resulting from permanent and semi-permanent employment will be higher than those obtained by renting land to carry out subsistence farming. This strategy also will produce important modifications in the labor element of traditional animal husbandry. By providing alternative occupations which will improve living standards, the Project will induce sharecroppers to leave their rented land. Once the larger traditional cattlemen have initiated changes in their production system, smaller cattlemen should adopt new practices in emulation of the big cattlemen. This will be reinforced by the credit resources the Project will make available to the smaller cattlemen to become more market oriented.

5.2 Land Tenancy Issues

The land tenancy question will be an important issue if the Project is to have a major impact on sharecroppers. There is evidence that renters may not participate in the Project. During the recent study they rejected the idea of implementing soil conservation measures (hughes-Hallet 1980). It was argued that rental obligations had to be improved before any such measures could be implemented. Extension of rental periods was also suggested as a condition for acceptance. The most important difficulty the Project will encounter is related to the changes in the basic corn-cattle-fallow rotation that improved practices may entail.

The essential strategy that the Project will follow in order to minimize the impact of the agricultural practices of sharecroppers will be to offer them employment opportunities in forest related programs and in the labor intensive soil conservation to be executed by other Project beneficiaries. Land reallocation and extension of rental periods are not adequate strategies because of the social disruption they can create, and because of the antagonism against the Project that can be generated among potential beneficiaries if such measures are adopted. Despite the fact that in the southern part of the Choluteca Watershed up to one third of the target group farmers are renting out parcels from larger land owners, there are also land owners among medium size farmers just as there are tenants who own some land. Nevertheless, if large landlords rent land in order to obtain in-kind incomes and dry season fodder for their animals without any direct costs, smaller landlords rent out land because they do not have the necessary resources to work their holdings. In addition, in the case of smaller landlords land is commonly rented to extended family members and of tenants who do own land, the renting of parcels is a consequence of the marginality of the farms they own.

Land rental is currently illegal in the Honduras, and land use through "indirect" means is justification to expropriate farms. If the Project were to require enforcement of the law, the affected farmers would be both large and medium size farmers. By adopting this strategy, the Project would not only be discouraging those medium size farmers from becoming involved in the Project due to fear of land expropriation, but it would also be promoting conflicts between landless tenants and large landlords and between extended family members. In addition, the beneficiaries of land expropriation would not only be landless peasants, but also smaller and even medium-small farmers already owning land.

By utilizing the same strategy with all social strata, the Project will have adverse results among all target groups, whose cooperation is essential if the Project is to have significant environmental impact. The need to have a differentiating strategy to approach the distinct target groups is a logical consequence of the difficulties discussed. Actual landless tenants must be offered permanent and semi-permanent job opportunities, smaller and medium-small farmers must receive the necessary credit to improve their soils, and medium size farmers must have available the necessary resources not only to upgrade their farms but also to incorporate into their production scheme the land thus far worked indirectly. These reasons make feasible the approach taken e.g., to increase off-farm employment opportunities, resettlement on nearby national land, incorporation into forestry or forest product coops, employment in nurseries or establishment of extended family farming on land converted to intensive cultivation.

5.3 Community Organizations

The process of organizing groups of beneficiaries within communities is an important element of the general Project strategy. The formal groups to be organized will have three important functions, regardless of the local junta, pre-cooperative or cooperative format that can be adopted. From the standpoint of social promotion, the first function will be to allow beneficiaries to obtain the necessary skills for expressing opinions and for making collective decisions. These skills will have an important impact on the role that recipients will play in the administration of Project inputs at the local level. The organization of groups will be used to generate consensus among community members concerning the use of the new technologies. The ecological effect of adequate watershed management and soil conservation practices will be hindered if only a few farmers participate, while the large majority continues using traditional technology methods. If farmers were approached on an individual basis, the achievements and efforts of the few would be minimized by the undertakings of the many, and the environmental impact of the Project would be insignificant. From the standpoint of the Project delivery, groups, as opposed to individuals, can assume higher risks, can administer a nursery more effectively due to the different production and maintenance functions to be carried out, and can have higher credit liability.

The establishment of groups will be preceeded by a social promotion campaign at the local level. Through this campaign, individuals will be invited to participate in the definition of community problems and the actions to be taken to solve them. The determination of common problems will allow the setting of common goals and action priorities. Social Promoters of the WMU will help the group in this process and members will be encouraged to use their resources rationally, creatively and dynamically so that they can improve their living conditions through continued participation in community activities.

The fact that watershed sub-groups interviewed indicated preferences for the channeling of resources through community organizations (Hughes-Hallet, 1980) increases the likelihood of establishing a junta, pre-cooperative or cooperative. No resistance to this element of the Project is anticipated. The lower strata of rural

communities in the Project area have participated in radio transmitted adult literacy programs through the radio on a community basis. Classes were taught to groups voluntarily formed and coordinated by a community leader functioning as a monitor. This program expanded rapidly. In 1962, there were 343 schools and 7,240 students. In 1970, there were already 895 schools and 14,254 students. By 1972, the total number of students was above 20,000 (White, 1976). The group experience with the radio schools also resulted in the establishment of a credit union program oriented toward rural communities. This second program was sponsored by a special branch of the radio school educational campaign of the privately organized Foundation for Honduran Development. The success of the credit unions was such that $8,500 in loans were approved in 1969, the first year of operations. Loans of $690,466 were made in 1973, only four years later (AID, 1978).

Additionally, in 1976-77 10% of all small traditional independent farmers in the country participated in some kind of service cooperative. Through cooperatives it is possible to obtain agricultural inputs at lower prices and to organize labor input exchange among members, thus reducing the small farm's labor costs (Kelley, 1978).

At the national level there is a significant correlation between the perception of group membership as a viable alternative for solving the small farmer's socio-economic problems and the farmer's orientation of production toward the market (Giron, 1978). Anthropological studies (Eoff, 1978; Waterbury, 1978) also indicate that within market oriented communities there is a wider acceptance of production and service cooperatives. In one village that was studied, small farmers belonging to the production cooperative combined work on individually owned plots with work on cooperative land. Consequently, for such farmers, producing essentially for the market, group membership constitutes an alternative mechanism for absorbing unemployed family labor which otherwise would have to look for lower paying jobs on the larger <u>haciendas</u> in a nearby valley.

By sponsoring community organizations, without emphasizing one particular format, and by identifying the more market oriented and cohesive villages within priority areas of the Choluteca Watershed the community organization element in Project implementation should not encounter difficulty. Nevertheless, group organizations sponsored by the Project will have to be strengthened by allowing members to receive training in four areas: organizational structure, group participation, accounting principles, and nursery maintenance and production. The training in these areas will develop an awareness of the need for having working regulations and the definition of given roles within the structure. The correspondence between given group structures and the accomplishment of objectives will be emphasized. The organization of groups is not an objective in itself; it is one means to promote community participation in the implementation of the Project. By providing group members with this type of training, their continued participation in Project implementation should be assured.

6. Acceptability Issues

The Choluteca Watershed erosion problems are caused by several factors. In the case of agricultural practices, erosion results from land clearing methods, land scraping connected with weeding, and disperse basic grain planting. In the case of animal husbandry, it results from gulley formation due to cattle trails as well as from the disappearance of the soil cover created by overgrazing and land burning for tick control and jaragua pasture sowing. There is evidence that peasants in the Project area are more aware of gulley erosion than of sheet erosion. In this case, perceptibility has led to awareness.

Recognition of the problem, however, does not necessarily imply understanding the basic reasons for its occurrence. The extensive use of the land for traditional agriculture seems rational to most peasants. Excessive land use is the most common explanation given for soil erosion. However, no connection is established between the spatial factor and technology, or even between the surface sown and the type(s) of crop(s) planted. Furthermore, the impact of cattle trails and range management practices are not cited when explanations for the erosion problem are offered. This is apparently true independently of the sub-group interviewed or area visited within the watershed region (Hughes-Hallet, 1980).

Burning the land is the second most common explanation given for erosion problems. Yet, in the case of sharecroppers and the other smaller farmers land is either invariably or usually burnt. Rental conditions and lack of capital reinforces the continued use of this practice considered harmful to the soil. The need to develop Project interest by making campesinos aware of cause-effect relationships between cultivation systems, erosion and productivity will be achieved through the educational campaign. This campaign will create among prospective target groups the necessary threshold for the future group action.

The second issue is the need to consider the land concentration and tenancy question before promoting Project participation among sharecroppers and those smaller peasants working on national lands. In such cases, credit will prove to be insufficient for adoption of the Project. The land title strategy described earlier may be adequate.

Acceptance and diffusion of the Project activities is another issue. The educational campaign will have to be reinforced by the social promoters and paraprofessionals. However, socio-cultural differences may present a barrier to good communications. Thus, it will be important to hire and train paraprofessionals selected from among local community members. Identification of message recipient with message source is important for credibility. It is expected that local paraprofessionals will be able to communicate more easily with farmers, and will be more accustomed to local traveling, accommodations and general living conditions. While good information may produce awareness, it may not necessarily induce action. Social promotion by paraprofessionals will be an important tool for allowing recipients to go from awareness and interest to involvement.

Nonetheless, social promotion will not be carried out on an individual basis in the fashion of extension programs. The participation of individuals in group community problem definition and proposed solution selection will be more effective in inducing Project participation. An additional advantage of such a strategy is the development of organizational skills among certain community members. By sponsoring local leadership development through community based groups the community's capacity to solve its own problems as well as the capacity to demand external resource channeling from central development agencies may be enhanced.

The three elements of the strategy outlined: educational campaign, paraprofessionals and basic community organization, have proved to be effective in Honduras in other development programs.

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Project Organization and Institutional Analysis

1. Introduction

This Analysis will describe how the Project will be organized to carry out its objectives; the organization and human resource needs of each of the component parts required to meet the Project's goals and the administrative arrangements and capacity of AID to provide adequate management and monitoring.

In each of the sections a rationale is provided and judgements are made regarding the institutional capabilities to carry out the Project based on recent historical performance.

2. Description of the Project Management Structure

The Project as described in more detail elsewhere has two institution building components, (1) Natural Resources Policy and Planning and (2) Data Collection and Analysis. The third component, dealing with a program for management of the Choluteca Watershed, builds a new organization within the GOH to implement activities which will have direct impact on the deteriorating physical watershed and on improving the employment and income of small farmers living on the hillsides. The Project structure is complex in order to respond to the GOH's current responsibility, authority and organizational structure.

The Agricultural Policy Commission (CPA) 1/ will provide overall policy and managerial guidance to the Project and will be a direct participant in Project activities as described below. A Natural Resources Executive Committee made up of the MNR, INA, CONSUPLANE and COHDEFOR will be established to provide executive direction and management.

A Project Office will be organized separately with its own staff to coordinate, manage or execute all of the Project activities. This Office will be administratively attached to the MNR for purposes of authority to execute contracts, manage funds, personnel, etc. In addition, the MNR Coordination Office funded by the Agricultural Sector

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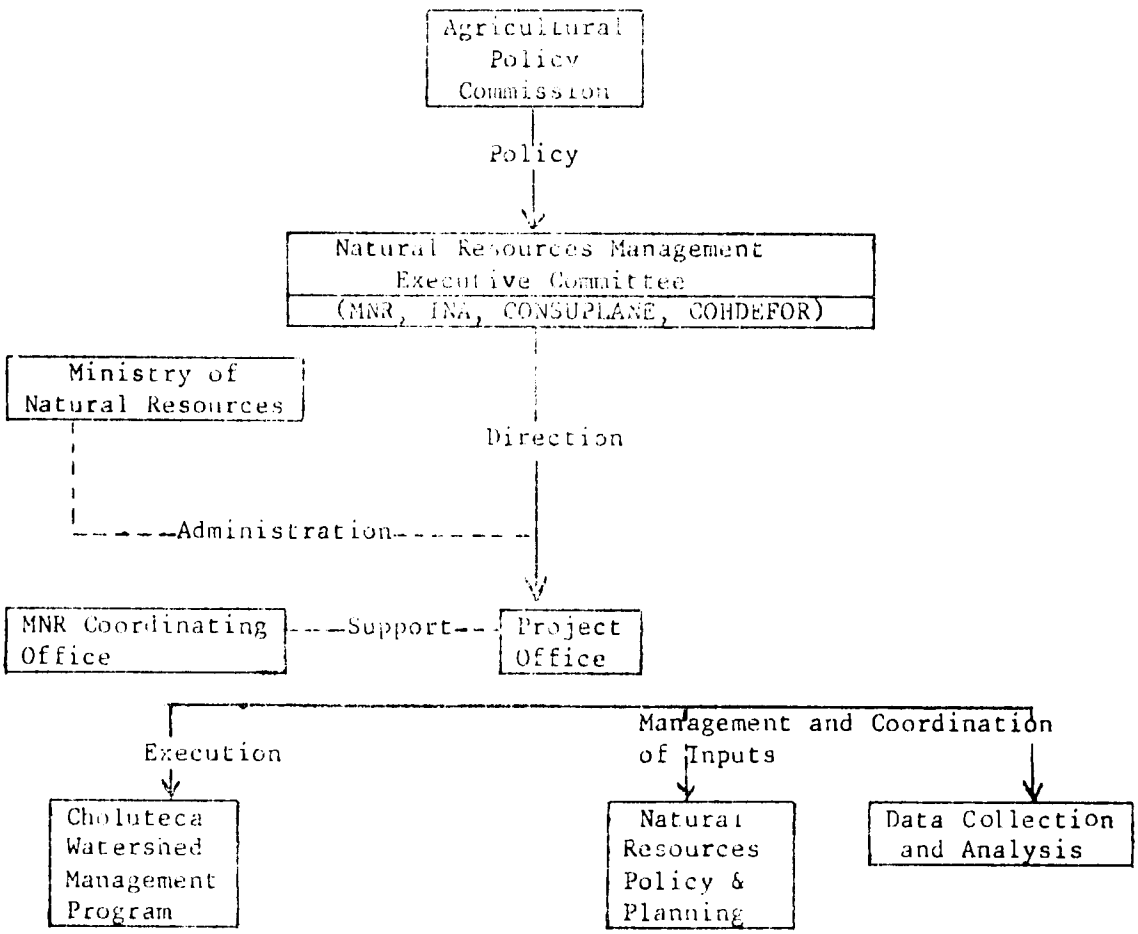
1/ This consists of the Ministers of Natural Resources, Economy, Finance; the Executive Directors of Planning and Agrarian Reform; Director of the Agrarian Counsel. For purposes of Natural Resource Policy and for Management of this Project, the General Manager of COHDEFOR will be a member of the CPA.

II Program will provide administrative support to the Project. A Project Coordinator will be contracted to provide liaison between the AID Office of Environment and Technology and the Project Office. A schematic for this overall structure follows.

Overall Project Management Structure



This Project structure was chosen keeping in mind that achieving the Project's purposes would require the participation of several GOH activities:

a) Technical Assistance and support will be provided in policy development for natural resources and land use. The key ministerial organizations who have responsibility for these aspects are the MNR, INA CONSUPLANE and COHDEFOR; all should be involved in management of the Project.

b) In the area of improvement of the natural resource data collection and analysis both the Department of Hydrology and Climatology of the MNR and the National Cadaster Program which is attached to CONSUPLANE will receive substantial assistance and should be involved in the Project's operation.

c) The Choluteca Watershed Management component of the Project primarily involves the responsibilities of the Ministry of Natural Resources and COHDEFOR.

The CPA is the only executive body which includes the key cabinet members who have responsibility for natural resources. The CPA in Sept. 1979 reviewed various proposals made by an interinstitutional planning committee to establish an organization to focus on the problems of natural resources in Honduras. It came to the following conclusions. The proposals to centralize authority in CONSUPLANE or in the Ministry of Natural Resources did not take into account the independent authority stemming from the Chief of State to INA, nor the clear authority of COHDEFOR in forest management nor the fact that since CONSUPLANE has no executive authority many thought that it would be inappropriate for it to be given the authority to make operational decisions in this important area.

The Environmental Council and other organizations proposed would lead to confusions in roles and overlapping with the mandate of the CPA in agrarian reform and agricultural development. In addition, the Environmental Technical Committee which had been proposed to review all new projects to determine their ecological impacts would be essentially a negative control without the land use policy backup, technical basis or access to appropriate natural resource data needed to make reasonable judgements on projects.

Without a better idea of what laws policies and programs need revisions, what new policies must be developed or what new authorities and actions are needed to bring coherence to the management of natural resources, it would be better to postpone a decision on a new governmental structure until such time as the problems and possible directions were clarified.

As a result of these conclusions the GOH decided to give to the CPA, the management responsibility for the current Project and to use it as the vehicle to provide support and assistance to the GOH in clarifying the policy work to be done and proposing rational and realistic solutions for revising the government structure to meet the natural resource and environmental challenge on a broader basis.

3. <u>Analysis of the institutional capability of the organizations involved in the overall management of the Project.</u>

a) CPA

The CPA was established in March 1977 by the Chief of State to deal with the difficult problems of coordination and execution of the Agrarian Reform. The history of the origins of this organization goes back to 1972. At that time AID provided funds to establish a small analytical group on a contract basis to do agricultural planning for the GOH. This was in recognition of the lack of planning and coordination

among the then four GOH agencies (MNR, INA, BANAFOM and CONSUPLANE) that composed the Agricultural Sector. (From 1975 until the present the Sector has grown with the addition of Corporacion Hondurena de Desarrollo Forestal (COHDEFOR), Instituto Hondureno del Cafe (IHCAFE), Corporacion Hondurena del Banano (COHBANA), Direccion de Fomento Cooperativo (DIFOCOOP) and Instituto Hondureno de Mercadeo Agricola (IHMA). The AID Agriculture Sector Program I loan which was begun in 1974 put great emphasis on the need for aggressive sector wide planning and coordination. Building on the earlier contract group a Sector Planning Office was established in the MNR and an agricultural sector Coordination Committee (COCO) was set up in 1975. The Sector Planning Office never really planned for the sector as a result of territorial disputes with CONSUPLANE and each of the other sector agencies. The COCO had too many members, no executive authority and little enthusiasm since it was viewed as being merely a quid pro quo for the AID loan. Except for the Scholarship Committee of COCO, the organization was soon abandoned. It was cancelled formally in March of 1978. However, the problems of planning and coordination did not go away. The problems of independent executives dealing directly with the Chief of State in many areas which overlapped the responsibility of other ministries; the obvious inability to achieve coordinated operations by MNR, INA and BANAFOM; the lack of a coherent operational plan for the sector, etc., led to the establishment of the CPA, and in January 1978 the mandate of the CPA was expanded to include agricultural development. With AID support, a Technical Secretariat was established to help carry out its functions.

The CPA has resolved a large number of operational as well as policy problems. It has provided leadership in the development of the Agricultural Sector policies contained in the GOH s Development Plan. It activily participated in discussions relating to the joint GOH/AID 1978 Agricultural Assessment, and approved certain policy directions needed for the Agricultural Sector II program. The latter was fully debated and approved by the CPA. It has provided guidance for and deliberated on the World Bank's Second Agricultural Credit Loan which was recently approved and which relies on the CPA for policy guidance, etc.

The Technical Secretariat of the CPA is a small but effective organization staffed with four highly experienced agricultural and agrarian reform experts one of whom is an ex-Minister of Natural Resources and another an ex-director of INA. Its annual budget is approximately $130,000. The Secretariat develops agendas of issues, prepares analytical and policy papers, and coordinates and oversees the execution of decisions by the CPA. A major responsibility is to oversee the development of an integrated agricultural sector planning system which is to be financed by the Agricultural Sector II program.

Policy makers and technocrats alike have come to the conclusion that the collective, deliberative body that the CPA represents is not the best solution for the GOH problems in the sector, but the alternative is to revert back to the near anarchy that existed in the early 1970's. One might say that the CPA exists only because there does not seem to be a practical alternative.

The two alternatives to the CPA which have been considered at various times over the last three years are to expand the authority of the MNR to cover the entire agricultural sector and to increase the planning and coordination authority of CONSUPLANE. Neither of these alternatives have been considered feasible by the GOH. CONSUPLANE is an advisory organization to the chief executive, and does not have executive powers outside its own organization. Further it is a weak organization both legally and in terms of staff; it has no impact on budget decisions or on the operational planning of the agencies in the sector. The idea of making the MNR the "Czar" of the agricultural sector may be logical but it always has met with strong resistance from the other executives in the sector and perhaps the unwillingness of the Chief of State to significantly expand the authority vested in one of his subordinates. Thus, at least for the near future the CPA is the only practical organization available to deal with sector wide problems, and is the most appropriate forum to provide policy and management guidance to the Project.

On May 20, 1980, the President of the Military Junta, through memorandum (See Annex A-2) instructed the Agricultural Policy Commission to take responsibility for natural resource policy for as long as it takes the GOH to define the most appropriate institutional mechanism to deal with these issues. This memorandum implies that the Technical Secretariat of the CPA will have to continue as the main technical body of the CPA to assist the Commission in carrying out its new functions.

However, some concern has been expressed and discussions have recently taken place about the whole structure of the Agricultural Sector. Either the CPA and its Technical Secretariat will be strengthened as a result of this process or else dramatic changes in the institutional structure of the agricultural sector will come about. The analysis made of the possible consequences of any change in this area by the Project Committee has lead to the conclusion that whatever the nature of these changes, they will not affect negatively the structure of the Project; on the contrary, whatever improvements are made in the system to formulate and carry out agricultural and natural resource policies will most likely be benefitial for the Project.

b) Natural Resources Management Executive Committee

This organization is needed to assure that executive/managerial problems of the Project can be solved without involving the CPA as a body. As a new organization designed for and dependent on this Project, its institutional life can exist independent of the CPA if needed, but it can also disappear during the life of the Project if the broader GOH Agricultural Sector organization issues are solved.

The Natural Resources Executive Committee will be formed by the three permanent members of the Comision de Politica Agricola - the Ministry of Natural Resources (MNR), the National Agrarian Institute (INA), and the Planning Council (CONSUPLANE) - plus the General Manager of the Forestry Development Corporation (COHDEFOR).

The Executive Committee will provide executive direction to the newly organized Project Office in areas such as policy concerns within the Project (matters of policy at the national level will be taken up by the CPA itself); the review, revision and approval of annual implementation plans, interinstitutional agreements, and annual operating budgets; and the review of periodic progress reports as submitted by the Project Office and; the handing down of directives based on such reports.

The Committee will meet a minimum of once a month, or more often if deemed necessary, during the first six months of the Project, and thereafter at appropriate intervals as dictated by need.

c) MNR

The role that the MNR plays concerning the administrative aspects of th Project is to assure an appropriate channel for funds and day to day administration. This role is not new for the MNR, since it acts as a funding agent for GOH funds going to INA and BANADESA (previously BANAFOM)and it is also the administrative agent for the Agriculture Sector II Project. The MNR Coordinating Office has performed well over the last year of operation and is staffed with competent people. The institutional capacity is well established and no problems are foreseen for the administrative support role envisaged under the Project.

d) Project Office

The Project Office which is described in greater detail in paragraph 3c below will be relatively self-sufficient in staff to concentrate its efforts on effective management and implementation actions.

3. Activity Organizational and Administrative Arrangements

a. Natural Resource Policy and Planning.

There are three planned outputs for this activity which fall into two categories:

(i) Policy Analysis

A series of new or revised laws, policies and regulations in the areas of land use, water use, forestry and environment/conservation.

A permanent structure(s) within the GOH with authority and responsibility for planning and managing the use and conservation of natural resources.

(ii) Land Use Classification

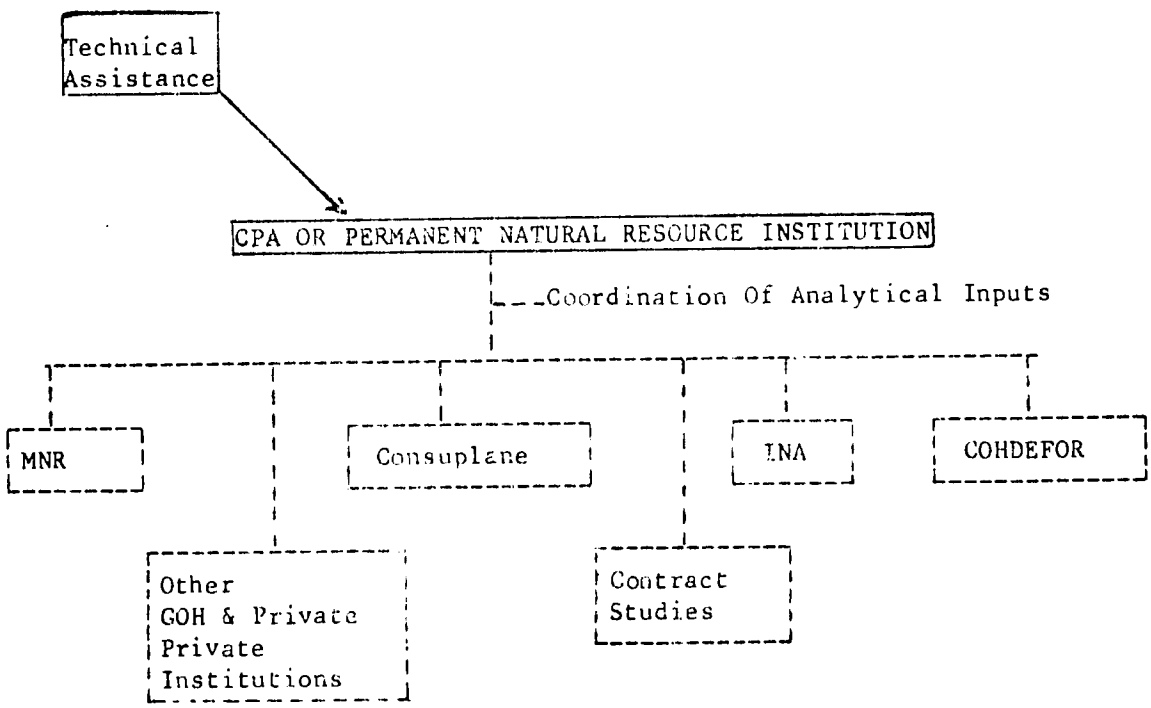
An operational system for classification of potential land use; at least 50% of the rural land classified and; procedures and controls for assuring that GOH planning, programming and project development as well as private projects effectively take into account the appropriate use of land.

The key organizations involved in executing this activity are the CPA, the National Cadaster Program and a Land Use Classification Technical Committee which will be established under the Project.

(1) Policy Analysis Activity

The organizational structure and operational relationship for the Policy Analysis aspect of this activity follows:

Policy Analysis



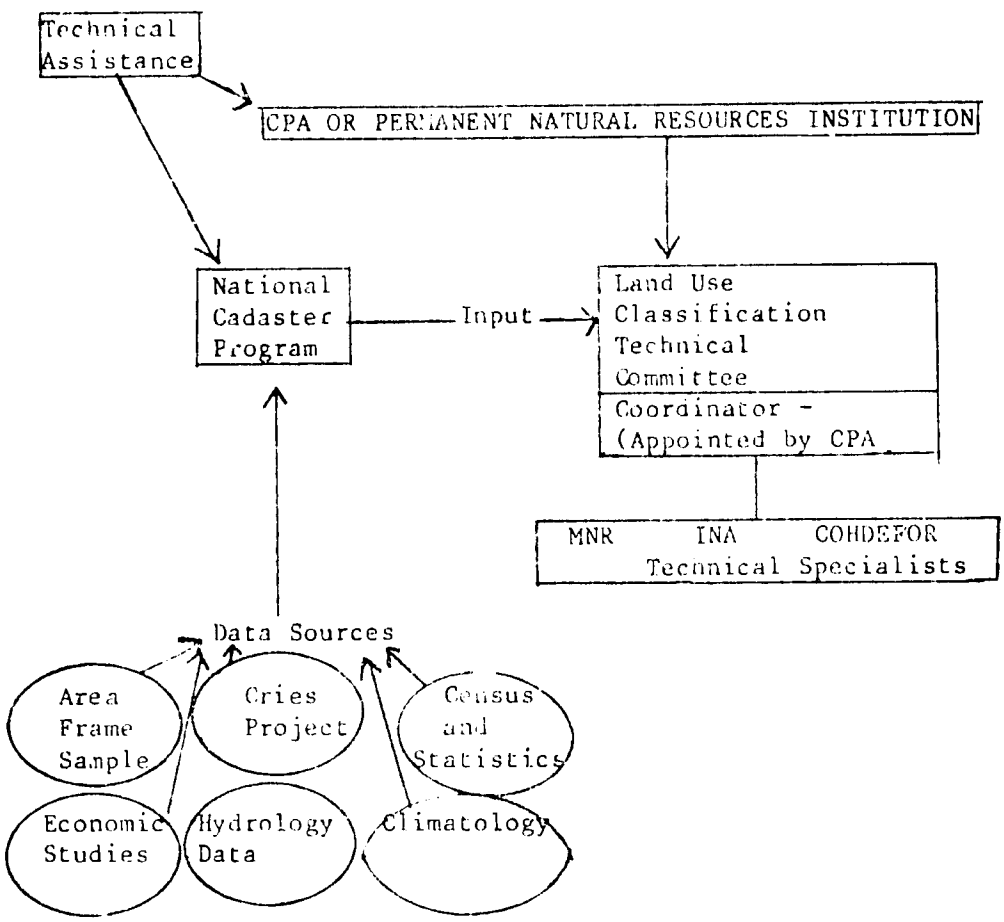
As discussed elsewhere the role of the CPA in policy analysis is superimposed on and impacts directly on the authorities of each of the members. At the technical levels in these ministries the competition and bureaucratic in-fighting to avoid loss of or sharing of authority is keen. Collaboration is difficult to achieve and does not take place without strong leadership from the ministers themselves. Whether or not institutional participation works will partially depend the final outcome

of the GOH deliberations regarding the structure of agricultural and natural resource policy. Two possibilities might result out of those discussions; a)the continued effective support of the Technical Secreteriat by the membership of the CPA; or b) the creation of a new, permanent institution to deal with matters of natural resources and conservation policy. Sufficient funds for contracts and technical assistance to CPA have been included, to allow effective support either to CPA or to the permanent institution that could be created to deal with these issues.

(2) Land Use Classification Activity

The structure for this activity follows:

Land Use Classification



The performance of this activity will be critical to the application of rational land use policies developed under the Policy Analysis activity. Technical assistance will be provided in both the design of new and appropriate land use policies, and in the design of a land use classification system including data requirements, data collection standards and methods, analytical methods, and review and approval procedures. A system for the incorporation of land use classification and land use criteria throughout the GOH planning and programming process and the installation of a review and approval process for programs which have impact on land resources will be an important outcome of the Project.

The Land Use Classification Technical Committee will be established under the Project. It will be coordinated by one specialist to be appointed by CPA, and will contain specialists representing MNR, INA and COMDEFOR. It will review proposed classifications of land and the supporting data submitted by the PCN and recommend final action to the CPA. Because of the singular importance of land classification as seen by the participating agencies, no problem is forseen in building this committee. In addition, salary supplements will be provided to the committee members to assure attraction of highly trained technicians. The work of the PCN is described in more detail in Annex L.

The Project will provide for a forest economist and a natural resource/watershed management specialist, to give additional support to the CPA. The forest economist will likely be hired from Latin American expatriot sources such as Chile and watershed specialist capability is available in Honduras.

b. Natural Resources Data Collection and Analysis

The National Cadaster Program (PCN) will be provided substantial support in several departments to expand and accelerate its delineation and natural resources work to cover all of the country except the eastern, largely unpopulated area of the country. Delineation and natural resource data collection will be extended to the forested areas under the Project. The data processing capacity will be strengthened to serve as the National Natural Resources Data Bank and to improve user access. The current Actual Land Use Department will be expanded to include potential land use and to carry out the data collection and analysis work needed to support the Land Use Classification system described above. The Department of Hydrology and Climatology (DHC) of the Water Resources Unit of the MNR will be expanding their staff capability and their data collection services.

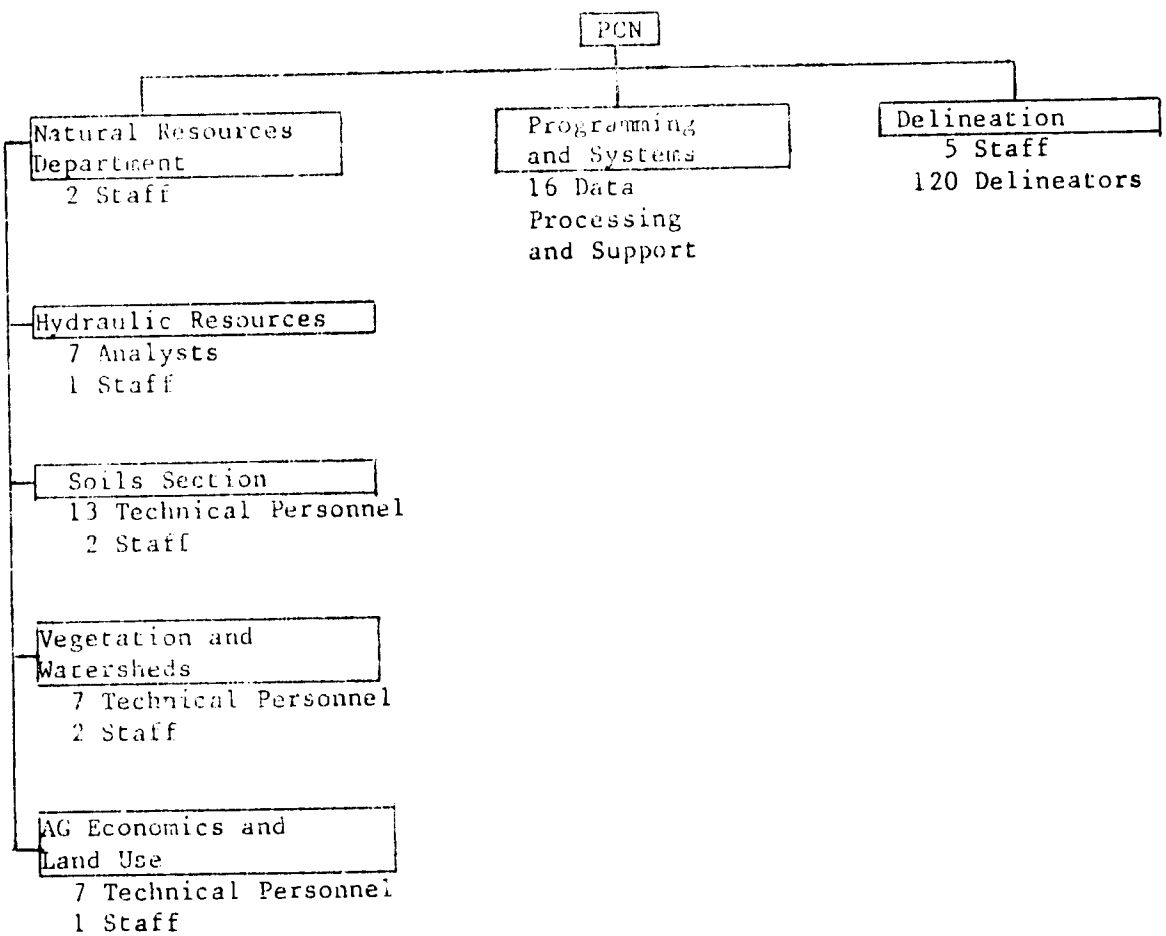
1. National Cadaster Program (PCN)

AID funded a Demonstration Cadaster Project beginning in 1972. In 1974 an AID loan for $5 million was provided to carry out the cadaster work in one half of the country, with concentration in the major populated valleys. The project was completed in Dec. 1979 by which time PCN had achieved 90% of its goals. The progress of the PCN is a

remarkable success story which has resulted from the combination of a vigorous GOH manager, careful monitoring and support by A.I.D. and effective support from the GOH leadership.

The PCN is organizationally attached to CONSUPLANE for administrative purposes. The GOH has recently passed a law which established PCN as a permanent, semi-autonomous agency of the government. This law is expected to be issued before completion of the Project Agreement for this Project.

The PCN is currently organized into three departments, Natural Resources, Delineation and Programming and Systems. Its total staff is 187, broken down as follows:



The Project will increase the total PCN staff by adding 49 new positions over the five year period. Additional staff will include personnel for soils laboratory work, field soils survey, 10 new delineators teams, additional data processing personnel, several technical level forest classifiers and surveyors and one forest economist and one agricultural economist. Training will be scheduled for some of the current mid-level

personnel to assume higher level technical positions and technical assistance will help increase the capacity of others through on-the job training. Most of the additional personnel are low-to-mid level technicians who are readily available in Honduras. The PCN has well established training programs for such new employees. Added personnel, training, and new technical assistance inputs are scheduled over the five year Project, thus not substantially increasing the PCN management burden.

As already indicated, the PCN has an excellent rating as an institution. The leadership is very competent and well versed in both the planning and management of implementation of a fairly complex program. The middle managers are well motivated but lack some higher technical skills. Some technical assistance and training will assist in this area. The organization structure is well developed and there is a noticeable lack of bureaucratic overstaffing as most section chiefs are working supervisors. The PCN also enjoys a high level of commitment and support from both the MNR and the Ministry of Finance. The GOH contribution to its budget has increased from $213,000 in 1976 to $1.5 million in 1980.

The ability of the PCN to accommodate its new responsibilities and absorb an increased staff is very good. No significant institutional weaknesses are evident, and it is unlikely that PCN will have difficulties in performing its Project responsibilities or in coordinating its actions within the Project and the GOH.

2. Department of Hydrology and Climatology (DHC)

This department is a section of the of the Directorate of Water Resources (DRH) within the MNR. It is responsible for: nation-wide collection of hydrological and climatological data; the inventory of surface and ground water, primarily for irrigation of under-productive agricultural lands; and providing assistance to other GOH agencies which are concerned with using water for hydroelectric generation and providing potable water supplies.

In 1978, the Water Management Unit was reorganized into the current DRH and provided expanded staff and responsibilities. A substantial amount of professional level training and consulting services were provided to the DRH under an A.I.D. grant project in 1976. The Consortium for International Development (CID), based at Utah State University provided consulting services and did much of the training.

The DRH, although still in its development stages, has very good top management and leadership. It has fairly good direction with respect to its efforts in irrigation and ground water development. However, it lacks fully capable staff in all departments, and could benefit from long term technical assistance.

The DHC is not as strong as other units of the DRH. Although it is staffed by 229 employees, the technical and managerial levels of its management staff are minimal; its lower level staff is not well

trained; and its data collectors and collection stations are insufficient to provide either the quality or quantity of data and analysis service necessary to support those development efforts of the GOH which involve water resources. A substantial amount of Project assistance will be used to train the current staff; improve the technical levels of the work performance; significantly expand the number of hydrology and climate stations throughout the country; and expand the number of lower level data collectors and the mid-level technical analysts. Careful attention has been paid in the implementation plans for this activity to assure a gradual build up of staff, effective training and appropriate amounts and kinds of technical assistance; all of which has been designed to avoid an excessive management burden.

This organization will have a substantial increase in staff including 65 meteorology technicians, four hydrology technicians and two data analysis technicians for a total of 71. Of this number 69 positions require no technical qualifications other than short but intensive training, two are mid-level technician positions which require skills that are available in Honduras. The two highly trained specialists in hydrology and climatology needed as regular staff members will be sought from among expatriot Latin Americans who are known to be available. During the second year of the Project funding of the added personnel will be absorbed by GOH counterpart.

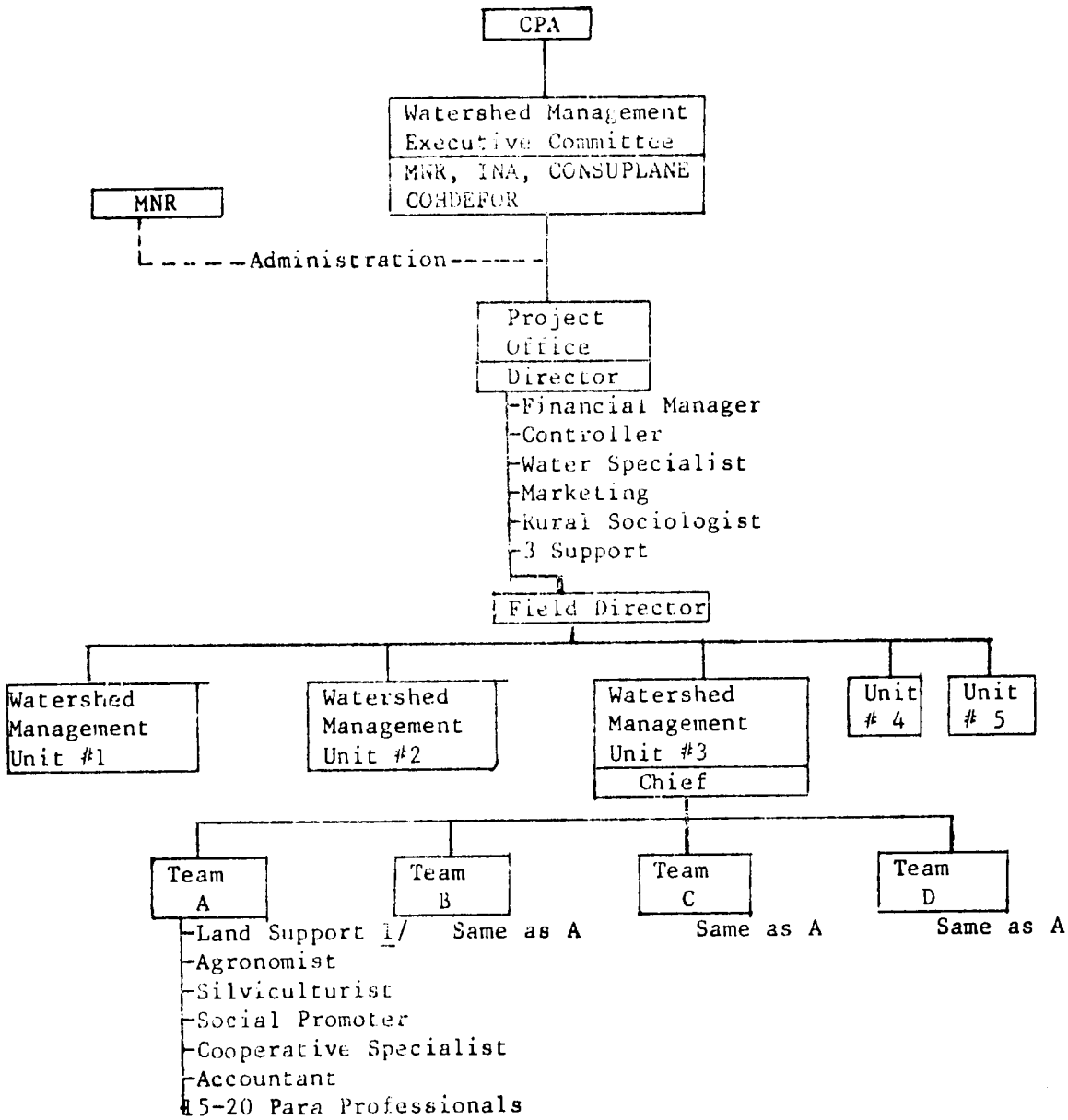
For the last several years budget support for the DHC and for the Directorate itself has not been sufficient to maintain continuous operations even at the current fairly low quality levels. However, the Project requires a substantial GOH budget commitment, approximately one half of the total costs over the five year period. This commitment as well as a covenant to maintain the same level of operations beyond the fifth year provides reasonable assurance that the GOH is prepared to increase its past support levels.

c. Choluteca Watershed Management Program

1. Organizational Structure

The program to rehabilitate a large portion of the Choluteca Watershed through an integrated approach is ambitious--specially in Honduras which has a limited human resource base, relatively weak institutional structure and no well established national organization with experience central to the task. The Project is designed to overcome many of these weaknesses by establishing a vertically integrated project structure with its own staff and resources. A Project Office which has dual responsibility for managing and coordinating the inputs to the Policy and Data Collection activities as well as the direction and implementation of the watershed activity, will be established as a semi-autonomous organization administratively attached to the MNR. The five Watershed Management Units will report directly to the Project Office.

The Project Office structure and staff will be as follows:



1/ One land support specialist for each 2 teams

The Project Office will be delegated authority from the MNR for funds management, contracting, and general project implementation functions. It will receive policy guidance from the Natural Resources Executive Committee established for the purpose of this Project.

The Project Office headquarters staff as planned will be composed of the following: Office Director, Financial Manager, Controller, Water Specialist, Marketing Specialist, Sociologist and 3 support personnel. There will also be a Field Director to supervise the operations of five Watershed Management Units, each composed of four teams. These teams, in turn, will be composed of: one land support specialist, one agronomist, one silviculturist, one social promoter, one cooperative specialist, one accountant, and 15 - 20 paraprofessionals.

The Project Office will coordinate and manage Project inputs and coordinate the implementation activities of the executing agencies (National Cadaster Program and Water Resources Unit) for the Policy and Planning and the Data Collection components of the Project, and will be directly responsible for implementing the Choluteca Watershed Management component.

In addition, the Project Office will be assisted by the MNR Coordinating Unit (organized and set up under Agriculture Sector Loan II) with respect to AID and GOH procedures and requirements regarding contracting, procurement, and reporting.

The Project Office will also coordinate actions which may be required from other agencies (such as the Proveeduria General and BANADESA), in order to ensure that inputs are made in accordance with current implementation plans, budgets, etc.

The viability of the organization for this activity will depend on the high level attention and support from the GOH; the effectiveness of its operations; and its ability to maintain good relations and coordination with technical level personnel in the field and the central offices of the MNR, INA and COHDEFOR. USAID will have to carefully and closely monitor the development and progress of the Project Office to avoid problems and possible failure. Highly effective and dynamic people must be selected for key positions if the Project is to work; and A.I.D. will have to keep the CPA and Executive Committee fully informed of Project progress and problems.

This new structure is appropriate in terms of the current status and condition of development of the functional GOH executive agencies; however, it will be reexamined after the third year of the Project to determine both the continued effectiveness of the approach and the readiness of the MNR and COHDEFOR to assure responsibility for the Project within their functional organizations.

This organizational approach is both expensive in terms of human resources and carries the risk of being left to die when the external funding ends. However, the risks are minimized by the following factors:

(i) The GOH recognizes the urgent need to take action on the watershed problem and to build a national capability that largely does not now exist.

(ii) The GOH, recognizing the importance of the Project has assigned management responsibility to its highest level group of executives involved in agricultural development, the CPA.

(iii) The GOH is committed to a substantial amount of totally new resources to the Project and to a long term effort extending beyond the life of the Project.

2. Specific functions of the Project Office will be:

a) to develop annual operating budgets for approval by the Natural Resources Executive Committee.

b) to develop operational and implementation plans.

c) to design and schedule technical assistance for Project beneficiaries and for the WMU personnel.

d) to develop criteria for setting priorities with respect to the selection of communities.

e) to design work methods for the office staff and field personnel.

f) to design and manage an educational campaign for Project beneficiaries.

g) to determine training requirements and priorities, and carry out and manage the training program.

h) to prepare a personnel management program, including position descriptions and salary levels for all Project office and field personnel.

i) to prepare a variety of periodic progress reports regarding Project activities, including financial, technical, social and administrative aspects, problems encountered and solutions proposed, for submission to the Natural Resources Executive Committee and to AID.

3. General Functions of Project Office Staff

<u>Office Director</u>

General supervisory and management functions.
Act as liaison between the Project Office and the Natural Resources Executive Committee, and the Project Coordinator and AID.
Give final Project Office approval to all plans, programs and operating budgets.
Preside over the Credit Committee.

Financial Manager

Develop and manage the financial system, prepare operating budgets and assist in operating plans.
Insure proper execution of operating budgets.
Review and monitor the financial management system, and organization and functioning of Community Organizations.
Member of Credit Committee.

Controller

Maintain financial and accounting records for the Project.
Prepare financial reports for submission to the Natural Resources Executive Committee and USAID.
Assist in the preparation of operating budgets.

Watershed Specialist

Develop detailed watershed management plans.
Design water management techniques, such as hillside ditches, catchment dams, and erosion control works.
Monitor the implementation and degree of success of these activities through the WMU teams.
Responsible for the training and technical supervision of WMU teams.
Analyze and apply data input from hydrology and climatology. activities carried out under the Data Collection and Analysis Component.

Marketing Specialist

Prepare market and price information for distribution to community organizations.
Provide advice on the marketing of specific products.

Sociologist

Establish educational campaign.
Monitor feedback with regard to content of educational program.
Carry out studies of social constraints to the adoption of new technologies.
Evaluate social problems in the community organizations.
Determine optimum form of organization for community residents.
Provide technical supervision to cooperative specialist.
Resolve problems on an ad hoc basis.

Field Director

Establish work plans, methods and priorities for the WMU teams.
General supervision and coordination of WMU team activities in the field.
Member of Credit Committee.

WATERSHED MANAGEMENT UNITS

Unit Chief

Will be an agronomist/engineer.
Will be a working supervisor.
Schedule the teams with regard to work assignments.
Provide continuous supervision in the field.

WATERSHED MANAGEMENT UNIT TEAMS

Land Support Specialist

Assist in identifying and solving land tenure and ownership problems.
After community has been organized, examine documentation of farmers.
If necessary, perform land survey in order to be able to locate land on orthomaps.
Consult with the Cadastar Office to determine whether property has been delineated.
Locate records for the property.
Assist in meeting requirements so that a proper title can be obtained from the National Agrarian Institute, or a public deed from a Notary Public based on years of tenancy, etc.

Agronomist

Determine appropriate use of land on individual farms.
Determine appropriate crops and appropriate planting and cultivating methods.
Provide advice on the use of fertilizers, pesticides and other farm inputs.
Design conservation works with the support, and under the supervision, of the Unit Chief.
Assist farmers in developing individual farm plans.
Monitor range management and pasture improvement activities.

Silviculturist

Determine the appropriate tree species to be planted.
Provide guidance for the care of seedlings after planting.
Provide assistance with the design, construction and operation of the community nurseries.
Provide advice regarding the management and harvesting of agroforestry and firewood crops.
Monitor all forestry-related Project activities.

Social Promoter

Make initial contacts with community residents, based on priorities previously established by the Project Office, in order to help establish a willingness of the residents to organize into community-based associations.

Determine to what extent the radio educational campaign has generated farmer interest.

Make general, overall assessment of the communities to determine the existence and extent of community cohesion, the nature of land structure and ownership, market orientation, crops cultivated, etc., with a view toward determining the potential degree of success of the Project.

After above, generate acceptance for the team in the community.

After community organizations are established, provide assistance to the cooperative specialist.

Make recommendations for the selection of paraprofessionals for approval by the Unit Chief.

Make arrangements for paraprofessionals to receive training.

Provide social assistance to participating farm families on a more individual level with regard to problem areas of a social or family nature.

Cooperative Specialist

Provide initial assistance to community members in establishing community organizations, based on alternative types of associations provided.

Help set up accounting records, systems and procedures in newly established community organizations.

Provide continuous guidance in the initial months, and assist in establishing the legal identity of community organizations by wing up by-laws, charter, etc.,

Carry out continuous monitoring activities and assist in solving problems of an organizational nature.

Accountant

Actually perform the accounting work at the individual community organizations on a full time basis.

Carry out continuous monitoring of the financial activities of the community organizations and assist in solving problems of a financial or bookkeeping nature.

Paraprofessionals

Act as liaison between the farmers, the WMU and the community organizations.

Monitor Project financed activities on individual farms and report matters of a technical, credit or administrative nature to the WMU or community organization.

4. Human Resources

The most critical problem facing the execution of the watershed activity is the need for substantial increase in the number and quality of people to carry it out. The Project deals with problenms in several ways:

(i) The bulk of the technical specializations at the field level are sub-professionals such as mid-level silviculturalists and agronomists. Persons with this skill level are being produced in Honduras at the annual rate of 25 and 60 respectively.

(ii) The para-professionals will be campesinos selected from local participating communities and pose no recruiting problem.

(iii) The skills which will be most difficult to obtain are marketing and sociology. The Project will use some returning participants trained under Agriculture Sector II, and will be hiring some people in the same categories but with lower technical training The latter will be reinforced by 11 Peace Corps Volunteers 1/ who will act as counterparts and bring higher level training and technical assistance to the Project while additional Hondurans are trained.

5. AID Capacity to Manage the Project

The Office of Environment and Technology (OET) of USAID Honduras will be assigned management responsibility for the Project. OET is currently responsible for a Rural Technologies Project ($8 million)and the National Cadaster Program (soon to reach terminal disbursement); and over the next several months probably it will be assigned a responsibility for Forest Resource Development Project. This office is currently staffed by one General Development Officer, an Assistant General Development Officer (currently an IDI), one PASA Watershed Management Officer and one Contract Industrial Engineer. With the addition of a Project funded coordinator for the Natural Resources Management Project, OET would appear able to meet these new responsibilities.

1/ Categories are Hydrologist, Soil Conservation, Watershed Management Specialist, Agronomist and Community Development.

522-0168

ACTION MEMORANDUM FOR THE ADMINISTRATOR

THRU : ES

AA/PPC, Mr. Alexander Shakow

FROM : AA/LAC, Edward W. Coy (Acting)

SUBJECT: Project Authorization

Your approval is required for a loan and grant of $12,252,000 and $2,743,000, respectively, from the Section 103, Agriculture, Rural Development, and Nutrition appropriation to Honduras for a Natural Resources Management Project (522-0168).

Discussion: The purpose of the project is two-fold: to strengthen the institutional mechanisms through which the Government of Honduras (GOH) manages the country's natural resources, and to demonstrate effective conservation techniques in the Choluteca Watershed Basin. The project will directly benefit approximately 30,700 people living on small farms in the Project area.

The Project contains three major activities: 1) Natural Resources Policy and Planning which includes the development of a national land use classification system and the policies to manage and protect natural resources; 2) Natural Resources Data Collection and Analysis, which includes the establishment of 103 natural resource data stations and the more effective use of data collected; and 3) Choluteca Watershed Management Program, which includes the promotion of improved soil and water conservation and agricultural practices on approximately 18,000 hectares.

Implementing agencies will be the Ministry of Natural Resources (MNR), which is primarily concerned with agricultural programs; the Honduran Forestry Development Corporation (COHDEFOR), which is responsible for managing the country's forests and watersheds; and the National Cadaster Program (PCN), which is concerned with land titling and the collection and analysis of land use and natural resource data. The Agricultural Policy Commission (CPA), acting at the ministerial level of the GOH, will insure coordination and joint action.

The total cost of the project is $21,962,000, of which AID will lend $12,252,000 and grant $2,743,000 (68% of the total project cost). The AID loan will finance: (1) operating costs ($3,680,000), including personnel ($816,600), equipment and supplies ($1,776,900), vehicles and maintenance ($608,400), training seminars ($462,100), and contingency ($16,000); and (2) the Choluteca Watershed Management Credit Fund ($8,572,000), including fertilizer loans ($1,593,900), agroforestry and fuelwood projects ($2,926,000), reforestation projects ($1,481,500), range management and pasture improvement projects ($1,515,000), and community nurseries and tools ($1,055,500). The AID grant will finance 31 person years of technical assistance ($1,926,000), contract studies and services ($592,000), and part of the Project Coordination Office costs ($225,000). The GOH will contribute $6,967,000 (32% of the total project cost). These counterpart funds will be used for operating costs -- personnel, vehicles, per diem, materials, equipment and supplies.

The Development Assistance Executive Committee (DAEC) of the LAC Bureau reviewed and recommended approval of the project on June 10, 1980. The following changes were made as a result of that review:

-- The incentive packages for farmers under the Choluteca Watershed Management Program are to be redesigned to allow for testing of the attractiveness to farmers of various schemes. At least one of the incentive packages will minimize the degree to which AID loan funds are offered at less than market costs.

-- Fertilizer, tool, and nursery packages for communities in the Choluteca Watershed will be financed with AID loan, rather than grant, funds. As a result, the grant funded portion of the project was reduced by $1,547,000 to its new life-of-project total of $2,743,000. The loan was correspondingly increased.

-- The Natural Resources Policy and Planning component of the project is to be accelerated, and the relevant policy-level institution will be in operation by the fourth, rather than fifth, year of the project. A covenant in the Project Authorization was revised to reflect this acceleration.

-- A covenant was added to the Project Authorization calling for the Government of Honduras, prior to the fifth year of the project, to establish a permanent institutional form which will continue the work of the project in the Choluteca Watershed and extend it to other watersheds in Honduras, as appropriate.

Waivers: None

Justification to Congress: An Advice of Program Change was sent to Congress on June 13, 1980. The waiting period expires and the Authorization may be signed on June 28, 1980.

Clearances Obtained: An Initial Environmental Examination recommending a negative determination was approved by the AA/LAC on June 10, 1980.

Recommendation: That you sign the attached project authorization.

Attachment

Clearances:
GC:N. Holmes [signature] Date 6/30/80
AAA/PPC/PDPR:S. Klein [signature] Date 15 July 80

AID/LAC/P-053

PROJECT AUTHORIZATION

Name of Country	:	Republic of Honduras
Name of Project	:	Natural Resources Management
Number of Project	:	522-0168
Number of Loan	:	522-T-041

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Natural Resource Management Project for the Republic of Honduras involving planned obligations of not to exceed $12,252,000 in loan funds and $2,743,000 in grant funds over a five year period from date of authorization, subject to the availability of funds in accordance with the A.I.D. OYB/allotment process, to help in financing foreign exchange and local currency costs for the Project.

2. The Project consists of the following elements: (1) Natural Resource and Land Use Policy and Planning; (2) Natural Resource Data Collection and Analysis and; (3) Watershed Management, intended to strengthen institutional mechanisms through which the Government of Honduras manages the country's natural resources, and to undertake an action program in selected watersheds to increase farmers' income and to conserve the natural resources of soil and water through the introduction of modified agricultural and forestry practices.

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

a. Interest Rate and Terms of Repayment

The Cooperating Country shall repay the Loan to A.I.D. in U.S. Dollars within forty (40) years from the date of first disbursement of the Loan, including a grace period of not to exceed ten (10) years. The Cooperating Country shall pay to A.I.D. in U.S. Dollars interest from the date of first disbursement of the Loan at the rate of (a) two percent (2%) per annum during the first ten (10) years, and (b) three percent (3%) per annum thereafter, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

b. Source and Origin of Goods and Services (Loan)

Goods and services, except for ocean shipping, financed by A.I.D. under the Project shall have their source and origin in the countries which are members

of the Central American Common Market and in countries included in A.I.D. Geographic Code 941 except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the Project shall, except as A.I.D. may otherwise agree in writing, be financed only on flag vessels of the United States or countries that are members of the Central American Common Market.

c. Source and Origin of Goods and Services (Grant)

Goods and services, except for ocean shipping, financed by A.I.D. under the Project shall have their source and origin in the Countries of the Central American Common Market or in the United States except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the Project shall, except as A.I.D. may otherwise agree in writing, be financed only on flag vessels of the United States.

d. Reimbursement of Expenses

Upon compliance with the relevant Conditions Precedent to Disbursement, A.I.D. may disburse Loan or Grant funds as reimbursement for eligible items incurred subsequent to the date of this authorization.

e. Conditions Precedent

(1) Prior to any disbursement, or the issuances of any commitment document under the Project Agreement, the Cooperating Country will furnish in form and substance satisfactory to A.I.D., evidence that the Natural Resources Executive Committee has been established officially to provide overall direction and guidance to the Project and that the Project Office has been established by the Ministry of Natural Resources.

(2) Prior to any disbursement or the issuance of any commitment document under the Project Agreement to finance sub-loans or sub-grant activities for tree propagation or planting under the Watershed Management element of the Project, the Cooperating Country will, except as otherwise agreed in writing, furnish in form and substance satisfactory to A.I.D., evidence that the appropriate regulations have been established to assure that responsibility for the management, control and disposition of all trees planted using Project monies, will be vested in the Project beneficiaries as long as the Project beneficiaries observe good natural resource management practices and adhere to the approved farm plan which was the basis for the provision of Project financing and materials.

(3) Prior to any disbursement or to the issuance of any commitment document under the Project Agreement to finance Watershed Management Credit Activities, the Cooperating Country will furnish in form and substance satisfactory to A.I.D., evidence that a Choluteca Watershed Management Fiduciary Credit Fund has been established, and that adequate procedures have been developed to supervise said Fund.

(4) Prior to any disbursement or the issuance of any commitment document under the Project Agreement to finance the construction, equip-

ping and supplying of the Community/Cooperative nurseries to be established under the Project, the Cooperating Country will furnish in form and substance satisfactory to A.I.D. a set of regulations and procedures to be followed in awarding such grants.

f. Covenants

The Cooperating Country will covenant as follows:

(1) that the Project Office in cooperation with the participating governmental institutions, will provide to A.I.D. by the first of each August, an annual, detailed implementation plan for the first and each subsequent year of the Project that provides a schedule for the procurement of Project inputs including technical assistance, training and commodities;

(2) that adequate budgetary support will be provided for expanded activities as required and as specified in the Project Agreement.

(3) to assure that the Watershed Management Credit Fund will be provided with the additional funds necessary to maintain, during the five years following the Project Assistance Completion Date (as defined in the Project Agreement), the level of grant and credit disbursements achieved during the last year of the Project;

(4) that on or before the beginning of the fourth Project year, responsibility and authority for natural resources management policy, planning and execution will be assigned a permanent institutional form; and

(5) that on or before the beginning of the fifth project year, permanent arrangements between the Ministry of Natural Resources, Forest Development Corporation (COHDEFOR), and other such appropriate organizations as it may designate will be established to continue the work of the Project in the Choluteca Watershed and to extend the work to other watersheds in Honduras, as appropriate.

Administrator

July 16, 80
Date

Clearances:

AAA/LAC:EWCoy — date 7/14/80
AA/PPC:AShakow — date 7/15/80
GC:NLHolmes — date

Drafted:GC/LAC:JLKessler:jlo:6/18/80:x23272