

UNCLASSIFIED

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

PROJECT PAPER

INDONESIA

UPLAND AGRICULTURE AND CONSERVATION PROJECT

497-0311

AUGUST 1984

USAID/Indonesia

PDAAP 885

AGENCY FOR INTERNATIONAL DEVELOPMENT PROJECT DATA SHEET	1. TRANSACTION CODE <input type="checkbox"/> A = Add <input type="checkbox"/> C = Change <input type="checkbox"/> D = Delete Amendment Number _____	DOCUMENT CODE 3
2. COUNTRY/ENTITY Indonesia	3. PROJECT NUMBER 497-0311	
4. BUREAU/OFFICE Asia Bureau	5. PROJECT TITLE (maximum 40 characters) Upland Agriculture & Conservation Proj.	
6. PROJECT ASSISTANCE COMPLETION DATE (PACD) MM DD YY 06 30 91	7. ESTIMATED DATE OF OBLIGATION (Under 'B.' below, enter 1, 2, 3, or 4) A. Initial FY 84 B. Quarter 3 C. Final FY 86	

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

A. FUNDING SOURCE	FIRST FY			LIFE OF PROJECT		
	B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total
AID Appropriated Total	4,250	2,900	7,150	7,500	11,400	18,900
(Grant)	(1,700)	(0)	(1,700)	(4,500)	(500)	(5,000)
(Loan)	(2,550)	(2,900)	(5,450)	(3,000)	(10,900)	(13,900)
Other U.S.						
1.						
2.						
Host Country	0	750	750	0	20,000	20,000
Other Donor(s)	2,300	9,000	11,300	2,300	9,000	11,300
TOTALS	6,550	12,650	19,200	9,500	40,400	50,200

9. SCHEDULE OF AID FUNDING (\$000)

A. APPRO- PRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE		D. OBLIGATIONS TO DATE		E. AMOUNT APPROVED THIS ACTION		F. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1) FN	140	066	066			5,000	13,900	5,000	13,900
(2)									
(3)									
(4)									
TOTALS						5,000	13,900	5,000	13,900

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each) 020 093 070	11. SECONDARY PURPOSE CC 120
12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each) A. Code B5 BR PART ENV B. Amount	

13. PROJECT PURPOSE (maximum 480 characters)

To expand and improve institutional capacities, primarily at provincial, district and farm levels, to experiment with alternate approaches to upland farming and to apply the alternative approaches.

14. SCHEDULED EVALUATIONS Interim MM YY MM YY Final MM YY 11 86 06 91	15. SOURCE/ORIGIN OF GOODS AND SERVICES <input checked="" type="checkbox"/> 000 <input checked="" type="checkbox"/> 941 <input checked="" type="checkbox"/> Local <input type="checkbox"/> Other (Specify) _____
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16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a _____ page PP Amendment.)

17. APPROVED BY	Signature Title Director USAID/Indonesia	Date Signed MM DD YY 07 30 84	18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION MM DD YY 07 30 84
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5. Budget Annex
6. Statutory Checklist
7. Waivers
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CONDITIONS PRECEDENT TO DISBURSEMENT

1. Prior to the first disbursement, the Government will furnish to AID in form and substance satisfactory to AID:
 - a. a statement of the names of the persons who will be authorized representatives, together with a specimen signature of each person specified in such statement, and
 - b. evidence that Provincial Coordination Offices and Project Management Units have been established and that sufficient Project staff is in place to carry out first year activities.
2. Prior to disbursement for project activities other than pre-implementation activities, such as studies, surveys, technical assistance, limited commodities, and establishment of a management information system, the Government shall furnish in form and substance satisfactory to AID:
 - a. evidence that the Project Executive Secretariat has been established and is formulating appropriate guidance for Project implementation, and
 - b. evidence that an agreement between the Government of the Republic of Indonesia and the International Bank for Reconstruction and Development has been executed, which provides funding for the Project in an amount and for activities anticipated in this Project Agreement.
3. Prior to disbursement for project activities that take place after April 1, 1985, the Government shall furnish in form and substance satisfactory to AID, evidence that guidance has been issued and is in effect to place Project management at the provincial and district levels, to unify management, and to unify budgeting.

COVENANTS

1. Government agrees to provide sufficient staff for project activities as described in the staffing pattern included in the AID-GOI Project Agreement.
2. Government agrees that the funding mechanism for the project will provide for local government responsibility and authority under the project.

CURRENCY EQUIVALENT

US\$ 1 = Rp. 1,000

WEIGHTS AND MEASURES

1 metric ton = 1,000 kilograms (Kg) = 2205 pounds = 0.98 long ton
1 meter (m) = 29.37 inches = 3.28 feet = 1.09 yards
1 hectare (ha) = 10,000 m² = 2.47 acres
1 square kilometer (km²) = 100 ha = 0.39 square miles

ABBREVIATIONS

AAATE - Agency for Agriculture Education, Training and Extension (BPLPP)
AARD - Agency for Agricultural Research and Development
BAPPEDA - Agency for Regional Development Planning (I is at province level, II is at district level)
BIMAS - Program of technical guidance for increasing agriculture production that provided credit incentives
BIP - Agriculture Information Centers
BKK - Badan Kredit Kecamatan - sub-district credit organization
BLPP - Agriculture In-Service Training
BPLPP - (See AAETE)
BRI - Bank Rakyat Indonesia
BRKKT - Land Rehabilitation and Soil Conservation Centers, under the Directorate General of Reforestation and Land Rehabilitation
DG - Directorate General in a ministry
Dinas - Agriculture technical services at provincial and district levels
DIP/DUP - GOI regular budget process
FID - Financial Institutions Development Project supported by AID
FKPP - Forum for Coordination of Ministry of Agriculture activities (district level)
IFY - Indonesian Fiscal Year (April 1 - March 31)
INMAS - Similar to BIMAS but without credit incentives
INPRES - Presidential Instruction re rural development programs
INPRES DATI I - Funding given to provinces for rural development programs
INSUS - Similar to BIMAS but without credit incentives
KUD - Koperasi Unit Desa (cooperative at the village level)
KUPEDES - General Rural Credit Program of the BRI
LKMD - Village council
NAEP - National Agriculture Extension Project supported by the IBRD

NSC -	National Seed Corporation
OSR -	On-Site Research plots
Padat Karya -	Labor intensive construction method
PCO -	Project Coordination Office at the province level
PIF -	Project Innovation Fund
PLP -	Field Extension Agent, Ministry of Forestry
PMU -	Project Management Unit at the district level
PFL -	Field Extension Agent, Ministry of Agriculture
PPM -	Extension supervisor
PES -	Subject Matter Specialist
P3RPDAS -	Reforestation and Regreening Planning and Supervision for Watershed Program, now renamed BRLKT
PTO -	Project Training Officer in Jakarta
PU -	Public Works
REC -	Rural Extension Center
REPELITA IV -	The Fourth 5 Year Plan
SKB -	Formal agreement that ministries will cooperate in an endeavor
SUFS -	Sustainable Upland Farming Systems - the primary component of the Upland Agriculture and Conservation Project
WKBPP -	Area served by an REC

EXECUTIVE SUMMARY

- I. Borrower : Republic of Indonesia
- II. Financing : IBRD: \$11.3 million (including capitalized front end fee)
 AID : \$13.9 million loan
 \$05.0 million grant
 GOI : \$20.0 million
- III. Terms: : IBRD: Repayable in 20 years, including a 5-year grace period, at the standard variable interest rate.
 AID : Loan repayable in 40 years, with a grace period of 10 years, during which time interest will accrue at an annual rate of 2%. Thereafter, an annual rate of 3% will apply on any outstanding principal and interest due.

IV. Estimate Costs*

	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
	-----(\$ million)-----		
Sustainable Upland Farming Systems	10.6	0.9	11.5
Farming Systems Research	3.3	0.3	3.6
Access Roads	4.4	-	4.4
Training	1.2	1.0	2.2
Institutional Development	5.4	8.4	13.8
Project Innovation Fund	0.4	0.1	0.5
<u>Base Cost</u>	<u>25.3</u>	<u>10.7</u>	<u>36.0</u>
Physical Contingencies	2.5	1.1	3.6
Price Contingencies	8.2	2.2	10.4
<u>Total Project Cost</u>	<u>36.0</u>	<u>14.0</u>	<u>50.0</u>
Adjustment for rounding		0.1	0.1
Front-end fee on Bank Loan	-	0.1	0.1
<u>Total Financing Required</u>	<u>36.0</u>	<u>14.2</u>	<u>50.2</u>

V. Financing Plan^{1/}

	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
	-----(\$ million)-----		
Bank	9.0	2.3	11.3
USAID	7.0	11.9**	18.9
GOI	20.0	-	20.0
<u>Total</u>	<u>36.0</u>	<u>14.2</u>	<u>50.2</u>

* Net of taxes and duties
 ** Including \$5 million grant
 1/ See Budget Tables in Annex for more detailed illustrative budget.
 Variances in figures are due to rounding.

PROJECT DESCRIPTION

I. The Problem

The people in upland areas of Indonesia subsist primarily on rainfed rice, cassava, peanuts and maize crops--combined with marginal livestock and forest products. Because these sources of income have not received much attention, the standard of living of people in the uplands has been falling behind that of people in the lowlands. With increasing population in upland areas, over-exploitation of resources and soil erosion, many people in the uplands are experiencing absolute decreases in their standard of living, from an already poor base.

Upland areas have the basic agro climatic conditions needed for increased productivity. With improved farm management techniques, research on new technology and increased institutional capacities to deal with the problem, the productivity of the uplands can be substantially increased.

II. Project Goal and Purpose

The goal of the Upland Agriculture and Conservation Project is to increase farm production and incomes, while minimizing soil erosion, in densely populated upland areas in Java by improving farming systems and farm technologies and management. The Project's specific purpose is to expand and improve institutional capacities, primarily at provincial, district and farm levels, to experiment with and apply alternative approaches to upland farming.

The Project is a joint effort of AID, the IBRD and the Government. IBRD support is being provided through a separate agreement with the Government.

The establishment of a Management Information System (MIS) at the beginning of the Project is essential to evaluation later of whether and to what degree the Project Goal and Purpose are met. The Project will emphasize the continuing use of MIS techniques to maintain adequate planning and day-to-day management.. The Project includes funds for studies to provide Project Managers with information relevant to project performance. Basic MIS activities may include:

(a) Technical and agro-economic profiles that will be carried out in target areas to describe the pre-project physical, environmental, social, institutional and agro-economic situation.

(b) Regular data generation related to implementation performance to ascertain Project status, e.g., hectares of expansion completed, distribution of inputs (seed, fertilizer, trees, grass) and research results.

In addition, funds will be available to contract for special studies through appropriate local institutions or consultants. As a general rule these studies will be short-term, not exceeding three months, so that their findings can be applied to the planning and implementation process without delay.

AID funds will be available for technical assistance, operating cost and equipment for MIS, as needed.

III. Location of Project

Initially the Project will be implemented in two districts in Central Java within the Jratunseluna Watershed and two districts in East Java within the Brantas River Watershed.

The decision to expand project activities to four or more additional districts will be made jointly by the Government, IBRD and AID, based on periodic assessments of field performance, evidence that effective provincial and district planning and management systems are functioning and that capacity exists to expand project activities without adversely affecting overall project management.

IV. Project Activities

To allow the Project to function as a pilot project, the Government will suspend the activities of other government programs providing similar or competing services to the same beneficiaries. Appropriate official guidelines will be issued to assure that other government programs work in harmony with the experimental aspects of the Project, especially in the project activities cited below.

To strengthen institutional capacity and to test possible approaches to improve farming systems, technologies and management, the Project will include five components: 1) Applied Research; 2) Sustainable Upland Farming Systems Pilot Project; 3) Human Resources Development; 4) Access Roads; and 5) a Project Innovation Fund.

A. Applied Research Activities

The purpose of the research component is to develop the capacity to produce technologies that will increase farm production and incomes and promote soil conservation. A field headquarters with research

facilities will be established by the Agency for Agricultural Research and Development (AARD) within one of the target basins in a location representative of a major ecological zone. The preferred location would be within a radius of 20 km from Ungaran or Salatiga, in Central Java. This facility also will serve as a research headquarters for the upland research conducted in the Jratunseluna Watershed, and will provide communication and logistic support to the field research and support staff. Similar facilities will be established in the Brantas Watershed, preferably in Malang. In addition to the headquarters and research facilities, approximately eight on-site research plots will be established in areas representative of the conditions found in both watersheds. Staff for the combined headquarters and field laboratory will include five full-time scientists and other field technical staff, while staff at the other headquarters will include two full-time scientists and other technical staff.

In addition to supporting the staff and development of these research sites, funds will be available for research. It is anticipated that research will be conducted in the following subject areas: socio-economic evaluation, crop and livestock systems, treecrops and silvipasture, soil and water management. These studies will be integrated with the project field demonstration and expansion program (described next) to insure feedback of empirical data on the performance of different varieties and farming systems and on rates of adoption of recommended technology.

AID funds will be available for training equipment, vehicles and research costs, including travel, per diem and operating costs. It is anticipated the IBRD will finance local currency investment costs and a portion of the research budget.

B. Sustainable Upland Farming Systems Pilot Project (SUFS)

This is an effort to improve on-farm trials and diffusion of improved technologies and management relevant to upland areas. SUFS will include support for nursery development, food-crop seed production and distribution, demonstration farms and expansion areas and subsidies. Each of these components is described below.

(1) Nurseries. It is anticipated that a network of ten nurseries (at least one per district) will be established under Government auspices to manage the production and distribution of large volumes of grasses/legumes for use in stabilizing terraces or in the introduction of silvipasture on steeper slopes.

The nurseries will be established on fertile soil with year-round access to water and will probably require at least 3 hectares of irrigated land. To the greatest extent possible, nurseries will be

located on a main road as close to the general target area in each district as possible. The Government will purchase or lease and develop the land, including irrigation facilities, and fund the operating costs.

It is anticipated that one nursery per district will be established during the initial project year in districts Boyolali and Semarang in Central Java and Malang and Blitar in East Java.

AID funds will finance vehicles and equipment for this component.

(2) Upland Food Crop Seeds. The Project will support the production and/or procurement, processing, storage and distribution of the secondary crop planting material required for both demonstration farms and expansion areas and, in addition, for the expected follow-on seed demand generated by the Project.

It is anticipated that over three thousand tons of certified rice, maize, soybean and peanut seed will be required. Budgets for planting material development will be made available one year ahead of the season in which the seeds will be needed, to allow for the purchase of stock seed, seed multiplication and their timely delivery to expansion areas.

AID funds will be available for vehicles, equipment and operating costs, including procuring and processing of plant material for this component.

(3) Tree Crop Seedlings. Tree seedlings will be provided free of charge to farmers willing to put their land under permanent vegetation or follow sound soil and water conservation practices.

It is anticipated that seedlings will be purchased from existing, privately owned nurseries in the project area. When improved tree seeds are available from AARD, AARD will make arrangements to supply nursery contractors the improved seed stock along with the specific management recommendations from appropriate AARD staff.

AID funds will be available for the purchase and distribution of seedlings.

(4) Demonstration Farms and Expansion Areas. Within identified areas, demonstration farms will be established as the principal activity for technology demonstration and dissemination under the SUFS pilot project. In addition to farming systems technologies, it is anticipated that two types of conservation technology will be demonstrated initially: bench terraces with grasses planted to stabilize the soil and grass strips, lamtoro or other appropriate legume tree/shrubs to form a barrier to soil erosion. If acceptable to the owners, marginal lands or lands

with low productivity and high erosion risk will be planted to silvipasture with cash crop trees and forage grass/legumes for livestock feed. Farmers with steep and marginal lands will be encouraged and assisted to change from annual food crop production to permanent or mostly permanent vegetative cover.

It is anticipated that 72 demonstration farms will be established under the Project; over the life of the Project 23,000 hectares will be treated.

AID funds will be available for technical assistance, equipment, commodities, vehicles and operating costs under this component.

(5) Subsidies. Farmer adoption of improved farming systems technology will require incremental inputs, in the form of labor, fertilizer, pesticides, planting material and other items, above the levels presently applied under traditional farming practices. The Project will fund direct subsidies in the form of materials or farm inputs for participating upland farm communities for an initial period of their participation in the program. Specific requirements will vary from area to area. Project officials will have the authority to adjust the subsidy package to insure that it is appropriate to farmer needs in any given locality.

In introducing subsidies, adherence to certain criteria will be required. First, farmers in a contiguous area must organize themselves into farming units and formally request government support for their unit. The farming group will be provided the necessary materials to undertake farming and conservation measures, under the guidance of a qualified technician. After completion of initial activities, such as construction of bench terraces, participating farmers will be provided with necessary materials (such as grasses, seed, fertilizer and pesticide) for the initial year's production. Appropriate inputs will be provided during the second year according to the needs of the farming system the farmers adopt. It is anticipated that subsidies will be provided for approximately two years, and that funding for farm inputs after the initial subsidy period will be in the form of credit from other sources. It is anticipated that the Parties to this Agreement will focus their credit activities on the project areas.

AID funds may be used for equipment and farm inputs, and other approved local currency costs. The IBRD will also finance a portion of local costs for this component.

C. Human Resources Development

This component includes workshops, intensive technical courses, newsletters, study tours, demonstration visits and handbooks for extension workers, farmers, community leaders and technical and

managerial staff. In addition, it is anticipated that 40 PPLs will receive diplomas in Upland Farming Extension and Soil Conservation from Indonesian schools; 20 project personnel will be trained to the M.S. level at Indonesian universities, focusing on upland management and farming systems; and 16 project personnel will be trained abroad to the M.S. level.

During the first year of the Project an assessment will be made of skills needed. At the same time, a personnel management system that maintains up to date information on individuals' experience and training will be instituted.

Training will emphasize practical applications of technology and will utilize field exercise as the primary instruction mode. The training effort will be implemented by utilizing existing facilities, experienced staff and trainers, and on-going programs when possible. The Project also includes support for these elements if necessary.

It is anticipated that IBRD funds will be used for this activity.

D. Conservation Access Roads

Access roads are required to facilitate the movement of materials into demonstration farms and expansion areas, and the movement of farm production out of these areas to markets. Approximately 475 kilometres of access roads will be constructed or upgraded in the eight project districts during the life of the Project. The location and rate of construction of access roads in the designated areas will depend on the rate of development in these areas.

In addition to construction within the project areas, the Project has included funds to link the expansion area roads to the existing road networks and to upgrade sections of the existing road networks that inhibit movement from expansion areas to markets.

Construction will utilize labor-intensive methods when possible. Roads will have a waterbound macadam surface, constructed according to standards acceptable to the Government and AID. The concern for soil conservation may require a higher standard and higher costs per kilometer than is customary with conventional labor-intensive methods.

AID funds may be used to provide technical assistance and logistics support for this component, while IBRD support is envisaged for road construction.

E. Project Innovation Fund

The purpose of the Project Innovation Fund (PIF) component is to provide a flexible source of financing for studies, small pilot projects,

field tests or other initiatives not otherwise funded under the Project but which contribute to the Project's purpose. Funds for these activities will be made available to non-governmental institutions, such as local universities, foundations or private sector organizations, as well as for experimental activities sponsored by government institutions.

Specific criteria for selecting PIF initiatives will be established by the Government and AID during the first year of the Project.

It is anticipated that by the end of the Project, each participating district will have an active portfolio of such activities. The initial results of these will be evaluated for broader application within the Project.

AID funds will be available for this activity.

V. Implementation

Government will issue appropriate instructions to effect collaboration and coordination among the participating ministries as required (1) for effective implementation of the project components; and (2) for the Project to meet its goals and purposes. Because of the involvement of many Government agencies and the need for local level planning and implementation, the lead agency for the Project will be the Ministry of Home Affairs (MHA); the Ministries of Agriculture and of Forestry will be the primary technical agencies (Chart). MHA will approve the overall annual plans and budgets, which will be submitted to AID for approval.

The Governors of Central and East Java, or their designees, will be the principal decision-makers responsible for overall project direction and performance, except for the research and training components of the Project. The provincial level administration will also be responsible for assisting district level governments to plan, manage and monitor field programs in upland agriculture development and for establishing standards for district performance and will help district agencies strengthen capacities accordingly.

To facilitate the efficient execution of the Project, the Governors of Central and East Java will be authorized to create and staff a Project Coordination Office (see Chart I). Each governor will appoint a full-time provincial Project Coordinator to provide overall project leadership. Each Project Coordinator will be supported by a full-time staff composed of a planning officer, a monitoring and evaluation officer, a finance officer and supporting administrative staff. Each participating provincial technical agency will appoint a staff member to be responsible for that agency's technical input into the Project. These line agency project representatives will work closely with the Project

Coordination Office staff to insure that overall project planning and implementation is fully synchronized and integrated. Technical Assistance financed under the Project will work under the direction of the provincial Project Coordinator.

The district chiefs of each participating district will be responsible to their provincial governor for overall planning and coordinated implementation of the Project in their respective districts. Appropriate authorities will be delegated to participating district chiefs to insure the effective administration of project activities at the district level.

The governor of each province will appoint, on the advise of the district chief in each participating district, a full-time Project Manager and supporting staff and authorize the creation of a Project Management Unit (PMU) for each district (see Chart 1). The Project Manager will be responsible for overall project direction. Each project component (e.g., the SUFS pilot project and access roads) will be planned and implemented by the appropriate technical line agency(ies) under the overall direction of the district chief and the Project Manager. Each project component, with the exception of the training component and the Project Innovation Fund, will be under the direct day-to-day management of a line agency sub-project manager who, for purposes of this Project, will report to the respective district Project Manager.

The District Forum for Coordination of Agriculture Extension (FKPP) will be responsible for the direction and performance of the Sustained Upland Farming System (SUFS) component of the Project. A senior professional from one of the four participating technical services will be appointed by the district chief to serve as the sub-project manager for the SUFS component. The FKPP will meet at least quarterly to review project performance, and to agree on plans and budgets for the SUFS pilot project.

To insure the unified execution of the Project and efficient financial management, the project budget, financed through Inpres Dati I, will be dispersed under the direction of each provincial Project Coordinator, who will sub-allocate funds to the respective district Project Managers. District Project Managers will, in turn, authorize disbursement to the responsible sub-project component managers responsible for field implementation.

The extension of services to the farmers will be through a unified extension system centered at and managed from the GOI's network of rural extension centers (REC) in the project area. The Ministry of Agriculture will issue the necessary instructions to its personnel and various elements to effect this unified extension management at the REC level.

Primary responsibility for implementation of conservation access roads, and Sustained Upland Farming Systems pilot projects (SUFS) will rest with the concerned technical agencies, namely Public Works, Agriculture and Forestry.

The Agency for Agricultural Research and Development (AARD) will be responsible for formulating and coordinating agriculture research policy under the Project with the Ministry of Home Affairs and other relevant agencies. AARD will be supported in formulating their research priorities by the Directorate General within the Ministry of Agriculture, the Ministry of Forestry's Directorate General for Reforestation and Land Rehabilitation and selected agriculture colleges.

VI. Financial Plan

A. Budget Source

The project has been organized around four basic principles: decentralized management, unified management, unified budgeting and community participation. With respect to the concept of unified budgeting, the government is expected to make every effort to provide project specific funds through the Inpres Dati I channel. To meet the financial requirements of the Project without undue disruption of other on-going programs being financed by the provinces through Inpres Dati I, special project allocations will be provided that are in addition to the regular Dati I allocations.

If necessary, due to restrictions in Inpres Dati I, the government will issue special guidelines, if required, so that the project Dati I allocation may be used to finance the expenditure categories outline in the Project Paper.

B. Project Activities

a. Technical Assistance. All technical assistance costs will be financed by AID and the Government. AID will directly contract with three organizations to provide technical assistance for the project. One contract will be in the form of a PASA with the USDA/Soil Conservation Service for technical services at the central level. The second AID contract will support two field technical teams located in the project areas in East and Central Java. This contract will be open for competitive bidding to firms from Code 941 countries. Joint venture arrangements or sub-contracts with qualified Indonesian consulting firms will be encouraged. It is anticipated that AID will contract with one or more of the international agriculture research centers to support the collaborative research program with AARD. It is also anticipated that there will be other AID direct contracts, generally under \$100,000, for

management information and evaluation studies and for other activities supporting project implementation. AID will contract with Indonesian-based financial consultants to assist in the development of appropriate financial management systems and to carry out training of project staff in the application of these systems.

b. Commodities. It is anticipated that all commodities (e.g. office equipment, data processing equipment, agriculture processing equipment, vehicles, etc.) will be financed by AID under direct payment procedures.

c. Training. It is anticipated that all training, both in-country and international, will be financed by the IBRD. The Government will follow the applicable IBRD financial procedures.

d. Construction. All in-country construction for facilities associated with the Farming System Research and Sustainable Upland Farming Systems components will be financed by the IBRD and the Government, and will follow applicable IBRD financial procedures. In addition, the Conservation Access Road component will be entirely financed by the IBRD and the Government. Road constructions will be pre-financed by the Government. It is anticipated that up to 60% of costs will be reimbursed by the IBRD.

e. Joint IBRD/AID Local Currency Financing. Local currency costs for two project components, Farming System Research and the Sustainable Upland Farming System pilot projects, will be jointly financed by AID, IBRD and the Government. These costs are for salaries and local support costs. The financial management procedure to be applied for each component is described below.

(1) Farming Systems Research. AID and IBRD will collectively finance 58% of the annual operational research budget for this project component. AARD will 100% pre-finance the annual research budget which will subsequently be reimbursed up to 58% of actual cost by both AID and IBRD.

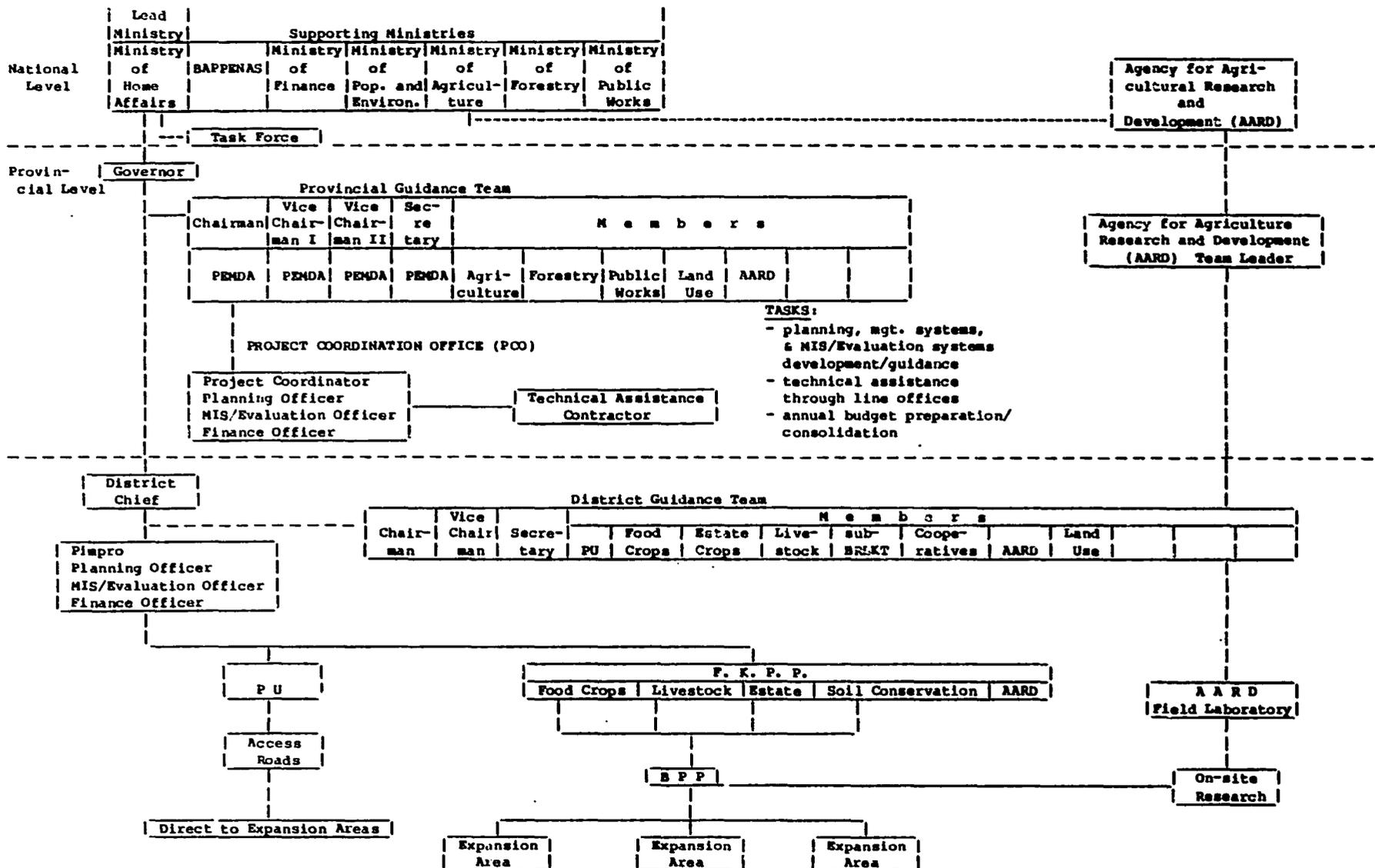
(2) Sustainable Upland Farming System Pilot Projects (SUFS). AID and IBRD will jointly finance the annual subsidy provided for demonstration farms and expansion activities under the SUFS component on a reimbursement basis.

f. Project Innovation Fund (PIF). AID will finance the PIF costs on a grant reimbursement basis. Disbursements under the PIF will be made only upon certification by the AID project officer. Separate accounts will be maintained by recipient institutions in a manner acceptable in form and content to AID.

B. Budget

The following is an illustrative financial plan. Adjustments may be made between line items by the representatives of the Parties in the text of the Agreement without formal amendment of this Agreement so long as (a) the Borrower/Grantee's contribution as stated in the text of the Agreement is not decreased and (b) AID's contribution as stated in the text of the Agreement is not increased.

Chart 1
Upland Agriculture and Conservation Project Organization



XVII

Table 22
Summary of Estimated Project Costs by Project Year*
(Rp Million)

Project Year IFY Project Component	0 84/85	1 85/86	2 86/87	3 87/88	4 88/89	5 89/90	6 90/91	Total Rp.000000	Total Us\$000
<u>Institutional Development</u>	930.7	2636.0	2636.0	2752.0	2188.4	1569.6	1063.0	13775.7	13775.7
National Level Executive Secretariat	50.4	30.4	30.4	30.4	30.4	30.4	30.4	232.0	232.0
Provincial Level Organization & Mgt.	208.8	128.8	128.8	128.8	128.8	128.8	128.8	981.6	981.6
District Level Organization & Mgt.	245.2	152.4	152.4	418.4	304.8	304.8	304.8	1882.0	1882.0
Technical Assistance	426.3	2324.4	2324.4	2174.4	1724.4	1105.6	599.0	10678.5	10678.5
<u>Farming Systems Research Component</u>	771.1	596.7	456.7	456.7	451.7	441.7	441.7	3616.3	3616.3
Investment	184.0	55.0						239.0	239.0
Research, Training and Recurrent Costs	587.1	541.7	456.7	456.7	451.7	441.7	441.7	3377.3	3377.3
<u>Sustainable Upland Farming Systems Pilot Projects (including Cooperative Seed Development)</u>	902.5	585.8	1241.8	1682.4	2222.7	2693.8	2184.3	11513.3	11513.3
Investment	306.0	16.0	320.8	82.8				725.6	725.6
Recurrent Cost	456.7	328.6	532.0	717.8	730.8	730.8	730.8	4227.5	4227.5
SUFS Subsidy	9.8	111.2	389.0	881.8	1491.9	1963.0	1453.6	6299.3	6299.3
Seed Processing Operation	130.0	130.0						260.0	260.0
<u>Human Resources Development Component</u>	40.3	219.8	392.0	442.6	456.8	422.6	270.4	2244.5	2244.5
<u>Conservation Access Roads Component</u>	60.0	75.9	382.1	632.5	950.5	1102.9	1196.0	4409.9	4409.9
<u>Project Innovation Fund (PIF)</u>			100.0	100.0	100.0	100.0	100.0	500.0	500.0
<u>Total Base Costs</u>	2711.6	4114.2	5208.6	6066.2	6370.1	6330.6	5257.4	36060.7	36060.7
<u>Contingencies (10% of base cost)</u>	271.4	411.4	520.9	606.6	637.0	633.1	525.7	3606.1	3606.1
<u>Total Base Costs + Contingencies</u>	2985.0	4525.6	5729.5	6672.8	7007.1	6963.7	5783.1	39666.8	39666.8
<u>Price Contingencies (7% compounded)</u>		316.8	830.2	1501.4	2177.8	2803.2	2840.5	10469.9	10469.9
IBRD Loan Fee								100.0	100.0
<u>TOTAL PROJECT COSTS</u>	2984.0	4842.4	6559.7	8174.2	9184.9	9766.9	8623.6	50235.7	50235.7

* Due to rounding line items within components may not add.

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XVII

UPLAND AGRICULTURE AND CONSERVATION PROJECT

I. BACKGROUND AND GOI/IBRD/AID COOPERATIVE STRATEGY

A. The Problem

1.01. Over the past decade Indonesia has transformed itself from the world's largest rice importer into being virtually self-sufficient in rice production. This success rests mainly on the irrigated lowlands of Indonesia, and it has carried a cost in terms of the relative neglect of upland areas where most of the poorest rural Indonesians live.

1.02. The people in upland areas subsist primarily on rainfed rice, cassava, peanuts and maize crops along with marginal livestock and forest products. Because of the comparative neglect of these areas, the standard of living in the uplands has been falling behind that of the lowlands. With increasing population, over exploitation of resources and soil erosion, many people in the uplands are even experiencing absolute decreases in their standard of living from an already poor base.

1.03. Upland areas are well endowed with the basic agro-climatic conditions needed for increased productivity. What is missing in the uplands are: (a) proper dissemination and application of known technology, (b) research for new technology suitable for upland conditions and (c) improved organization and management systems, both at the national and at the local level.

1.04. Table 1 presents the comparative yields of major crops in Indonesia and other countries. The fact that Indonesia is considerably below Thailand and Malaysia in yields for upland crops indicates the potential for improving yields of these crops in Indonesia and shows that the technology for increasing yields is available in the region.

1.05. There is little question that a major, and increasingly severe, constraint on the production of upland crops in Indonesia is the increasing pressure of population in upland areas, with consequent loss of soil and water resources. Although there are formidable problems in measurement and even in precise definition of soil erosion, there is little doubt that the situation in Indonesia, particularly on Java, is severe and deteriorating.

1.06. Historical data from the Cilutung Watershed in West Java show sediment losses steadily increasing during this century, from about 1 mm per hectare in 1911 to 2 mm in 1935 to around 6 mm today (van Dijk and Vogelang, 1948; ITC, 1976; cited in El-Swaify, 1983). The GOI now classifies over one million hectares of land on Java, or about 8 percent of the arable area, as "critical land," i.e., land so degraded that it is, or soon will be, unable to sustain even subsistence agriculture (USAID-GOI, 1983).

Table 1
Yields of Various Crops in Indonesia Compared with
Those of Other Asian Countries, Japan and the US, 1981
(tons/ha)

Commodity	Indonesia	%*	Philippines	Thailand	Malaysia	Japan	United States
Paddy rice	<u>3.67</u>	1.30	2.21	2.08	2.82	5.63	5.46
Corn	1.46	0.67	0.96	<u>2.16</u>	1.14	3.00	5.71
Cassava	9.72	0.57	11.50	<u>17.50</u>	10.29	-	-
Peanuts a)	1.15	0.43	0.64	0.65	<u>2.68</u>	1.27	2.08
Soybeans	0.89	0.56	0.89	0.84	<u>1.60</u>	1.46	2.05
Sweet Potatoes	7.53	0.78	4.68	8.99	<u>9.61</u>	20.32	12.94
Sugarcane	<u>99.21</u>	2.12	<u>46.74</u>	38.75	44.74	66.22	88.80

* Indonesia as a percentage of the highest yields among the three other ASEAN nations.

a) Shelled basis, derived from "in shell" yields using a conversion factor of 0.7.

Source: World Bank, Indonesia: POLICY OPTIONS AND STRATEGIES FOR MAJOR FOOD CROPS (1983, Report No. 3686.IND)

1.07. Estimates of annual soil loss from sixteen sites, presented in Table 2, range from 0.24 to 10.6 mm/yr. Losses on most sites significantly exceed the annual rate of soil formation, which is estimated to be about 2.4 mm/yr (Hamer, 1980/1982). But these catchment-wide figures mask the severity of the problem. Most soil erosion comes from small, private land holdings worked by low income, subsistence farmers. These intensively cultivated plots cover only one-quarter to one-half of the land area of most watersheds, but may have soil losses as high as 50 mm/yr. Continued erosion at these levels leads to complete loss of productivity within only a few years. These areas are the source of Java's rapidly growing critical lands and the major object of this project.

1.08. Finding solutions to the problems of upland productivity and loss of soil and water resources is complicated by the wide variation in agro-climatic and demographic conditions in the Indonesian archipelago. Three basic demographic/agro climatic typologies capture conditions found in Indonesia watersheds:

- densely populated, humid watersheds (Java, Bali and Madura);
- sparsely populated, humid watersheds (Sumatra, Kalimantan and parts of Sulawesi and Irian Jaya);
- sparsely populated, drought prone watersheds (East and West Nusa Tenggara, East Timor and parts of Sulawesi and Irian Jaya).

1.09. Each typology requires a range of technical solutions and institutional arrangements that are, at best, only partially in place. No single, standardized program will work; research and extension programs need to be tailored to each of the three typologies. The GOI/IBRD/AID strategy outlined in Section I.C focuses attention and resources on the densely populated/humid watersheds of Java.

B. Relationship of Project to GOI, AID and IBRD Priorities

1.10. The Upland Agriculture and Conservation Project adheres to the priorities of the implementing agencies as outlined below.

1.11. The GOI attaches high priority to area development programs that address problems of food production and income of rural farmers in poverty areas and has initiated a range of agriculture development and conservation programs. The GOI also has made a substantial commitment of resources to the National Regreening Program, which addresses the rapidly deteriorating conditions found in the nation's watersheds (particularly on Java, Bali, Madura and the eastern islands of the archipelago). Budget and staff for the Regreening Program have increased steadily since the Program's inception in 1976.

1.12. The GOI is also aware of the decreasing returns to incremental investments in irrigated agriculture on Java and, as stated in the recently completed Fourth Five Year Plan (Repelita IV), will place much greater emphasis during the next plan period on exploiting the production potential of the country's rainfed, upland areas.

Table 2
SUMMARY OF RESULTS OF SOIL EROSION STUDIES 1/

Catchment Area (Province) (1)	Soil type (2)	Catchment Area (km ²) (3)	Sedimentation Rate per ha of Land (mm) (4)	Source (5)
Cimanuk (W. Java)	Volcanic products, marl, lateritic soil	N/A	0.24	Hollerwogger (1964)
Pengaren near Semarang (C. Java)	Marl, limestone, lateritic soil	N/A	4.1	Hollerwogger (1964)
Serayu near Cilacap --	Volcanic products, marl, lateritic soil	N/A	1.6	Hollerwogger (1964)
Rambut near Tegal --	Volcanic	45.0	0.42	Van Dijk and Ehrencron (1972)
Cacaban --	Marly	79.0	4.5	Van Dijk and Ehrencron (1972)
Research catchment near Garut	Volcanic forest	0.044	0.2 - 1.1	Caughran (1972)
Cimamaja (W. Java)	Volcanic and clay marly soil	N/A	1.0 - 1.4	De Haan (1952)
Cilulung near Kadipaten --	Mainly breccias, sandstones, claystones,	620.0	1.0 (in 1911)	Van Dijk and Vogelsang (1948)
	Marly sediments		2.0 (in 1934)	
Cimanuk at Parakankondang --	Mainly volcanic	1480	3.7	NEDECO-SNEC (1973)
Cilulung at Umum Weir --	See description for Cilulung above	600	8.0	NEDECO-SNEC (1973)
Serayu at Banyumas		2665	3.8	SNEC (1974)
Pekacangan at Brengkel	White clays	129	5.6	SNEC (1974)
Segaluh at Krasak		190	0.45	SNEC (1974)
Jragung at Jragung --		94	10.6*	ECI (1976)
Jratunseluna Upper catchments (average) (C. Java)		4786	3.4*	PRC/ECI (1980)
Serang at Kedung Ombo (C. Java)	Volcanic and sedimentary	614	3.1*	SNEC (1982)

1/ Review and Updating of the Serang River Project; SNEC; September 1982

* In situ density of soil (or specific weight) varies with soil type and generally ranges from 1.0 to 1.5 t/m³. Estimates of average soil loss rates may vary depending on the value used. Figures marked with an asterisk are based on an assumed density of 1.5 t/m³. N/A = Not Available. 1 mm/ha = 12-15 T/ha depending on density of the soil.

1.13. Three of the central themes stated in USAID/Indonesia's Country Development Strategy Statement (CDSS) are: increasing food production and rural productivity, especially the agricultural productivity and incomes of poor upland farmers; strengthening the capacity of local governments to plan and manage development programs that reflect the priorities and specific needs of local communities; and improving measures to protect and enhance Indonesia's natural resources. AID's Provincial Development Program already supports three agriculture/conservation efforts following these themes in the provinces of Nusa Tenggara Barat (NTB), Nusa Tenggara Timur (NTT) and on the island of Madura. The Upland Agriculture and Conservation (UAC) Project addresses these same themes as well as broader AID policy concerns regarding institutional development and technology transfer.

1.14. While the World Bank's main support to agriculture continues to focus on the irrigation and estate crop sectors, it also stresses strengthening other agricultural activities. The IBRD supports a pilot watershed effort in the areas of Gunung Kidul and Kulon Progo as part of the Jogjakarta Integrated Rural Development Project. Technical and investment support for activities that will significantly contribute to improving and stabilizing upland farming is now a high priority in Bank lending policy. The Bank found it difficult to identify a project focused on upland productivity and conservation that complemented the existing portfolio of Bank assisted projects in the agriculture sector. The UAC Project blends with current Bank projects and may provide the basis for a broader lending strategy if it proves to be a replicable model.

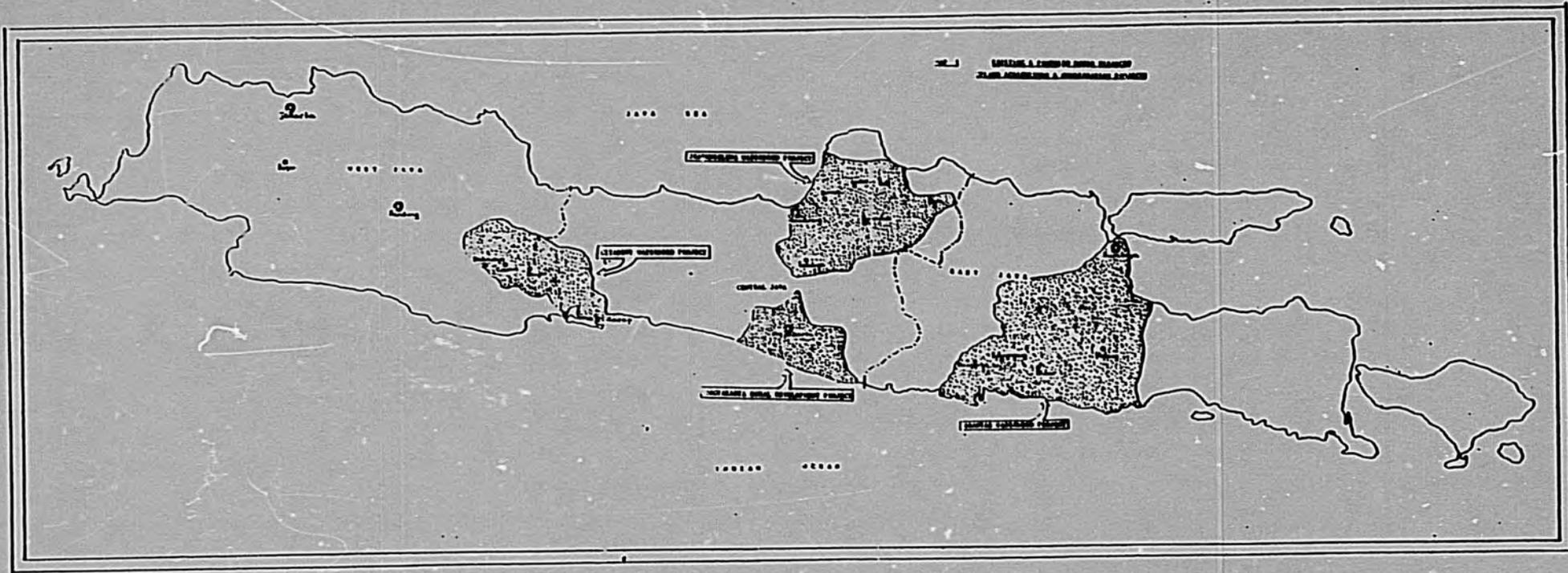
C. GOI/IBRD/AID Cooperation Strategy

1.15. The GOI presently is implementing a nationwide conservation program in 35 watersheds. This program includes all three demographic/agro climatic typologies previously mentioned. However, 13 watersheds of the densely populated/humid tropic typology, located primarily on Java, have been give priority.

1.16. Current IBRD and AID interventions in two densely populated/humid regions of Java (the Jogjakarta Integrated Rural Development Project and the Citanduy Project) are focused on addressing constraints outlined above. The proposed UAC Project will expand this focus in Central Java and begin acctivities in East Java. (See Map 1.)

1.17. The proposed project in the Jratunseluna and Brantas Watersheds will be implemented in two phases. Phase I, implemented over a 7 year period, will establish the decentralized institutional base and initial field program. Phase II, implemented over the following 10 years, will focus on a Java-wide expansion program in conjunction with the Citanduy and Jogjakarta upland agriculture and conservation programs.

Map 1



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1.18. The Phase I effort will be divided into two stages. During stage one, the project will work in two districts in Central Java and two districts in East Java. Focus will be on establishing a decentralized management and delivery system under district government management that effectively integrates component project activities. During stage two the project will expand to two or more districts in each province when it has been determined that the management, planning and input delivery systems in the initial target districts are effectively functioning.

1.19. The GOI, IBRD and AID have agreed on a combined effort to develop appropriate technology and institutional solutions to the problems outlined above. The two phase program will be carried out through combined GOI/IBRD/AID planning and management. Donor financing will be provided on both a "parallel" and a "joint" basis; USAID will be the lead implementing agency on the donor side for the Phase I effort. Phase II donor leadership most likely will be vested with IBRD.

II. THE PROJECT

A. Project Goal and Purpose

2.01. The goal of the Upland Agriculture and Conservation Project is to increase farm production and incomes, while minimizing soil erosion, in densely populated upland areas in Java by improving farming systems, farm technologies and management.

2.02. The project's specific purpose is to expand and improve capacities of provincial, district and farm levels institutions to experiment and apply alternative approaches to upland farming.

B. Project Strategy and Phasing

1. Project Strategy

2.03. In order to strengthen institutional capacity and test possible approaches to improve farming systems technologies and management, the project will have five primary components: 1) Applied Farming Systems Research; 2) Sustainable Upland Farming Systems Pilot Projects; 3) Human Resources Development; 4) Conservation Access Roads; and 5) a Project Innovation Fund. These five components are designed to strengthen and reinforce each other. Each component will have a learning dimension, with the exception of the roads component, which applies known technologies and management procedures.

2.04. The project will increase productivity and sustainability of upland agriculture within the project area and, in doing so, will create prototypes for an efficient and responsive national program. Authority, resources and staff of cooperating central agencies will be provided to various levels of local government to experiment with approaches outside normal program prescriptions. The project will also support independent and collaborative activities of selected local public and private groups in the experimental process.

2.05. The approaches to be developed and applied under the project will seek to strengthen the self-reliance of selected communities by increasing their ability to manage the adoption and dissemination of improved agricultural technologies, to conserve the land and water resource base and to build the social relationships required for self-reliance. This effort recognizes the potential for community initiative, the limitations of government resources and administrative capacities and, most importantly, the diversity of upland micro-environments. New technologies that are suited to local conditions and that use the skill and initiative of the individual farm household are required.

2.06. The project will require a participatory and integrated mode of agricultural research based on an understanding of existing farming practices, their underlying logic and the constraints to adoption of alternate practices. It also requires an agricultural extension service able to assist farming communities in identifying priority needs and opportunities, share expertise among themselves, communicate their needs to researchers and gain information to solve their problems and to exploit new opportunities. In such a system the extension agent acts as a broker of relationships as well as a conduit for technical information. Strong, direct, two-way relationships are required between extension agents, farmers and researchers. There must be ready access to essential agriculture support services.

2.07. Substantial reorientation and development of new capacities within the assisting agencies will be required. Neither can be achieved directly, but the project is intended to support the processes whereby responsible managers of the relevant agencies may bring them about--by providing a mandate and by making available flexible sources of technical assistance and capital.

2.08. The strategy looks to the province as the focal point for development of area specific programs. Added to the Jogjakarta Integrated Rural Development Project and the Citanduy Project, the UACP will complete the network of province based upland development laboratories on Java.

2.09. The selected districts will serve as field laboratories for learning how to improve existing programs by applying four basic project concepts: Decentralized Management, Unified Management, Unified Budgetary Systems, and Community Participation and Management. Each participating district will establish a Project Management Unit (PMU), responsible to the district chief, for the coordinated management of upland agriculture development activities within that district. This PMU will be a prototype for eventual creation of a permanent mechanism for district level coordination of upland development and conservation activities.

2.10. Each participating province will establish a Project Coordination Office (PCO) that will support the development of prototype programs, management systems and institutional capacities. They will

take the lead in developing data collection and diagnostic methodologies, will contract with local Indonesian research and training institutions for technical support and will manage the Project Innovation Fund.

2.11. The Ministry of Home Affairs, supported by a full-time Executive Secretariat with staff from the Ministries of Agriculture, Forestry, and Home Affairs, will provide policy guidance and sanction for the experimental activities carried out by the project and will assume responsibility for assessing and acting on broad policy issues.

2.12. Key to the project strategy is the distinction between: (a) responsibilities for managing the process of developing new program approaches and supporting management systems and (b) responsibilities for managing the actual planning and implementation of program operations. The former will be the primary responsibility of the Project Coordination Office. The latter will be the responsibility of appropriate permanent units of provincial and district administrations.

2. Phasing

2.13. It is assumed that expanded project operations in the remaining four or more districts will commence beginning the fourth year of the project (IFY 1987/88), with staff recruitment, training and planning initiated in the preceding fiscal year (IFY 1986/87). However, the decision to commence project operations in additional districts will depend entirely on actual field performance. The decision to expand operations will be made independently for both Central and East Java, reflecting the autonomous operation of project activities in each province.

3. Replicability

2.14. The project is designed to be administratively and tactically replicable if the pilot project methodology is followed. Since the government has made the decision to embark on a national program to increase the productivity of the uplands and to stabilize the upland environment, this project will serve as the field laboratory for design of the major program by presenting cost effective options for further expansion.

2.15. The project will seek ways to have an effective operation and yet limit the number of government personnel required. It also will seek to define the minimum levels of inputs required by the subsidy program.

2.16. Government personnel, technically trained and experienced, will be moved to new expansion areas as the project moves to Phase II. A community-based organization of key farmers will remain as the primary interface for continuing transfer of technology. The continued improvement in local agriculture will be supported by: (1) effective, unified management of the remaining thinned-out government cadre, (2) local non-government institutions and (3) an improved system of

agriculture communication. For example, the project supported agriculture/area newsletter might prove to be an effective communications tool, reducing the need for extension agents. Certainly the improved road net will increase the flow of information to the farmers.

4. Management Information System

2.17. There is no standardized "blueprint" for the development of upland agriculture and conservation practices. Rather, the central operational concept of the project is learning-by-doing, which depends on the capacity to monitor the project's output. The establishment of provincial and district Management Information Systems (MIS) capable of routinely generating data on output performance and providing information to project authorities is, therefore, a central component of the project. Accordingly, an effective management information system will be required prior to expanding the project into additional districts.

2.18. In addition to the MIS for daily management, project staff and technical assistance personnel at province and district levels will carry out annual assessments that examine reasons for success or failure of each component activity and recommend modifications.

2.19. The internal annual assessment and planning process undoubtedly will uncover many issues that will require additional data and analysis before action recommendations can be formulated. To address these issues, the project will fund short-term (3 months or less) special studies through appropriate local institutions or consultants.

2.20. Several external evaluations, independent of project authorities, will be carried out during the life of the project. These evaluations will re-appraise project concepts, design, allocation of funds, staffing patterns and component activities in light of the previous year's performance. The first external evaluation, carried out during the third year of project activity (IFY 1986/87), will determine if and when the additional districts will be brought into the program. The second mid-term review, during the fifth or sixth year of project activity (i.e. IFY 1988/89 or 1989/90), will focus on whether a Phase II program should be initiated. A final project evaluation will be carried out during the last year of the project and will be a comprehensive assessment of the Phase I effort.

C. Project Area

1. General Location

2.21. The project will be implemented in Central and East Java within the catchment areas of the Jratunseluna Watershed and the Brantas River Watershed respectively (Maps 2a and 2b). These two watersheds are among five designated for priority attention by the GOI during the 1980s. The eight project districts in these two watersheds have 251,649 hectares of rainfed land, of which 82,318 ha are critical land according to the Soil Conservation Service (Sub-BRLKT). Over 1/3 of the total rainfed area in these districts suffers from serious erosion.

2.22. The Jratunseluna Watershed, with an area of approximately 800,000 hectares, includes six major catchment areas draining five major rivers, the Jragung, Tuntang, Serang, Lusi and Juwana from which the name Jra-tun-se-lu-na is derived. The watershed falls within the administrative jurisdiction of nine districts, four of which (Semarang, Boyolali, Blora and Grobogan) will be included in the project's seven year first phase. During initial years of the project, activity will be focused in two districts (Semarang and Boyolali) that include catchment areas with high sedimentation rates. The district of Boyolali includes the majority of the watershed area upstream of the proposed Kedung Ombo dam.

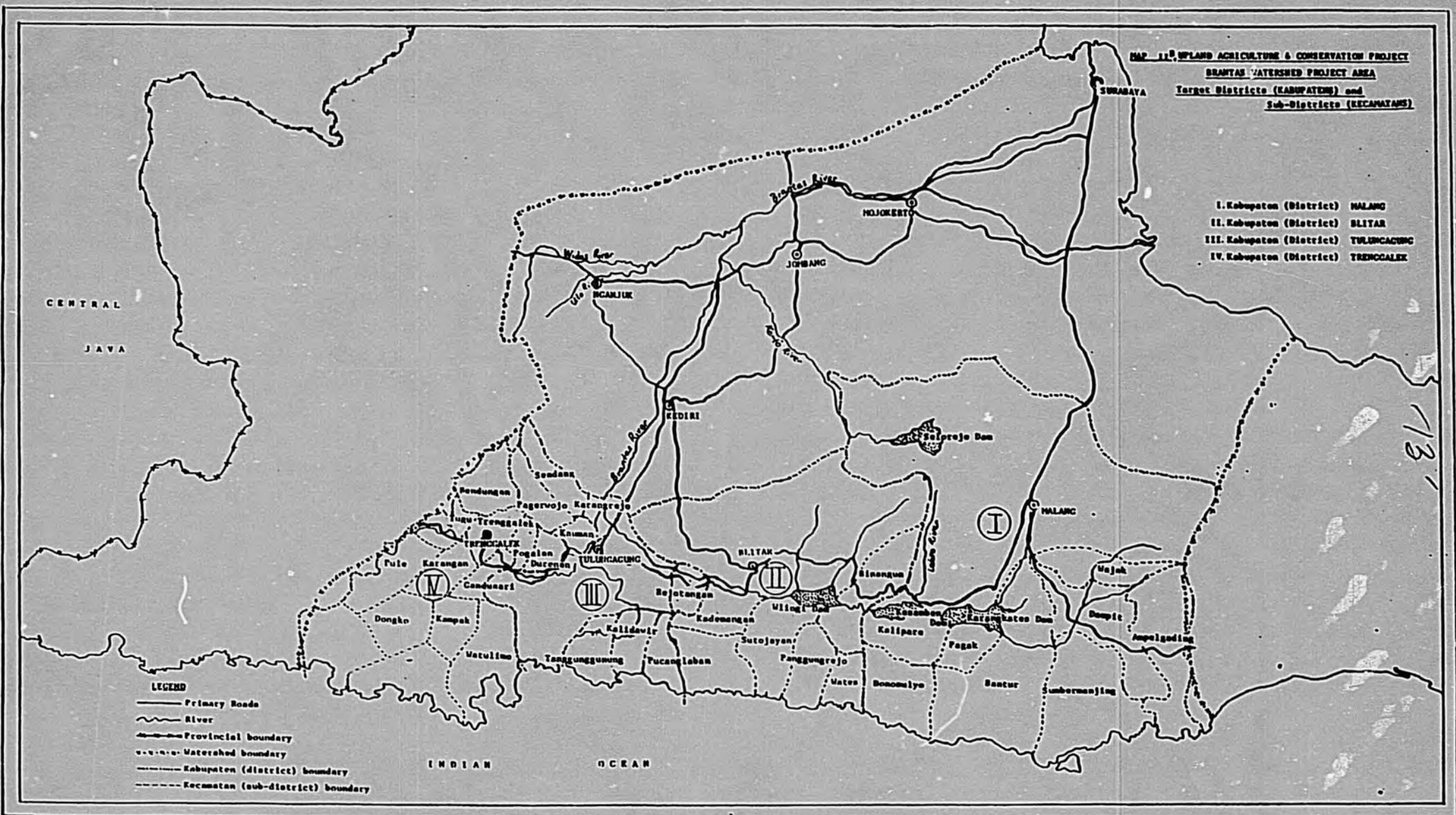
2.23. The Brantas Watershed covers an area of 1.18 million hectares, and is drained by the Brantas River and seven tributaries. The Brantas Watershed is composed of seven major catchment areas that fall within the administrative jurisdiction of ten district governments. Four districts, Malang, Blitar, Tulungagung and Trenggalek, will be included in the project. Malang and Blitar contain critical catchment areas immediately upstream of the existing Karangates dam and the Wonokerto dam, which is under construction. Initially the project will focus on these two catchments.

2. Population

2.24. The total population of the two watersheds was estimated in 1980 to be 18 million (Table 3). Of this total, approximately 3.3 million people reside within the eight districts selected for inclusion in the project (Table 4). Population density varies greatly, however, within and among districts. In the Jratunseluna Watershed within district variation is greatest in Boyolali. It ranges from 513 persons/km² to 1920 persons/km² of agricultural land. In the Brantas Watershed the range is from 553/km² to 1635/km² (see Table 5).

2.25. The overall rate of population growth is very low in the project districts; the Crude Birth Rate was 20/1000 and the Crude Death Rate was 6/1000 from 1978 to 1982. Again there is a great deal of variation among districts in the Crude Birth Rate, which varies from 18 to 29/1000. In all eight districts out-migration is significantly higher than in-migration. During 1982, the migration figures for the project sub-districts in East Java were 5,706 in-migrants compared to 9,018 out-migrants. For the Central Java districts the same figures were 10,107 and 19,572 respectively. A significant part of this variation can be attributed to differences in the agricultural potential among districts and to the corresponding differences in standards of living.

2.26. The average farm size is essentially the same for project districts in East and Central Java, i.e., 0.67 ha and 0.66 ha respectively (Table 5). Although these figures include holdings of both irrigated and rainfed land, they appear to be representative based on estimates commonly expressed by those working in both regions.



MAP II. UPLAND AGRICULTURE & CONSERVATION PROJECT
BRANTAS WATERSHED PROJECT AREA
Target Districts (KABUPATEN) and
Sub-Districts (KECAMATAN)

- I. Kabupaten (District) MALANG
- II. Kabupaten (District) BLITAR
- III. Kabupaten (District) TULUNGAGUNG
- IV. Kabupaten (District) TRENGGALEX

LEGEND

- Primary Roads
- ~ River
- Provincial boundary
- Watershed boundary
- Kabupaten (district) boundary
- Kecamatan (sub-district) boundary

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Table 3
Selected Demographic and Land Use Data

	JRATUNSELUNA Watershed	BRANTAS Watershed
Province	Central Java	East Java
# Districts	9	10
Population (million)	5.9	12
Total # ha	790,000	1,180,000
Population density (persons/km ²)	747	1,017
Land use (%)		
Irrigated	34.8	27.3
Rainfed	25.2	20.9
Home yards/gardens	13.8	16.0
Forest	22.8	23.4
Plantation	0.9	5.2
Others	2.5	7.2

Source:

- Pola Terpadu Pengembangan Wilayah Sungai Jratunseluna oleh BAPPEDA Tk.I Jawa Tengah dan Proyek Pengembangan Wilayah Sungai Jratunseluna, April, 1982.
- Direktorat Jendral Kehutanan, Sub-BRLKT Daerah Aliran Sungai Brantas. General Information about Brantas Watershed and some Running Activities, April 1983.

Table 4
Project Area Population Data

Location	Total * Population (1982)	Pop/km ² Total Land Area	Pop/km ² Agr Land	Pop/km ² Range (by kecamatan)	
				High	Low
C. Java	1,656,000	551	840	1,920	513
Semarang	647,000	728	877	1,429	632
Boyolali	234,000	557	830	1,920	513
Grobogan	480,000	463	876	1,517	703
Blora	294,000	446	731	1,095	532
E. Java	1,638,000	443	753	1,635	413
Malang	627,000	366	592	1,044	487
Blitar	229,000	502	905	710	413
Tulungagung	310,000	491	748	1,464	429
Trenggalek	472,000	512	991	1,635	558

Source: - Data Sosial Ekonomi Kabupaten, 1982 - Direktorat Jendral Bina Marga
* Total population of Selected Sub-districts within the Districts

Table 5
Average Farm Size in Eight Participating Districts

Location	Families *	Families *	TOTAL 1 + 2	Total **	Ave. Land Per Family (ha)
	Working Own Land (1)	Working Own Land & Others (2)		Cultivated Land (ha)	
<u>E. Java</u>	487,133	65,188	552,321	372,716	0.67
Malang	209,113	24,913	234,026	177,716	0.76
Blitar	114,795	18,333	133,128	84,817	0.64
Tulungagung	81,940	13,390	95,330	37,289	0.39
Trenggalek	81,285	8,552	89,837	72,757	0.81
<u>C. Java</u>	361,903	78,221	440,124	291,878	0.66
Semarang	85,581	18,568	104,149	59,119	0.57
Boyolali	95,979	19,637	115,616	55,570	0.48
Grobogan	99,962	25,394	125,356	94,100	0.75
Blora	80,381	14,622	95,003	83,089	0.87

* Penduduk Jawa Menurut Propinsi dan Kabupaten/Kotamadya 1980

** Kompilasi Data Hasil Survey Sosial Ekonomi

3. The Agricultural Sector

2.27. Agriculture provides the main livelihood for 68% of the population in the Jratunseluna Watershed and 74% in the Brantas Watershed. Despite intensive utilization of available lands in East and Central Java, five project districts are net importers of food.

2.28. Upland farming systems found throughout the Brantas and Jratunseluna watersheds are diverse and well suited to intercropping and plant adaptation. The present low level and poor quality of available inputs will be improved by the project.

2.29. Three general types of upland farming systems predominate and reflect the varying agroclimatic conditions found in both watersheds.

2.30. The first type is characterized by elevations over 700 meters and by precipitation rates greater than 3000 mm/year. The cooler temperatures of this zone and relatively high precipitation rates enable farmers to devote much of their activity to estate and horticulture crops such as carrots, potatoes and cabbages. The livestock preferred is dairy cows; grasses and leucaena are abundant for forage. Soils are more stable and the quality of the bench terraces is quite good.

2.31. The second type of upland farming system, found throughout the two watersheds, has between 2,500 and 3,000 mm of rain/year distributed over eight to nine months. Two intercrop plantings per year are general. In the first planting cycle, which begins with the onset of the rainy season, cassava, upland rice and corn are frequently intercropped but cassava is not harvested until after the second planting cycle. The second planting cycle usually includes interplanted corn and peanuts. Elevations between 250 and 700 meters above sea level are common for this zone.

2.32. The third general type of upland farming system receives less than 2500 mm/year during seven months or less. These areas generally have two planting cycles; the first begins with the rainy season and is characterized by intercropping of cassava-corn-peanuts or corn monoculture. The planting regime for the second season includes intercropping of corn and soybeans, or corn and peanuts or monoculture soybean. This farming system is the most prevalent on non-irrigated lands in both watersheds.

2.33. Several other cropping systems should be mentioned. Monoculture of cassava is found throughout the two watersheds, particularly on poor soils and seriously eroded, steep slopes. It is also characteristic of farming operations located near major urban areas where farmers derive their main source of income from off-farm employment. Tree crops are a small but important component of all three general types of farming systems because they provide additional cash income for the households as well as fuel wood and lumber for home consumption. Trees are cultivated throughout the farms but are most frequently found in the home gardens.

2.34. Home gardens account for approximately 30% of total land area (Table 3). The typical home garden is a mixture of trees for fruit, firewood and building materials, with underplantings of root crops, tubers, medicinal plants and vegetables. These plants, which form a closed canopy similar to natural forests, protect soil from erosion.

2.35. Accurate data on agricultural yields for upland areas are difficult to obtain due to the intercropping systems. Available data do not differentiate between yields from irrigated versus non-irrigated land or monocropping versus intercropping and multiple cropping patterns. However, Table 6 shows current yields of the dominant intercropping pattern on a per-hectare basis based on available information and interviews with farmers and other individuals knowledgeable about the area. Potential yields can be judged by comparing these figures with the results of experiments with similar cropping patterns in the Jogjakarta region (also shown on Table 6).

2.36. An experimental segment of the project will use livestock, which currently can contribute as much as 25-30% of farm income, as an incentive for farmers to invest their resources in conservation efforts such as silvipasture. For details see Annex 1.A.

5. Selection Criteria for Target Areas

a. Introduction and Selection Criteria

2.37. District and sub-district selection for inclusion in the project was based on the screening of potential project areas against a predetermined set of criteria and on judgment derived from several field visits to both watersheds. The first criterion for site selection specifies that project activity be limited to land with slopes above 15%. Two other criteria narrow this focus to land that is immediately upstream of existing or planned major infrastructure (i.e., multi-purpose dams, irrigation facilities, etc.) and/or lands where the erosion of soil is approaching the point beyond which crop yields will be significantly reduced.

Table 6
Estimated Current Yields in UACP Districts and
Experimental Results from Upland Trials in the
Jogyakarta Integrated Rural Development Project

Location	Crop	Yield/ha (kg)
UACP districts	Soybeans	450
	Corn	1,000
	Cassava	2,000
	Peanuts	500
JIRDP Site A	Corn	1,900
	Upland Rice	4,300
	Cassava	9,000
	Peanuts	700
JIRDP Site B	Corn	1,400
	Upland Rice	2,600
	Cassava	7,500
	Peanuts	600

2.38. This last criterion gives greater specificity to the present GOI definition of critical land, which includes future potential sources of erosion as well as lands that already are experiencing rapid soil erosion. The project principally will address treatment of those agricultural lands where soil depth is at or approaching 50cm. Under Indonesian conditions, this is generally accepted as the minimum soil

depth beyond which crop yields will be significantly reduced. The GOI definition of critical lands also includes those lands where soil erosion is so advanced that sedentary agriculture is no longer possible and the lands have been abandoned. These lands, unless they are major contributors to sedimentation of downstream infrastructure in the project area, will not be a primary focus of the project, at least during the initial phase of project operations.

2.39. Thus, project activity will fall between these two extremes and focus on a "curative" rather than a "preventive" program targeted on land where agriculture is still viable but which, if left untreated, will result in near-term irreversible destruction of the land's agricultural potential.

2.40. Site selection of lands for inclusion under the project (para 2.38) is, due to severe data limitations, tentative and subject to more precise definition as the project proceeds. An initial priority of the project will be the initiation of regular, iterative surveys and measurements that will determine: (a) the net rate of soil erosion, (b) the critical depth of soil and (c) the external costs of erosion due to sedimentation and flooding. With this information project managers will be able to identify priority areas for treatment under the project.

b. Project Area and Indicative Hectarage Covered by Project Activity

2.41. In each province, project management and field implementation will be centered at the district and rural extension center (RECs) levels. Tables 7.a for and b. summarize data on existing upland rainfed hectarage and critical land hectarage for Central and East Java respectively according to these respective management units. These tables also present indicative figures for the total hectarage of land to be treated during the life of the project.

2.42. Each district Project Management Unit (PMU) and participating rural extension center (REC) will identify through field surveys specific expansion areas for subsequent treatment. Implementation of field activities in these expansion areas will radiate from 10 hectare demonstration farms strategically located within each expansion area. Wide variation in the pace and quality of field implementation is expected from REC to REC as well as among participating districts. In the annual plans, PMUs and POOs will need to tailor the pace of field implementation to demonstrated performance in the field.

2.43. Compared to recent data from the Citanduy Project area, the aggregate indicative targets for land treatment over the seven year life of the UAC Project seem very conservative. The project MIS and annual assessments will provide accurate data upon which to base future adjustments.

Table 7a.
Central Java Project Area Data
Rainfed Uplands, Critical Lands and Indicative Expansion Hectarage

Province	District	REC (Rural Extension Center)	Sub-District	Existing Rainfed Upland (ha)	Existing Critical Land (ha)	Indicative Expansion Under Project (ha)
Central Java				140,141	52,774	12,069
	Semarang			27,428	14,950	4,085
		Tengaran		11,839	7,255	2,399
			Tengaran	2,550	1,456	
			Susukan	1,849	548	
			Suruh	1,250	190	
			Bringin	1,757	1,757	
			Getasan	4,423	3,304	
		Tuntang Kesongo		9,292	3,865	1,203
			Tuntang	1,185	725	
			Ambarawa	1,675	612	
			Jambu	3,892	1,801	
			Sumowono	2,540	727	
		Ungaran		6,297	3,830	1,203
			Ungaran	2,224	1,765	
			Klepu	2,492	1,235	
			Bawen	1,581	830	
	Boyolali			33,037	6,389	2,100
		Karanggede		26,408	3,710	1,298
			Karanggede	2,482	317	
			Wonosgoro	7,413	1,847	
			Juwangi	7,623	244	
			Kemus (or Kemorau)	8,890	1,302	
		Simo		6,629	2,679	802
			Klego	3,414	2,114	
			Andong	3,215	565	
	Blora			46,404	10,789	1,984
		Kundurán		35,652	7,261	992
			Ngawon	14,151	1,330	
			Blora	6,659	1,687	
			Banjarejo	7,405	3,062	
			Tunjungan	7,437	1,182	

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Table 7.a

Province	District	REC (Rural Extensive Center)	Sub-District	Existing Rainfed Upland (ha)	Existing Critical Land (ha)	Indicative Expansion Under Project (ha)	
	Grobogan	Jepon		10,752	3,528	992	
			Jepon	10,752	3,528		
				33,272	20,646	3,180	
			Gubug		11,331	4,765	795
				Karangrayung	6,036	1,476	
				Kedungjati (?)	5,295	3,289	
			Kradenan		13,263	9,957	1,488
				Kradenan	4,442	3,289	
				Pulokulon	4,167	3,012	
				Gabus	4,654	3,656	
		Toroh		8,678	5,924	897	
			Toroh (Temong)	4,116	2,924		
			Geyer	4,552	3,000		

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Table 7.b
East Java Project Area Data
Rainfed Uplands, Critical Lands and Indicative Expansion Hectarage

Province	District	REC (Rural Extensive Center)	Sub-District	Existing Rainfed Upland (ha)	Existing Critical Land (ha)	Indicative Expansion Under Project (ha)	
East Java	Malang			111,508	29,544	10,887	
				63,103	10,644	3,514	
		Dampit		24,560	1,770	904	
			Dampit	7,617	655		
			Ampelgading	9,849	136		
			Sumbermanjing	7,796	979		
		Pagak		34,904	8,119	2,209	
			Pagak	7,034	2,373		
			Donomulyo	4,257	625		
			Kalipare	8,989	1,791		
			Bantur	6,712	750		
			Gedangan	7,912	2,580		
		Turen		3,639	755	401	
			Wajak	3,639	755		
		Blitar		21,846	8,299	2,610	
			Binangun		13,485	5,467	1,305
				Binangun	4,942	495	
				Wates	3,142	1,125	
				Panggungrejo	5,401	3,847	
			Kademangan		8,361	2,832	1,305
		Kademangan	4,495	2,147			
		Sutojayan	3,866	685			
Tulungagung		13,676	4,774	2,480			
	Bolorejo		2,917	1,493	795		
		Pagerwojo	877	877			
		Kauman	775	-			
		Karangrejo	340	-			
		Sendang	925	616			
	Buntaran		7,609	3,124	1,480		
		Kalidawir	869	869			
		Rejotangan	4,650	165			
		Pucanglaban	2,090	2,090			

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Table 7.b

Province	District	REC (Rural Extensive Center)	Sub-District	Existing Rainfed Upland (ha)	Existing Critical Land (ha)	Indicative Expansion Under Project (ha)
		Sukoanyar		3,150	157	197
	Trenggalek		Tanggunggunung	3,150	157	
				12,883	5,827	2,283
		Durenan		4,861	1,462	693
			Durenan	1,167	116	
			Pogalan	1,250	39	
			Watulimo	810	810	
			Trenggalek	1,189	72	
			Bendungan	443	425	
		Dongko		1,079	949	299
			Dongko	1,079	949	
		Karangan		5,301	3,149	1,291
			Karangan	1,965	720	
			Pule	2,104	2,104	
			Tugu	1,232	325	
		Kampak		1,642	267	0
			Kampak	429	178	
			Gandusari	1,213	89	

II. D. Detailed Project Description

1. Applied Research Activities

a. Introduction

2.44. During the past decade, agricultural production programs in general and agriculture research specifically have focused on rice monoculture under irrigated conditions. This focus has yielded impressive gains: total rice production doubled in the past decade. However, the almost singular attention given to wet rice production stunted advancement of non-rice crops and crops grown under non-irrigated conditions. Thus improved agricultural technologies that are available for upland areas are only first approximations.

2.45. Research is needed to improve agricultural and conservation technology for upland areas and to tailor them to the requirements of specific watersheds. The research task is to:

- improve the productivity of existing cropping patterns;
- increase farm income;
- stabilize farm income;
- design soil conservation practices appropriate for the different conditions within the target areas.

2.46. The project will provide the means to carry research recommendations to the field and provide feedback to the researchers. The research component will draw on the experiences of the Citanduy, Solo and Jogjakarta projects. This strategy (Fig. 1) includes three research phases and two extension phases after the target areas have been selected.

b. Purpose and End of Project Status

2.47. The Farming System Research component will develop technologies to increase agricultural production and promote soil and water conservation in the upland rainfed areas of Java in ways that are socially and economically acceptable.

2.48. By the end of the project, technology will be in place for increasing the production and productivity of upland farming systems (including food crops, vegetables, tree crops, forage and livestock production). Methods of soil and water conservation under various agro climatic conditions will have been developed including criteria for the use of different conservation practices using crops, forage and trees as part of these practices.

c. Relationship with the National Research Program and International Agriculture Research Centers

2.49. The Agency for Agricultural Research and Development (AARD) has the major responsibility for developing technology for the rainfed upland areas. AARD is finalizing an administrative system so that its various research components will support one another and quickly provide answers to common problems.

Figure 1
Parallel biological and socio-economic activities
required for the five distinct research and implementation phases
of a Farming Systems program

Socio-economic Research	Phases	Biological & Soil Res.
	I	
Agro-economic profile Site reconnaissance	Site selection and description Partition area (initial)	Data collection - Soil classification - Climate - Soil & water losses
	II	
Economic data collection Technology Transfer IN Farm recording	Econ. & biological potential studies Quantify problems (yrs 1-5)	Component technology Technology Transfer IN Monitor soil losses
	III	
Economic analyses of systems Farm recording	Design and test farming systems (yrs 2-5)	Redesign and test systems Component studies
	IV	
Evaluation - technologies - institutions	Test Farms Expansion Program (yrs 3-5)	Identification of production problems
	V	
Agricultural statistics	Implementation and Technology Transfer OUT	Extension feedback

2.50. The AARD Farming Systems Research Group for this project will be responsible for providing the appropriate technology for rainfed upland agriculture to all implementing units of the Departments of Agriculture and Forestry. The explicit objective is to ensure the development of effective interdisciplinary research in an environment that closely resembles the farms systems where the technologies will be used.

2.51. The Farming Systems Research component will be supported by a collaborative research arrangement between AARD and a consortium of international agriculture research centers. IRRI will be the lead agency and will coordinate the input of other interested international centers. One senior scientist will backstop the Farming System Research full-time for six years. Commodity and discipline oriented scientists will provide additional support during Years One through Five, working with AARD

counterparts for about two months each year for each commodity/discipline. Financial support for this effort will be available through an AID/IRRI Collaborative Agreement funded by the project.

d. Research Scope

2.52. Agricultural and erosion production problems identified in upper river watersheds are interrelated and require an integrated approach, including comprehensive socio-economic analysis. These activities will follow the phasing and interaction as presented in Fig. 1 and include components focused on:

- cropping systems,
- livestock,
- tree crops and silvipasture,
- socio-economic studies,
- soil and water conservation and management.

(1) Crop and Livestock Systems

2.53. Research is needed on alternate land uses including different cropping systems, animal systems and a number of combinations of both. The cropping systems component will develop cropping patterns adapted for varying agroclimatic conditions and crop management practices. Varietal selection of crops will be made including upland rice, corn, legumes, cassava, vegetables and forage grasses and legumes. Lastly, this component will establish integrated pest management using surveys and evaluation of existing management systems.

2.54. The experimental animal systems component will focus on the improvement of feeds using crop residues and year-round forage and feed supplements; the improvement of animal health, parasite control and vaccination; and reduction of young stock mortality and increase in fertility.

(2) Tree Crops and Silvipasture

2.55. Rainfed upland areas are often far from villages in steep, inaccessible areas and are planted in crops that require low inputs. Under these conditions, the productivity of the land is very low and efforts to control soil erosion are minimal. These steep slope uplands, as well as those with shallow soils, should be put under silvipasture.

2.56. Research will focus on: 1) the economic viability and carrying capacity of grass/legumes forage production for livestock adaptability, 2) management and potential production of cash crop trees, and 3) the process by which a farmer can, within a five year period, gradually change his farming practices from annual crops to mainly permanent crops.

(3) Soil and Water Conservation and Management

2.57. Initial research will be designed to evaluate different conservation practices and to develop methodologies for quantifying soil and water losses and costs for the different practices. Simultaneously, efforts will be made to monitor and evaluate soil conservation practices implemented in the Citanduy, Solo and Jogjakarta projects as well as in other areas of activity of Sub-BRLKT. In the second phase of the research program, on site research will be the key activity and will be closely linked with the UAC Project through the provincial and district Guidance Teams and the FKPP.

2.58. The goals of the research effort will be to demonstrate and evaluate different methods of conserving soil and water, develop criteria for the use of different soil and water conservation practices, and evaluate different crop, forage and tree species for effectiveness in controlling soil and water losses.

(4) Socio-economic Evaluation

2.59. Socio-economic analysis will identify the specific needs of the target areas and will provide basic social and economic data and trends. It will include the development of an agro-economic profile, compilation and analysis of production data, farm record keeping and broad based studies or surveys necessary to develop a better understanding of the social and economic characteristics of the target areas. It must estimate the rate of adoption of new/recommended practices, which is a central factor in planning the diffusion of upland technology.

e. Research Organization and Staff

2.60. These aspects of the project are covered in detail in Project Organization and Management, Section III.C.

II. D. Detailed Project Description

2. Sustainable Upland Farming Systems (SUFS) Pilot Project

a. Purpose

2.61. The purpose of the Sustainable Upland Farming Systems pilot project (SUFS) is to demonstrate and extend to farmers' fields a replicable, cost effective combination of farming and conservation practices that will be economically stable and will keep erosion within acceptable limits. More specifically, the SUFS pilot project will achieve broad technology diffusion by gaining farmer participation and by improving institutional capacities, management and delivery systems (e.g., grass nurseries; seed production and distribution; and extension methods and systems).

b. End of Project Status

2.62. By the end of the project three basic programs will have been established.

(1) Planting Material Development and Distribution

- Grass/legume nurseries. A network of ten irrigated nurseries will have been established or upgraded to distribute enough grasses and legumes to meet demand in the eight participating districts.
- Seed production and distribution. A program will be established to produce sufficient certified seed to meet demand for the primary upland food crops.
- Tree (cash crop) distribution. A program will be in place that draws on private sector nurseries to meet demand for cash crop trees (e.g., mango, clove and petai).

(2) Livestock (Small Ruminant) Development and Distribution Program

- Several village based small ruminant pilot projects will be implemented and evaluated by the end of Year 3 (IFY 87/88), which may be replicated throughout all project expansion areas.

(3) Integrated Extension Service

- Annual plans for expansion areas within each of 22 REC Work Regions (WKBPP) will be prepared and executed.
- Three or four demonstration farms per REC will demonstrate improved agriculture and soil and water conservation practices to upland farm communities.
- Community farm groups, organized in each designated expansion area, will be prepared to adopt and use ecologically sound farming practices.
- Village councils, religious institutions and other NGOs will support and advance the widescale adoption of sustainable farming system practices.
- Systematic diffusion of upland agriculture and conservation technology and associated "in kind" subsidies (planting material, fertilizers, etc.) will be carried to approximately 22,900 hectares over the life of the project.

c. SUFS Strategy

2.63. The Sustainable Upland Farming Systems pilot project (SUFS) is an experimental, innovative undertaking, designed to conceive and test the effectiveness of alternate extension organizations, field delivery systems and support services. These alternate systems must be replicable over time in the context of larger national programs, particularly the GOI's National Regreening Program and the National Agriculture Extension Program. If the SUFS is to fulfill its mandate as an experimental "field laboratory" for ongoing national programs, it must be given flexibility and independence from the rules and regulations presently governing various upland agriculture and conservation efforts of the government. During project design the GOI, USAID and IBRD have agreed on this central concept. The GOI will issue appropriate instructions, acceptable to the Bank and AID, to identify the Upland Agriculture and Conservation Project generally, and the SUFS component specifically, as an experimental effort. Within this context, the GOI will issue the necessary instructions granting project authorities the management and budgetary flexibility required to execute an experimental program.

2.64. The SUFS component incorporates several important modifications that distinguish it from existing upland agriculture and conservation efforts. These strategic design considerations are summarized below.

2.65. First, the SUFS component will be planned and implemented in a decentralized and integrated manner. At present the national Regreening Program is planned by respective Sub-BRLKT and implemented by district governments. As noted in the Administrative Analysis Annex 1.D, this separation of responsibility for planning and implementation inevitably leads to disputes and contributes to poor performance. Under the SUFS, responsibility for planning and implementation will be with the respective district government Project Managers who supervise the four responsible technical services, i.e., the Soil Conservation Service, the Agricultural Service, the Livestock Service and the Estate Crops Service. The Inpres Dati I budget will be dispersed by the respective Project Managers to each of the participating services according to their jointly developed annual plan.

2.66. Field planning and implementation will be unified and integrated at the rural extension center (REC) level. The annual plan for each participating district, as outlined above, will be a composite of the annual demonstration and expansion program drawn up by the staff of each participating REC with the assistance of subject matter specialists (PPSs) for food crop agronomy, livestock, estate crops and soil conservation. All extension personnel assigned to the project will report directly to the respective supervisors of each REC.

2.67. Extension personnel assigned to each REC will be deployed to serve identified expansion areas (see site selection process described

below). Each expansion area will have one ten hectare demonstration farm to which will be assigned one extension supervisor (PEM) and five extension agents (PPL/PLP). This staff will be responsible for extending appropriate farming and conservation practices throughout the expansion area served by their respective demonstration farms.

2.68. A second important feature is the careful selection of expansion areas. The potential areas requiring treatment are vast, and the availability of trained manpower and financial resources is limited. Therefore, it is imperative that expansion areas be selected carefully to insure the maximum impact and most efficient allocation of resources. To this end, technical and agro-economic surveys will be carried out annually in each participating district to identify potential expansion areas one full year prior to establishing demonstration farms and commencing extension operations. The site selection process will follow a three step process. First, potential expansion areas will be identified according to the technical criteria outlined in para 2.37. Following this, an agro-economic survey will be carried out to determine potential agro-economic constraints that may influence the type of treatment to be introduced. Finally, meetings between project officials and farmers in the potential expansion areas will be held to gauge the degree of farmers' interest in joining the program. If interest is shown, they will be requested to organize themselves into a group and formally request inclusion in the project. REC and district level project staff, based on an analysis of the composite technical, agro-economic and participation data, will then select the areas to be included in the following fiscal year's program.

2.69. A third strategic consideration is the development of high quality planting material. A universal constraint limiting all upland agriculture programs at present is the scarcity of good planting material. Although improved productivity through use of good plant stock has been demonstrated, inadequate attention has been given to the development of nursery capacity and seed production and processing facilities. Consequently, the first priority of the SUFS project will be to establish the capacity to produce the required planting material. New expansion areas and supporting demonstration farms will not be established until the supply of planting material is assured.

2.70. A fourth concept relates to the subsidy policy to be applied and tested by the project. The SUFS will: (1) discontinue payments for terrace construction, reflecting farmers' willingness to adopt recommended practices at a lower level of subsidization than presently provided; (2) introduce a uniform subsidy for both demonstration farms and surrounding expansion areas and (3) authorize Project Managers in each district to vary the level, content and duration of subsidies, based on local conditions, the technology involved and farmer requirements. The project has been budgeted on the assumption that the average period of subsidy will be two years.

2.71. A fifth concept to be tested in the project area, although not directly financed by the project, is a program to replace direct subsidies after two years with a general household, non-subsidized line of credit that will be made available by BRI or other appropriate lending institutions, through a system of "village posts" established in all project expansion areas. Financing and technical assistance for this credit program will be made available under the AID financed Financial Institutions Development Project. The village post concept is presented in Working Paper 3.a. (see Annex 9).

2.72. A final concept is linkages. District officials and technical agencies must link component project activities to the SUFS pilot project extension effort. The establishment of field level working linkages between the SUFS and the AARD research effort will be particularly important. Linking the SUFS and the conservation access road component is essential, as are linkages with responsible marketing agents (e.g. cooperatives as well as the private sector), BRI credit officers, village officials and the extension service.

2.73. These five points should be viewed as an initial strategic framework for the project rather than a predetermined and unchangeable development policy. As project managers at all levels gain on-the-ground experience, this strategy is expected to be modified and improved.

d. Component Elements

(1) Planting Material Development and Distribution

2.74. The development of adequate supplies of grasses/legumes, food crop seed stocks and cash tree crop seedlings is central to achieving both the conservation and the agricultural objectives of the project.

(a) Grass/Legume Nurseries

2.75. A network of ten nurseries (at least one per district) will be established under government auspices to manage the continuous production and distribution of large volumes of grasses/legumes for use in stabilizing terraces or in the introduction of silvipasture on steep slopes.

2.76. The nurseries will be established on at least 3 hectares of fertile irrigated land purchased and developed by the government. Irrigation is essential since grasses must be propagated during the dry season for distribution to upland farmers at the on-set of the rainy season. Each nursery will be located on a main road as close to the general target area in each district as possible.

2.77. A permanent work force of laborers for each 3 hectare nursery will be hired to maintain and prepare plant seedlings for

demonstration farms and expansion areas. A PPL will be assigned to each nursery on a full-time basis and will be responsible for nursery management. The pulling of grass seedlings must be synchronized with the farmers' planting time. Planting materials must be handled properly to insure their survival. The PPS for soil conservation in each participating district will be responsible for coordinating nursery operations with the demonstration farm and expansion program activities.

2.78. Basic facilities and equipment for the nursery will include a storage shed, equipment such as sprayers, tools, water pumps and space for an office for the PPL manager. A four-wheel drive pickup truck will be provided for grass delivery to demonstration farms and expansion sites.

2.79. One nursery per district will be established during the initial project year in districts Boyolali and Semarang in Central Java and Malang and Blitar in East Java. The balance of the nurseries will be established in the remaining four districts when they join the project at a later date. Table 8 presents an indicative schedule for the establishment of nurseries under the project.

Table 8
Nursery Development Schedule

IFY	84/85	85/86	87/88	88/89	89/90	90/91	91/92	Total
Project Year	0	1	2	3	4	5	6	
<u>Initial</u>								
<u>SUFS Distr.</u>	# ha.		# ha.	# ha.				
Semarang	1 (3 ha)			1 (3 ha)				
Boyolali	1 (3 ha)							
Malang	1 (3 ha)			1 (3 ha)				
Blitar	1 (3 ha)							
<u>Sub-total</u>	4 (12 ha)			2 (6 ha)				6 (18 ha)
<u>Follow-on</u>								
<u>SUFS Distr.</u>								
Blora			1 (3 ha)					
Grobogan			1 (3 ha)					
Tulungagung			1 (3 ha)					
Trenggalek			1 (3 ha)					
<u>Sub-total</u>			4 (12 ha)					4 (12 ha)
TOTAL	4 (12 ha)		4 (12 ha)	2 (6 ha)				10 (30 ha)

Table 9
Indicative 3 ha Nursery Budget
(Rp.000)

<u>Capital Cost:</u>	
Irrigated land purchase (3 ha @ Rp.4,000,000)	Rp. 12,000
Grass seedlings (40,000 pulls/ha @ Rp.3/pull x 3 ha)	Rp. 360
Tools	Rp. 200
Pickup truck (four wheel drive)	Rp. 12,000
Water Pump	Rp. 1,000
Pesticide Sprayer	Rp. 170
Shed	Rp. 400
Office furniture	Rp. 400
<u>TOTAL CAPITAL COSTS:</u>	Rp. 26,530
<u>Annual Operating Cost (3 ha nursery)</u>	
Grass/legumes seedlings	Rp. 100
Fertilizers (3 applications/year/ha of 100 kg Urea, 50 kg TSP and 50 kg KCl @ Rp.90/kg x 3 ha)	Rp. 162
Pesticides	Rp. 25
Tools	Rp. 200
Fuel and maintenance for truck and water pump	Rp. 4,500
Laborers' salaries (2 full-time men/ha @ Rp.1,000/day and 6 days/week for a total of 312 days/year x 3 ha)	Rp. 1,872
Driver's salary (full-time @ Rp.35,000/month)	Rp. 420
Miscellaneous	Rp. 500
<u>ANNUAL OPERATING COSTS:</u>	Rp. 7,779

(b) Upland Food Crop Seeds

2.80. In 1982, the GOI and IBRD initiated the Seeds II Project (Loan 2066 IND) to supply sufficient processed seeds from the National Seed Cooperation (NSC), P.T. Pertani and participating cooperatives to meet 40% (25,000 tons) of the 1988 BIMAS/INMAS market for wetland rice seed and 20% for upland crops (11,400 tons) and dryland rice (750 tons) in 13 provinces. In every participating provinces, the project supports improved and expanded breeder seed storage, seed production supervision, upgrading of rice and upland crop seed farms to produce foundation seed, an expanded program of private contract growers to produce extension seed stock, 18 medium sized seed processing centers for the National Seed Corporation and P.T. Pertani and six small seed processing centers for cooperatives.

2.81. During IBRD/GOI negotiations, considerable discussion focused on the appropriate roles of the National Seed Corporation, cooperatives and the private sector. The National Seed Corporation (NSC) has a documented history of inefficient operation of mechanized seed farm production. Therefore the GOI and IBRD agreed that a long-term objective of the government's seed program should be to enhance the role of the private sector in seed processing. Nevertheless, both sides concluded that no private firm (a) would be likely soon to take the risk inherent in pioneering seed processing particularly for upland crops or (b) had the size and expertise to organize contract growers to multiply stock seed into extension seed, process the seed and supply the large insular markets of Indonesia. As a result, the project has focused on developing NSC's seed processing capability as well as establishing, on a pilot basis, small, cooperative (KUD) seed processing centers, based in six sub-districts. These centers would then contract with private producers for extension seed.

2.82. This strategy, with its emphasis on organizing private contract growers as opposed to state run seed farms, represents a first important step toward defining a greater role for the private sector in the seed industry. The GOI also agreed to gradually increase seed prices so that by 1988 NSC revenue will cover all costs, including a 10% return on investment. The UAC Project seed production and distribution activities have been formulated in the context of this larger GOI program and policy environment.

2.83. To meet the limited demand for extension quality seed stock in the early years of the project (see Table 10), project officials will work closely with provincial authorities and representatives of the NSC to purchase seed stock directly from provincial seed farms (PSF) in both East and Central Java. However, given the present limited production of foundation, stock and extension seed for upland crops at the provincial seed farms, delays in implementation of the GOI/IBRD Seeds II Project and the uncertainty regarding the role of the cooperatives and the private sector in the seed industry, the project will finance technical assistance and commission two studies specific to the general project area. The first study will focus on seed marketing and distribution and the second on the potential role of private and cooperative sectors in seed production and processing (see Working Paper 4, Seed Study Terms of Reference). These studies will complement national surveys being undertaken in the context of the Seeds II Project. The studies will be initiated during IFY 84/85 (Project Year 0) as a key priority of the project authorities. The results of these studies will guide the investment strategy for developing the seed industry in both provinces.

2.84. Should it be determined that the project cannot purchase sufficient extension grade seed stock to meet project requirements from existing sources, special consideration will be made during IFY 84/85 to finance a pilot seed production and processing project in conjunction with the Ministry of Cooperatives.

Table 10
SUFS Extension Seed Requirements
(Tons)

Project Yr.	0	1	2	3	4	5	6	Total
Type	84/85	85/86	86/87	87/88	88/89	89/90	90/91	
Maize	4.4	39.8	63.0	104.0	122.0	122.0		455.2
Soybeans	9.9	89.6	142.0	235.0	275.0	275.0		1,026.5
Peanut	15.4	139.0	221.0	365.0	428.0	428.0		1,596.4
Total	29.7	268.4	426.0	704.0	825.0	825.0		3,078.1

(c) Tree Crop Seedlings

2.85. SUFS will provide free tree seedlings to farmers who are willing to put their land under permanent vegetation or follow the project recommendations for soil and water conservation. Seedlings will be produced by existing, privately owned nurseries in the project area under contract to the project. Most of the cash crop trees adapted to the area are usually available in local private nurseries. When improved tree seeds are available through AARD, nursery contractors will be supplied with the improved seed stock and specific management recommendations from appropriate AARD staff.

2.86. The Estate Crop PPS, in cooperation with the PPMs at the RECs and PPMs at the demonstration farms, will be responsible for management of this component of the SUFS pilot project.

(2) Demonstration Farm and Expansion Program

(a) Demonstration Farms

2.87. Demonstration farms will be the principal tool for technology demonstration and dissemination under the SUFS pilot project. Two types of upland technology will be demonstrated initially. On lands with slopes below 50% and soil depth of at least 50 cm, bench terraces with grasses planted on terrace lips and risers will be established to stabilize the soil. When soil depth is not adequate or slopes are over 50%, grass strips, lamtoro (Leucaena leucocephala), gliricidia (Gliricidia sepium or G. maculata) or other appropriate legumes and trees/shrubs will be close planted on the contours to form a barrier to soil erosion if the land is to be used for food crop production.

Marginal lands or lands with low productivity and high erosion risk may be planted to silvipasture with cash crop trees and forage grass/legumes for livestock feed. On steep and marginal lands, efforts will be made to help farmers change from annual food crop production to permanent or mostly permanent vegetative cover.

2.88. Demonstration farms will show farmers the benefits and costs of practises such as:

- the most appropriate way to maintain a stable farming system for a given site, taking into consideration the soil type, depth, texture, topography, land use and climatic conditions.

- the most appropriate conservation measures (i.e. vegetative stabilization of terrace risers, contour strips or silvipasture) to insure maximum protection against soil erosion.

- the advantage of using improved seed, optimum plant densities, optimum use of inputs and proper soil management.

- the care of livestock, where applicable; the use of forage produced by the vegetative stabilization program; the use of farm by products and the optimum livestock carrying capacity for specific farming systems.

- the role and income potential of tree crops such as clove, petai, coffee and fruit as part of the upland farming system, particularly on slopes greater than 50% or on sites where the soils are too shallow to allow construction of bench terraces. Proven techniques such as pruning, fertilizing and pest control will be demonstrated to farmers who already own productive trees.

(b) Expansion Program

2.89. The expansion rate of the Citanduy Watershed Project averaged 85 ha/DF/yr. This was accomplished despite serious start-up problems and dispersed management. We expect a faster rate to be achieved in UAC Project. Given the aggregate target of approximately 23,000 hectares of critical land for treatment, 72 demonstration farms will be needed by the end of the project. The aggregate hectarage of land projected for treatment under the project may be conservative. The rate can be expected to accelerate as project managers and extension agents gain experience and the surrounding communities become aware of the project. Data from Citanduy of recent activities indicate a faster rate of expansion should be expected for the UAC Project. Also, the Citanduy expansion program subsidies are Rp. 200,000/ha. The Rp. 300,000/ha proposed for "in kind" subsidies to expansion areas under the SUFS should encourage farmers to participate more readily since their risks are greatly reduced.

2.90. Table 11 presents an indicative annual schedule for the establishment of these demonstration farms. Table 12 presents an illustrative schedule, for planning and budgetary purposes, of the 22,900 ha to be treated by expansion of the SUFS project. These 22,900 ha represents 28% of the 82,318 ha of identified critical land in the eight participating districts.

(3) Upland Agriculture and Conservation Subsidies

2.91. Farmer adoption of the improved farming systems technology advanced by this project requires incremental inputs of labor, fertilizer, pesticides, planting material and livestock. Financing to purchase these inputs can be drawn from three potential sources: the farm family's "own" account, subsidies or credit made available through either public or private channels.

(a) "Own" Account Financing

2.92. It is unlikely, at least in the initial years of the project, that economically marginal families will be prepared to voluntarily invest their limited savings in what is to them new and untested technology. However, as the non-credit technical guidance programs (INMAS and INSUS) have demonstrated, farm families will use their discretionary income to purchase productivity and income increasing inputs when they are confident that the technology is sound and the prospects of higher yields outweigh the risks. Other sources of financing must be developed to initiate technology diffusion and to carry the farm family until it has accumulated sufficient cash surplus to finance inputs. The initial coordinated program of subsidies will be replaced by non-subsidized commercial credit to meet recurrent cost requirements. One source of credit will be the USAID supported Financial Institutions Development Project, which serves the UAC Project areas.

(b) Subsidies

2.92. The GOI will provide direct subsidies for the initial two years of participation in the program. As a condition for joining the program, participating farmers will be required to undertake, at their own expense and labor, substantial earth moving to establish bench terraces or other mechanical conservation measures recommended by the project. In addition, participating farmers will introduce a range of vegetative conservation measures such as planting appropriate grasses, legumes, tree crops and silvipasture on steep slopes. Since these mechanical and vegetative conservation measures also reduce sedimentation, flooding and damage to estuaries, the upland farmer actually is subsidizing the lowland population that captures off-site benefits. This is reasonable justification for the subsidy package.

Table 11
Demonstration Farm Development Schedule

Indonesian FY	84/85	85/86	86/87	87/88	88/89	89/90	90/91	Total	# ha
Project Year	0	1	2	3	4	5	6	DF	Treated
EAST JAVA									
Malang		3	5					8	3,514
REC Dampit		1	1					2	904
REC Pagak		2	3					5	2,209
REC Turen			1					1	401
Blitar		2	4					6	2,610
REC Binangun		1	2					3	1,305
REC Kademangan		1	2					3	1,305
Tulungagung				5	5			10	2,480
REC Bolorejo				2	3			5	795
REC Buntaran				3	1			4	1,488
REC Sukoanyar					1			1	197
Trenggalek				5	4			9	2,283
REC Lurenan				1	2			3	693
REC Dongko				1				1	299
REC Karang				3	2			5	1,291
REC Kampak									
Sub-total		5	9	10	9			33	10,887
CENTRAL JAVA									
Semarang		4	4	2	3			13	4,085
REC Tengaran		2	2		3			7	2,399
REC Tuntang K.		1	1	1				3	1,203
REC Ungaran		1	1	1				3	1,203
Boyolali		1	3		2			6	2,100
REC Karanggede		1	1		2			4	1,298
REC Simo			2					2	802
Grobogan				8	4			12	3,180
REC Gubug				2	1			3	795
REC Kradenan				3	3			6	1,488
REC Toroh				3				3	897
Flora				4	4			8	1,984
REC Kunduran				2	2			4	992
REC Jepon				2	2			4	992
Sub Total		5	7	14	13			39	12,069
TOTAL DF		10	16	24	22			72	22,956

Table 12
Projected Expansion Hectarage Under the SUFS
Pilot Project

IFY	1984/85	85/86	86/87	87/88	88/89	89/90	90/91	TOTAL
Project Year	0	1	2	3	4	5	6	
<u>D1</u>		100						100
<u>E 12</u>		(10 DF)	850					950
<u>E 13</u>				1020				1970
<u>E 14</u>					1020			2990
<u>E 15</u>						1020		4010
<u>E 16</u>							1020	<u>5030</u>
<u>D.2</u>			160					160
<u>E 23</u>			(16 DF)	1360				1520
<u>E 24</u>					1632			3152
<u>E 25</u>						1632		4784
<u>E 26</u>							1632	<u>6416</u>
<u>D3</u>				240				240
<u>E 34</u>				(24 DF)	2040			2280
<u>E 35</u>						2448		4728
<u>E 36</u>							2448	<u>6416</u>
<u>D4</u>					220			220
<u>E 45</u>					(22 DF)	1870		2090
<u>E 46</u>							2244	<u>4334</u>
Total Ha.		100	1010	2620	4912	6970	7344	22956

D 1 = Demonstration farm (DF) established in Project Year 1.

E 12 = Expansion area in Year 2 from demonstration farm established during year 1.

2.93. Second, as a result of the introduction of mechanical conservation measures, farmers will be required to give up valuable crop land to allow for the construction of public waterways and terraces (typically 30% of total land area). Participating farmers may also experience substantial initial production declines after construction of the recommended mechanical conservation measures due to top soil disturbance. Thus, some form of subsidy is needed to off-set both the permanent real loss (i.e., land) as well as short-term loss in productivity.

2.94. Third, the mechanical and vegetative conservation measures and improved farming system technology is beyond the ability of low income, risk adverse farmers to finance.

2.95. For these reasons the project will finance for twenty-four months a composite subsidy package for each participating farm family. This will permit farmers to accumulate sufficient capital to operate both from their own resources and from those available on commercial terms through the banking system and private sector. Subsidies will be set at the minimum level required to obtain adoption. Consequently, the subsidy package will be under constant review with an eye to reducing the level of subsidy while maintaining acceptable rates of technology diffusion.

(4) Proposed Project Subsidies

2.96. Experience from the Jogjakarta and Citanduy Projects, although still limited, suggests that the subsidy for construction of bench terraces can be reduced without jeopardizing the rate of technology diffusion. Based on field observation by a number of independent observers, two adjustments in the subsidy package are recommended: discontinuance of direct payment for terrace construction at demonstration farms and the introduction of a uniform subsidy for both demonstration farms and the surrounding expansion areas. The recommended two year subsidy package is shown on Table 13.

2.97. Adherence to certain criteria will be required. Farmers in a contiguous watershed area must organize themselves into a farmer group and formally request government support. If accepted, the group must, in the case of the bench terrace model, collectively undertake construction of the proposed mechanical conservation measures under the guidance of a qualified technician. The farmer group will be provided the necessary construction material and grasses to build the required terraces and waterways. After completion of the physical construction, the participating farmers will receive grasses to plant on the terrace risers to stabilize the soil. Following this initial activity, farmers will be provided with inputs (seed, fertilizer and pesticide) for the initial year's production. During the second year farmers will receive the second subsidy. The specific inputs to be financed will be jointly determined by the participating farmer groups and the REC extension teams.

2.98. This two year multiple input subsidy is considered the minimum necessary to insure adoption of conservation and productivity increasing practices. The specific inputs shown on Table 13 are indicative only; they will vary widely from area to area and project officials will have the authority to "fine tune" the subsidy package to insure that it is appropriate to farmers' needs. While it is anticipated that the subsidy program can be terminated after two years, this decision can only be based on the results of implementation. If project authorities and AID determine that the subsidy should be extended for a longer period financing provided under the project can be used for this purpose.

2.99. Based on the projected expansion rate presented in Table 12 and the per hectare cost presented in Table 13; the aggregate SUFS subsidy budget by project year is presented in Table 14.

(5) SUFS Technical and Extension Staff Requirements

2.100 Table 15 presents the existing complement of technical/managerial and extension staff of the four technical services responsible for the implementation of the SUFS pilot project. This staff, currently totalling 1,295 personnel, is responsible for the technical management of all ongoing programs sponsored by these line agencies throughout the 176 sub-districts of the eight target districts.

2.101 An estimated 474 managerial, technical and extension personnel from these four participating agencies will be required if the project target for land treatment is to be achieved. Table 16 presents the personnel requirements according to occupational specialization, agency affiliation and year when the respective personnel are expected to join the SUFS pilot project.

2.102 During project design the GOI stated its intention to reassign or recruit new personnel to meet the full-time SUFS pilot project staff requirements, as outlined above and in Table 16.

2.103 Table 17 presents the allocation of the total SUFS staff according to the requirements of each participating district.

II. D. Detailed Project Description

3. Access to Credit

2.104 The availability of credit is central to the large scale, sustained diffusion of productivity and conservation increasing technology. It is unreasonable and inappropriate to expect the government to perpetually subsidize the uplands. Therefore, a prerequisite for sustained diffusion of farming system technology is of a financially viable credit program to meet the recurrent needs of upland farm communities. (Working Paper 3a, Kupedes/Village Post Credit Proposal is an analysis of present institutionalized credit lending in the project areas of East and Central Java and gives the general rational and design of the village post concept.)

Table 13
Subsidy Budget for SUFS Demonstration Farms & Expansion Areas
(Rupiahs)

	Bench Terrace Slope 50%	Silvipasture Slope 50%
	Rp/ha	Rp/ha
<u>Year I</u>		
Grasses/legumes	30,000	90,000
Waterway construction	70,000	
Seedlings (trees)		50,000
<u>1st crop input</u>		
Seeds	59,000	
Fertilizers (50 kg urea, 100 kg TSP & 50 kg KCL)	18,000	
Pesticide	8,000	
	(85,000)	
<u>2nd crop input</u>		
Seeds	39,000	
Fertilizers (50 kg urea, 100 kg TSP & 50 kg KCL)	18,000	
Pesticides	8,000	
	(65,000)	
<u>Year II</u>		
Variable subsidy for Bench Terrace model and small ruminants (10/ha) for silvipasture model	50,000	160,000
Total 2 year subsidy	300,000 =====	300,000 =====

2.105 The project will not have a discrete credit component but will work with the lead agency--i.e., the Ministry of Home Affairs, and with various financial institutions to devise effective credit programs to support the Sustained Uplands Farming Systems component. The Financial Institutions Development Project (FID) supported by AID, already has targetted technical assistance to Bank Kredit Kecamatan of the Bank Pembangunan Daerah, a provincial bank in Central Java, thus covering one watershed area.

Table 14
SUFS Demonstration Farm and Expansion Program Subsidy Budget
(Rps millions)

IFY	84/85	85/86	86/87	87/88	88/89	89/90	90/91	
Project Yr.	0	1	2	3	4	5	6	Total
Planting material	10	99	257	481	683	720		2250
1st Yr DF/ Exp. area Subsidy		12	123	320	599	850	896	2250
2nd Yr DF/ Exp. area Subsidy			8	81	210	393	558	1249
TOTAL	10	111	388	882	1492	1963	1454	6299

Assumptions: plant material Rp.98,000/ha budgeted 1 year prior to implement. Construction waterways + fertilizer + pesticides Rp.122,000/ha budgeted the same year as implemented. Rp.80,000/ha budgeted 1 year after implementation for inputs to support appropriate individual farming systems, e.g., tree crops, livestock.

2.106 In the early phase of implementation, FID will explore the potential for assisting Bank Rakyat Indonesia's (BRI) planned expansion of the Kupedes program into the project areas using the "village post" concept. FID assistance to BRI probably will be limited to technical assistance and some essential equipment. TA will support the development of proper phasing, procedures and accounting practices as the Kupedes program expands to the uplands. TA will be channeled through the Ministry of Home Affairs, which is also the prime implementing agency of FID, and will pay attention to the unique problems of the upland areas as one of its key elements.

Table 15
Existing Agricultural and Soil Conservation Staff
in SUFS Districts

	Food <u>1/</u> Crop Service	Live- <u>2/</u> stock Service	Estate <u>3/</u> Crops Service	Soil <u>4/</u> Conservation Service*	Total
<u>East Java</u>					
Malang	105	32	48	48	233
Blitar	63	16	20	35	134
Tulungagung	59	19	13	19	110
Trenggalek	60	11	12	22	105
Subtotal	287	78	93	124	582
<u>Central Java</u>					
Semarang	84	31	26	32	173
Boyolali	75	36	7	39	157
Grobogan	140	23	7	34	204
Blora	126	24	8	21	179
Subtotal	425	114	48	126	713
Total	712	192	141	250	1,295

- 1/ Includes PPS, PPM and PPL. Data from Directorate of Extension, DG Food Crops.
- 2/ Includes PPS, PPM and PPL.
- 3/ Includes midlevel supervisor field extension worker from MOF (PMP) and field extension worker (PLP) demplots, PLP regreening and field extension worker for checkdams (PLDP).
- 4/ Administrative and technical staff.
- * Balai and Sub-Balai Konservasi Tanah (BKT)

II. D. Detailed Project Description

4. Human Resources Development

a. Purpose and End of Project Status

(1) Purpose

2.107 The Human Resources Development component will orient Government of Indonesia personnel in the Ministry of Home Affairs, the Ministry of Agriculture and the Ministry of Forestry toward dealing with the serious production and conservation problems in the uplands. The project will:

Table 16
SUFS Pilot Project Staff Requirements

IFY Project Year	84/85	85/86	86/87	87/88	88/89	89/90	90/91	Total
<u>Initial SUFS District</u>								
PPS Food Crops Agro- nomy (MOA)	4							4
PPS Livestock (MOA)	4							4
PPS Est. Crops (MOA)	4							4
PPS Soil Conserv. (MOF) - REC Mgt./Ext. Staff	4							4
PPM Exten. Mgr. (MOA)	10	16	2	5				33
PPL/PLP Extension Agents (MOA)	50	80	10	25				165
PPL Nursery Mgt. (MOA)	4							4
Sub-total Initial SUFS	80	96	12	30				218
<u>Follow-on SUFS Distr.</u>								
PPS Food Crops Agro- nomy (MOA)			4					4
PPS Livestock (MOA)			4					4
PPS Estate Crops (MOA)			4					4
PPS Soil Conserv. (MOA) - REC Mgt./Ext. Staff			4					4
PPM/PLP Ext. Mgr. (MOA)			22	17				39
PPL/PLP Extension Agents (MOA)			110	85				195
PPL Nursery Mgt. (MOA)			4	2				6
Sub-total Follow-on			152	104				256
TOTAL SUFS Staff Req.	80	96	164	134				474

Table 17
SUFS Pilot Project Staff Requirement
per District and REC

Indonesian FY	84/85			85/86			86/87			87/88			88/89			89/90			90/91			TOTAL
Project Year	0			1			2			3			4			5			6			
	PPS	PPM	PPL	PPS	PPM	PPL	PPS	PPM	PPL	PPS	PPM	PPL	PPS	PPM	PPL	PPS	PPM	PPL	PPS	PPM	PPL	
EAST JAVA																						
Dist. Malang	4	3	16*	5	25							1*										54
REC Dampit		1	5	1	5																	
REC Pagak		2	10	3	15																	
REC Turen				1	5																	
Dist. Blitar	4	3	11*	4	20																	41
REC Binangun		1	5	2	10																	
REC Kademangan		1	5	2	10																	
Dist. Tulungagung							4	5	26*	5	25											65
REC Balerejo							2	10		1	5											
REC Buntaran							3	15		3	15											
REC Sukoanyar										1	15											
Dist. Trenggalek							4	5	26*	4	20											59
REC Durenan							1	5		2	10											
REC Dongko							1	5														
REC Karang							3	15		2	10											
REC Kampak																						
Sub-total	8	5	27	9	45		8	10	52	9	46											219
CENTRAL JAVA																						
Dist. Semarang	4	4	21*	4	20		2	10		3	16*											84
REC Tenganan		2	10	2	10					3	16											
REC Tuntang		1	5	1	5			1	5													
REC Ungaran		1	5	1	5			1	5													
Dist. Boyolali	4	1	6*	3	15					2	10											41
REC Karanggede		1	5	1	5					2	10											
REC Simo				2	10																	
Dist. Grobogan							4	8	41*	4	20											77
REC Gubug							2	10		1	5											
REC Kradenan							3	15		3	15											
REC Toroh							3	15														
Dist. Blora							4	4	21*	4	20											53
REC Kunduran							2	10		2	10											
REC Jepon							2	10		2	10											
Sub-total	8	5	27	7	35		8	14	72	13	66											255
TOTAL	16	10	54	16	80		16	24	124	22	112											474

* including PPL Nursery

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- inform farmers and community leaders about the government's programs and encourage them to participate in solving their own problems;

- provide specific technical skills training to government personnel and farmers;

- provide decision makers at all levels with opportunities to learn how others are dealing with similar problems.

(2) End of Project Status

2.108 The project will provide skills training in agricultural techniques, planning, management, motivation and communication to more than 600 government employees and 2000 farmers. Key individuals who influence national policy will be provided opportunities to interact with experts and foreign peers who deal with problems similar to those found in Indonesian watersheds. By Year 6, sixteen outstanding personnel associated with the project will have been trained abroad to the M.S. level, forty PPLs will have received diplomas in upland farming extension and soil conservation and twenty leading project personnel will have been trained to the M.S. level at Indonesian universities, focusing on upland management and farming systems.

b. Components

(1) Farmer and Community Leader Training and Motivation

2.109 In the final analysis, farmers and their communities will determine the success of the project. Training will be focused on key farmers who will act as models and give accurate information to other farmers and provide feedback for the project. The key farmer, not the extension agent, should be the main interface between the project and the target group.

2.110 Training will include workshops to facilitate understanding of the project and its procedures, technical training at demonstration farms and RECs and in-country tours to see improved practices.

(2) Extension Agent Training

2.111 The extension agent is the first technical level of government interaction. All extension agents (PPL and PLP) will work out of the rural extension centers and be backstopped by the Agricultural Services at the district level and by Sub-BRLKT. They will interact with farmers by providing information on programs and farming techniques and by helping them participate in government programs; and the extension agents will provide reports and data to the management information system.

2.112 Training will place strong emphasis on knowledge of rainfed crops and animals. A ratio of 70% field training to 30% classroom activity is acceptable. Training that provides practical, hands-on experience will be devised, such as each trainee assembling his own training manual and making his own communication aids. Every effort will be made to have the extension agent maintain his own farm plot.

2.113 One hundred and ninety-five PPLs/PLPs will be phased into the project by March 1987; an additional 145 will be phased in by March 1989. It will be necessary for the GOI to recruit and train more than 400 extension agents during the project to allow for long-term training, attrition and surplus cadre for expansion during Phase II.

(3) Extension Supervisors (PPM) Training

2.114 The extension supervisor, located at the rural extension center, functions as planner, manager, technician, and trainer. He is responsible for the personnel, program and facilities in the REC work area. Usually he is a person with broad knowledge of agriculture who has come up from the ranks and is an experienced, proven performer.

2.115 The supervisor's performance will be critical to project success and expansion. There will be 72 extension supervisors in place when the project is completed and more will be needed for further expansion. The government must train 115 to 130 extension supervisors within this project to provide for personnel attrition and for initial expansion during Phase II.

(4) Subject Matter Specialists (PPS) Training

2.116 The PPS is located at the district level. Specialist are university trained backstops for the generalists working at the RECs and in the field. As the professional link between the researcher and the extensionist, they assist farmers directly and train PPLs, PLPs and key farmers.

2.117 The PPS's training will be focused on upgrading technical skills and keeping abreast of new developments. Great stress will be placed on how each area of specialization can contribute to the farming systems approach. Additionally, he will receive training as a trainer.

(5) Planning, Management, Administrative Staff Training

2.118 The Upland Agriculture and Conservation Project will place a heavy emphasis on management. The process of developing management skills can be greatly accelerated with practical training, provision of simple "tools", and instruction in techniques. Workshops will deal with the actual needs of the project in a learning-by-doing method.

2.119 There are 46 full-time project positions in the planning, management and administrative classification. Provincial and local government officials and technical services personnel must be included in this training segment, even though not assigned to the project.

c. Methodology

2.120 The project's training effort will use existing facilities, experienced staff and trainers and on-going programs (e.g., NAEP's training and visitation procedure), bolstering these elements as required.

2.121 Training for the project staff will begin immediately in the on-going programs at the BLPPs, at the Soil and Water Conservation Centers, and at the National Agriculture Training Center (Ciawi). This training will run concurrent with planning and assessment activities during the initial project year.

2.122 During Year 0 (IFY 84/85), an assessment will be made of skills needed for the project. A personnel management system now being developed in the Citanduy II Project, will be established to maintain up-to-date information on individuals' experience and training.

2.123 Project funds for training will be provided through Inpres Dati I and managed by the training component manager housed within the national Executive Secretariat. Additional funds for training will be included in the Farming Systems Research component of the project.

2.124 In some instances, the GOI will need to double encumber (assign two people to one position) to provide for long-term training.

d. Purposes and Methodologies for Training

2.125 Below are a list of the general aims of the training program and the means to achieve them. Specific training measures are found in Working Paper 5, Training Concepts.

2.126 The training program should broaden farmers' and project staff's understanding of upland agriculture and conservation problems and the methods being used to deal with them. A program of workshops, newsletters, study tours and demonstration visits will be concentrated in project expansion areas.

2.127 Key farmers and the project staff will be given technical training in agriculture and soil conservation, especially related to rainfed agriculture and conservation, ranging from theory to practical field exercises.

2.128 Key farmers and project staff will be taught how to transfer knowledge to others in an annual intensive (3-4 days) course.

2.129 Training for mid-level and upper management staff will focus on planning, implementation and evaluation.

2.130 Project staff will be taught how to manage: a) their own time, b) other personnel, c) resources and d) budgets and financial flows. Specialized training tailored to the needs of different levels of project management will be carried out. Workshops, guided by experts, will define and institutionalize position responsibilities, management organization and procedures, and protocols for implementation and communication.

2.131 District level PMU managers and upper echelon management, i.e., provincial and national, will be given policy guidance for the project and training to improve their analytical and planning capability in anticipation of an expanded national program. Special training courses, study tours, and workshops in Indonesia and abroad will be arranged.

e. Organization and Staffing

2.132 The Project Training Officer, assisted by the Training Advisor and others, will be responsible for planning, managing, coordinating and evaluating all the Human Resources Development component activities. The Project Training Officer will be one of the permanent staff of the Executive Secretariat (ExSec) located in Jakarta.

2.133 He will work closely with BPLPP and its units, the Directorate General for Land Rehabilitation and Conservation and the Technical Services of the Ministry of Agriculture, which have on-going programs and facilities suitable for the project. The Project Training Officer will decide how and by whom the training can best be carried out.

2.134 Prior to initiating training, the annual training plan must be approved in writing by USAID. The expectation is that Year 0 (start-up) primarily will provide refresher training under programs already in place. Subsequent years will have additional project specific training. Annual plans will be adjusted as required. It will be the Project Training Officer's responsibility to see that required documentation is processed.

2.135 A long-term Project Training Consultant, assigned to the project Executive Secretariat, will work in tandem with the ExSec Training Coordinator. He will assist coordination of the activities among the many government institutions and non-government organizations, advise all levels of Government and provide regular evaluations regarding the quality and effectiveness of the training. Short-term consultants will also be provided.

2.136 The government will be required to provide a Project Training Coordinator and additional full- and part-time staff for training and for development of manuals, material and publications. Experienced administrators at BPLPP will be needed to set up specialized training courses, and the Agriculture Information Centers will be called

upon to support the project. Also, the government will be requested to provide high level personnel to assist in evaluating the training component.

2.137 The need for additional personnel to double encumber positions targeted for both domestic and overseas long-term training will be agreed to during project negotiations.

II. D. Detailed Project Description

5. Conservation Access Roads

a. Purpose and End of Project Status

2.138 The project will construct all-weather roads to provide access to demonstration farms and expansion areas and for general communication. At the end of the project approximately 475 kilometers of macadam roads will have been constructed, repaired, or upgraded in eight districts.

b. Design Standards and Conservation Measures

2.139 Considerable care will be exercised to assure that design standards will use construction techniques and structures that minimize environmental damage. The roads will have waterbound macadam surfaces, a traditional type of construction found on Java. The standards, however, will be higher than those normally used in Padat Karya programs. The construction method to be followed will employ the labor intensive construction techniques developed under the Padat Karya program.

2.140 The design and construction of the roads will take into consideration the future requirements for maintenance by people in the area and by local government. Budgets normally are low for routine maintenance and only provide for materials, since the local population supplies the bulk of the manpower under the Padat Karya program. Taking into account the high level of design and construction, the emphasis on good drainage to control run-off and establishment of firm road shoulders, the annual cost for maintenance materials should not exceed Rp. 25,000 per kilometer.

2.141 The project will provide technical assistance to assure high engineering standards, to help establish maintenance programs and to certify that construction meets the standards.

c. Cost Analysis

2.142 Based on the environmental design considerations, the road geometric for a waterbound macadam road and assumption of 4 culverts per kilometer and one 6 meter bridge every 6 km, the unit cost for one kilometer will be approximately Rp.9,200,000/km. (See Table 18.) This figure includes cost for construction, administration and cost for purchasing vehicles and office equipment. Because of additional design considerations, this estimate is above the average cost for regular Padat Karya construction under the USAID Rural Roads Project.

Table 18
Average Unit Cost for One Kilometer Road Construction
(Waterbound Macadam) in East Java and Central Java Province
(Rp. 000)

Province	Type of Road	Kind of Road	Unit Cost/ Km Road	Cost of Culverts/ Km Road	Cost of Bridge/ Km Road	Unit Cost/Km Road Construction
East Java						
			Rp.	Rp.	Rp.	Rp.
1. Malang	PJ	MCD	6,000	1,600	360	7,960
2. Blitar	PJ	MCD	5,700	1,350	360	7,410
3. Tulungagung	PJ	MCD	4,850	1,600	360	6,810
4. Trenggalek	PJ	MCD	4,750	1,600	1,962	8,312
Central Java						
5. Semarang	PJ	MCD	7,200	1,735	1,565	10,500
6. Boyolali	PJ	MCD	6,650	1,700	1,600	9,950
7. Grobogan	PJ	MCD	6,000	4,000	1,950	11,950
8. Blora	PJ	MCD	4,000	4,400	1,950	10,350
			5,644	2,248	1,263	9,200

Note:

1. PJ = Penunjang (a standard for construction higher than the regular Padat Karya standard. Labor intensive construction methods are suitable.)
2. MCD = Macadam
3. Cost of Culverts is calculated for 4 culverts per kilometer road
4. Cost of Bridges is calculated for one meter bridge per kilometer road and it is further assumed that every six kilometers of road needs an average of one 6 meter bridge.

2.143 The road component will be financed by the World Bank and the GOI. The total construction cost of Phase I is estimated at Rp.4.4 billion. (See Annex 5, Table 8 for construction schedule and detailed budget.)

d. Executing Agencies and Procedures

2.144 The road construction is designed to support the activities of the project and therefore will be determined by the location of demonstration farms and expansion areas. The project will

help local governments improve the general road net if roads outside the expansion area are inadequate and hamper full utilization of expansion area roads.

2.145 Public Works (PU) and the Manpower Ministry at the district level will be assigned by the district chief to work together to lay out a right of way and to complete the design. PU will be assigned the responsibility for these activities.

2.146 Prior to beginning construction that will be reimbursed from the IBRD loan, USAID approval in writing of the design and the cost estimates will be required.

II. D. Detailed Project Description

6. Project Innovation Fund (PIF)

a. Introduction

2.147 The potential for innovation and experimentation with upland agriculture and conservation technology transcends formal government institutions such as AARD and the SUFS pilot project and must include local institutions, universities and upland communities themselves. To the extent that these local institutions and communities can be encouraged and supported in their complementary but independent efforts to improve conservation and productivity in the uplands, the prospects of attaining the project's and GOI's goal will be enhanced. To this end, a Project Innovation Fund (PIF) will be established to finance initiatives by the appropriate local institutions, communities, research organizations and universities.

b. Project Purpose and End of Project Status

2.148 The purpose of the Project Innovation Fund will be to provide project management with a flexible source of funding to finance:

- proposals from local communities, universities, foundations or other recognized institutes that directly or indirectly address issues of upland productivity and resource conservation;
- small-scale pilot projects designed to field test or perfect production, marketing or processing interventions;
- feasibility studies of private sector investments to broaden the options for farmers, e.g., post harvest reprocessing facilities, storage facilities, gasifiers for power generation, abattoirs and feed mills;
- private sector companies, NGOs, or universities to develop radio programs focused on upland agriculture, pamphlets and manuals;

- non-government organizations that will implement similar conservation programs.

2.149 By the end of the project's fourth year there will be a system for soliciting, reviewing and financing proposals submitted by local institutions and communities. At the end of Phase I, each participating district will have an active portfolio of projects financed through the PIF, and initial results will have been evaluated for broader application.

c. Financing

2.150 \$500,000 in grant funds will be committed to PIF during Phase I. To insure flexibility these funds will be managed independently of the GOI DIP/DUP process. Given the substantial need for these types of activities the proposed funding level may appear low, but this is a deliberate decision to create competition among the many expected proposals. All the funds will not be committed early-on, as good ideas are expected to flourish in the project's later years.

d. Fund Management

2.151 The PIF will be directly under the management of the Project Coordinator in each province. The Project Manager will submit proposals from the district, with recommendations, to the Project Coordination Office. The Project Coordinator and the provincial Guidance Team will decide which proposals merit financing. Both solicited and unsolicited proposals will be given equal consideration, and proposals may be submitted at any time to either the provincial or district project authorities.

2.152 All projects will be judged by the criteria that will be developed during the initial year of project operations and must be approved by AID. Once projects are approved by the provincial authorities, they will be forwarded to USAID for review/approval prior to disbursement of funds.

III. PROJECT ORGANIZATION AND MANAGEMENT

A. Introduction and Rationale

3.01. Successful implementation of the project requires the local government to plan and manage development initiatives focused on upland areas. Accordingly, the project has been designed to strengthen certain planning and technical offices of the provincial and district governments and to channel all operational funds for demonstration and technology diffusion activities and access roads through a unified management and financial structure under the supervision of provincial and district governments.

B. Management Concepts

3.02. The experience of the Citanduy and Jogjakarta projects has led to the formulation of management concepts that should create an effective interagency approach to watershed/upland farming systems development.

1. Decentralized Management

3.03. Given the widely varying agro climatic, social and institutional environments characteristic of the Indonesian archipelago, a decentralized management structure that places responsibility and authority at lower levels of government is the only practical way of planning and managing development and conservation interventions. Because multiple interventions are required to assure adoption of productive but ecologically stable, upland agriculture technology, it is simply not feasible to manage upland agricultural programs in a centralized manner.

2. Unified Management

3.04. If the responsibility for these programs is appropriately placed at provincial and lower levels of government, these officials must be vested with sufficient authority, including effective budgetary control, to ensure the unified management of the various human, technical and financial resources. Presently, these resources are under the responsibility of several technical line agencies. All must be mobilized and allocated in a balanced and coordinated manner if the project's achievements are to be sustained. The magnitude of the problem requires that GOI policy makers strengthen the management capacity and authority of local governments so they can effectively guide and coordinate the specialized inputs and skills of the technical line ministries of government.

3. Unified Budgetary System

3.05. The ability to develop and allocate the budget determines the extent to which local governments can unify the delivery of services by respective line ministries.

3.06. A budgetary system similar to that in the Jogjakarta Integrated Rural Development Project will be established for the Upland Agriculture and Conservation Project. In the Jogjakarta Project annual plans and budgets are prepared by the Jogjakarta Planning Board (BAPPEDA) in conjunction with the participating line ministries. These budgets are reviewed and approved by the Ministry of Home Affairs, and then disbursements are made through the Inpres Dati I channel to the provincial government, which, in turn, sub-allocates the budgets to each participating line agency. Not only is one budgetary channel utilized, but authority for the development and allocation of the budget is effectively decentralized and vested with local government. Without the adoption of a similar budgetary concept, the correlary concepts of decentralized and unified management can be only partially and, at best, ineffectively carried out.

4. Community Participation and Management

3.07. The preceding three concepts have focused on how government institutions organize and decentralize their operations to enable them to effectively reach and service the target beneficiaries. A complementary and directly related question concerns how upland communities need to organize themselves to address productivity and conservation problems and to access resources/markets available through the government and the market place. The issue is how to broadly engage upland communities in making the decisions about upland development and conservation.

3.08. The failure of the initial FAO assisted Solo Watershed Project to gain farmer acceptance of proposed innovations is generally attributed to the absence of a strategy and process for mobilizing community understanding of the problem and active participation in addressing the problem. On the other hand, the Panawangan Pilot Watershed Project and its recent successor, the Cigaru Project, in the Citanduy Basin, succeeded largely due to dynamic local leadership that mobilized community support for these projects.

3.09. The project organization and management structure outlined below in Section C is an attempt to apply these four management concepts. What is proposed is neither a radical reorganization of government services nor a new organizational structure. Rather, the approach represents a more effective way of using existing government structures, procedures and programs.

C. Project Organization and Management

3.10. The planning and management systems used by this project are in many respects new and untested innovations. The GOI, IBRD and USAID fully expect that, as experience is acquired, modifications in both organizational structure and process will be required to improve the efficiency of project implementation. Accordingly, periodic reviews will be held to assess performance and recommend changes that subsequently will be incorporated into the project.

3.11. The four management concepts discussed above will be put into effect as follows:

1. Decentralization

3.12. The project will be planned and managed at the district level. Provincial government authorities will be responsible for the design/application of the relevant planning, management and budgetary information systems needed by participating districts to formulate and execute the project. The provincial governments of East and Central Java will also be responsible for evaluation of district government performance and the review and approval of district annual and long-term plans and budgets. Once all grant and loan agreements are in place and basic national policies established, the provincial governments of East

and Central Java will appoint a representative to be the responsible authority on the GOI side for the disbursement of IBRD and AID funds for all project activities except agricultural research, and training, and some other discrete elements. These latter activities will be managed by appropriate national level authorities as described below.

2. Unified Management

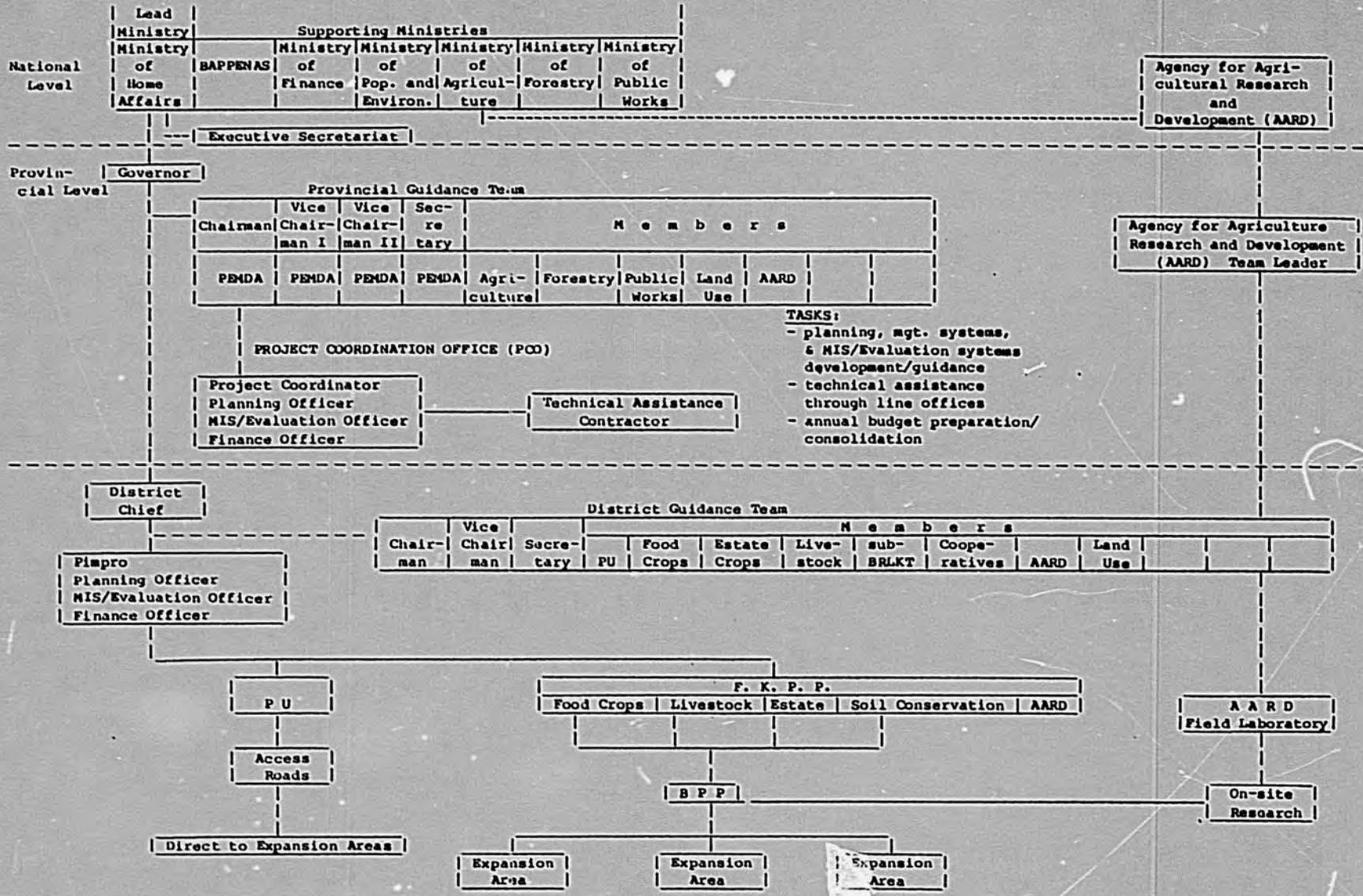
3.13. The Governors of Central and East Java will each appoint a full-time Project Coordinator and staff who will form the nucleus of a Project Coordination Office (see Chart 1). This office will operate under the overall policy guidance of an interagency provincial Guidance Team that will be authorized by the governor and composed of appropriate provincial government authorities and the heads of the technical line agencies directly involved in the project, including the head of the Regional Center for Land Rehabilitation and Soil Conservation. Each participating technical agency will appoint a staff member to be responsible for that agency's technical input into the project.

3.14. The governor will also appoint, on the advise of the district chief in each participating district, a full-time Project Manager and supporting staff and authorize the creation of a Project Management Unit (PMU) for each district. The Project Manager in each district will report directly to the district chief, but will be supported by technical agencies responsible for field implementation of agriculture extension programs. Each of the line agencies with a major management role will appoint at least one professional member of their respective staff to work full-time on the project in close coordination with the Project Manager and his staff. These representatives from the line agencies will be responsible for management of their agencies' contribution to the overall field program.

3.15. Technology diffusion and agriculture support activities (e.g., nurseries) will be managed as a single program through the GOI's network of rural extension centers (REC) in the project area. The supervisor of each rural extension center will be responsible for the management of all project activities and extension personnel drawn from the four relevant technical services [i.e., the Livestock, Estate Crops and Soil Conservation Services]. Additional management and extension staff will be added to the existing staff resources of these RECs to handle project related field implementation. The REC management and extension staff will be supported directly by subject matter specialists (PPS) working full-time for the project from the four technical agriculture and soil conservation services and by the staff of the Project Management Unit.

3.16. Work in the field will be carried out in designated expansion areas to be identified through detailed technical and socio-economic surveys. These expansion areas are in the work regions (WKBPP) of ten rural extension centers that presently serve the first thirty project sub-districts. Similar expansion areas will be identified in the second four districts.

Chart 1
Upland Agriculture and Conservation Project Organization



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3.17. Conservation access roads and seed procurement will be implemented at the district level by various technical agencies under the general management of the respective Project Manager and Project Management Units. These support activities will be carried out in the identified expansion areas. Access roads will be executed by the district Public Works offices, assisted by district Manpower offices. Seed procurement will be managed by the Project Manager assisted by the district representative of the Ministry of Cooperatives and other technical agencies involved in seed production and distribution. The Project Innovation Fund will be managed by the provincial Project Coordination Office. Each component activity carried out at the district level will be under the full-time management of a Sub-project Manager.

3.18. Management of the SUFS pilot project presents a particularly difficult problem, since four technical services from two ministries play important roles. To insure unified management of the SUFS pilot project, the FKPP will assume overall responsibility for the coordinated management of the component. For SUFS pilot project activities, the chairman of the FKPP will report directly to the PMU Project Manager. The FKPP will appoint a senior representative from one of the participating services as the full-time Sub-project Manager who will manage the SUFS project including daily supervision of participating technical personnel from all four services.

3.19. To insure the timely and coordinated implementation of all these related activities, the respective PMUs will schedule regular supervisory meetings with all Sub-project Managers as well as meet regularly with the FKPP and district Guidance Teams. Also, each year a consolidated plan and unified budget for each district will be prepared under the leadership of the PMU Project Manager. This will be submitted for review and approval to the respective provincial Project Coordination Offices and Guidance Teams.

3.20. The training components of the project will be centered in Jakarta and managed by a full-time project officer housed in the Executive Secretariat. This centralized management is necessary, given the large number of possible institutional sources of training, most of which are not located in the project area. Each province and participating district will identify its training requirements annually. The Project Training Officer (PTO) and the Interagency Training Committee within the Executive Secretariat will assist provincial and district authorities in formulating training plans. The PTO will be responsible for identifying appropriate institutions to carry out the training.

3.21. The agriculture research component will be managed by the Agency for Agriculture Research and Development (see Chart 2). Headquarters and research facilities will be established in Central Java with up to eight outreach sites located throughout the Jratunseluna and Brantas Watersheds in representative agro-climatic zones. Research and extension will coordinate through frequent meetings of AARD personnel and project officials at the provincial and district levels. AARD staff will

attend provincial and district Guidance Team meetings as well as meet frequently with the district FKPPs. On site research by AARD personnel will be coordinated with the extension teams working out of the rural extension centers. An annual provincial review of AARD's research program will be held to insure close linkage between research and implementation personnel.

3. Unified Budgeting

3.22. The GOI, IBRD and AID have agreed in general terms on a financial system for the project that will minimize budgetary fragmentation, an issue that has plagued the AID financed Citanduy II Project. During Project Year 0 (IFY 84/85) this unified financial system, which is expected to utilize the Inpres Dati I funding channel, will be fully defined and made operational. The outline of the financial/budgetary system presented here is more fully elaborated in the Financial Plan, Section V.

a. Inpres Dati I (Provincial Inpres Program)

3.23. The Inpres Dati I will be used to finance the Sustained Upland Farming System component, the Access Road component, the Training component and the incremental operating expenses associated with the Project Executive Secretariat, the provincial Project Coordination Offices, the respective district level Project Management Units, FKPPs and participating rural extension centers. The GOI has agreed to modify the appropriate Inpres Dati I Ministerial Instructions to accommodate this broader range of expenditure categories.

3.24. The GOI, IBRD and AID have agreed that the overall ratio of financial support for the project should be approximately 40% from the GOI and 60% from the combined IBRD and AID contributions.

3.25. With the guidance of the provincial Project Coordinator and the provincial Guidance Team, each district level Project Manager will be designated as the responsible officer for the management of the Inpres Dati I budget. Project Managers may alter any line item of the budget by 10% on their own authority and an additional 10% subject to the approval of the provincial Project Coordinator.

3.26. Each Project Coordinator will be the authorized GOI representative responsible for both AID and IBRD grant/loan funds used to reimburse all project activities pre-financed by Inpres Dati I, with the exception of the training component as discussed below.

3.27. (1) Sustained Upland Farming Systems Component: Inpres Dati I funds will finance the recruitment of additional PLP extension personnel; the establishment and operation of demonstration farms; seed production, procurement and distribution; the development of grass and tree nurseries; the distribution of planting materials; expansion program subsidies; incremental operating expenses of participating rural extension centers associated with project execution and unforeseen needs of the project.

3.28. (2) Conservation Access Roads: The Inpres Dati I budget will finance the project's conservation access roads. These funds will be under the management of the Project Manager of each district PMU. The district Project Manager will transfer implementation authority each year to the district Public Works Department (PU) for the construction of the access roads. PU will be responsible for designs, specifications and cost estimates, assisted by the district Manpower office to insure that appropriate labor intensive construction methods are employed. The district Public Works office will be responsible for the force account construction of all access roads.

3.29. (3) Training Program: The Inpres Dati I budget will finance all training activities. A full-time Project Manager of this component will be appointed and housed within the Executive Secretariat. Funding for field training directly implemented in the project area will be sub-allocated to the district Project Managers.

3.30. (4) Operating Expenses: The project's incremental operating expenses financed from the Inpres Dati I budget will include cost of data generation and analysis for purposes of project monitoring and planning and counterpart rupiah financing for technical assistance.

b. Ministry of Agriculture

3.31. Incremental support and agricultural research staff will be funded by the MOA. Agricultural research will be directly financed at the national level through a regular Agency for Agriculture Research and Development (AARD) budget proposal, supplemented, where necessary, by direct budgetary pre-financing from the Ministry of Finance, to cover the donor reimbursable components of the research activities. Prior to budget approval, the annual research plan and budget will be submitted to the provincial Guidance Team in each province for review and coordination with other project components.

3.32. The Ministry of Agriculture will provide, through its regular budget process (DUP/DIP), the annual budget to finance all provincial and district agricultural personnel (managerial, i.e., SUFS component Sub-project Managers, technical and extension staff) required to carry-out the SUFS pilot project.

c. Ministry of Forestry

3.33. The Ministry of Forestry, through the Directorate General of Reforestation and Land Rehabilitation will provide the incremental budget requirements for soil conservation personnel (PLP and PPS) and funds for land suitability and capability studies, including aerial photography and mapping as needed. Appropriate activities in this latter category will be eligible for reimbursement by AID and IBRD loan funds.

4. Community Management

3.34. Communities will be encouraged to propose and organize their own collective efforts. The Project Innovation Fund will encourage grass roots community initiatives consistent with the general purpose of the project.

5. Proposed Project Organization Structure (see Chart 1)

a. National Level

3.35. (1) The Ministry of Home Affairs as Lead Agency. The project will be organized under the direction of the Ministry of Home Affairs. The Ministries of Agriculture and Forestry will be adjutant, supporting agencies responsible for providing technical, administrative and policy support to the project.

3.36. The principal task at the national level will be to put in place the overall policy framework to govern the execution of the project. A second task will be to review the annual progress of the project and, based on that review, approve the consolidated annual plan and budget for the project.

3.37. (2) Executive Secretariat and MHA, MOF and MOA Backstop Support: The Executive Secretariat of the project will have full-time staff to administratively backstop the Upland Agriculture and Conservation Project. For this purpose the Executive Secretariat will be staffed by two full-time professionals from the Director General for Regional Development, Ministry of Home Affairs, and one professional staff each from the Ministry of Forestry and the Ministry of Agriculture. Additionally, the designated Project Manager for the training component of the project will be assigned to the Executive Secretariat. The training officer will be designated as the authorized GOI representative for the application and use of AID and IBRD funds budgeted for training under the project.

The tasks of the Executive Secretariat will include:

- drafting for consideration and approval of the involved ministries the required Interministerial Instructions (SKB) or ministry specific guidelines for project execution.

- the annual review with designated representatives from the Ministry of Population and Environment (KLH), Ministry of Finance and BAPPENAS of each provinces' performance in the preceding fiscal year and proposed plan and annual budget for the coming fiscal year.

- maintaining close liaison with participating provincial and district governments, participating ministries and with USAID and IBRD to resolve administrative or financial problems impeding project implementation.

b. Provincial Level

3.38. The Governors of Central and East Java, or their designees, will be the principal decision makers responsible for overall project direction and performance. Authority for program management, with the exception of the research and training components of the project, will be delegated by the central government to the two provincial governors. To insure effective planning and execution of the project the governor of each province will redelegate authority to provincial level institutions and overall field planning and management responsibility to participating district chiefs and their respective administrations.

3.39. (1) Provincial Guidance Team. At the provincial level, each governor will create a provincial Guidance Team responsible for:

- the design, installation and refinement of a decentralized planning/management system to increase the capacity of district governments to plan, manage and monitor field programs in upland agriculture and conservation;

- the establishment of standards against which performance of participating districts will be reviewed and upon which budget decisions will be based;

- the development of capacity within each provincial administration to carry out basic monitoring and evaluation studies, constraints to implementation studies and process evaluations;

- the annual review and recommendations regarding each district's operational plan and proposed budget;

- providing technical assistance to participating district administrations in technical fields and planning and management;

- preparation (beginning in Year 3) of a long-term, comprehensive upland agriculture and conservation plan and program.

3.40. (2) A Project Coordination Office will carry out the policy instructions of the provincial Guidance Team. The governor will appoint as its head a Project Coordinator who will be the authorized GOI representative responsible for the application and use of both USAID and IBRD funds used to pre-finance or reimburse all project activities, with the exception of the research and training components of the project.

3.41. The Project Coordinator in each province will also be the authorized GOI representative for the application and use of IBRD and USAID grant and loan funds to finance provincially based technical assistance contracts (both domestic and international) and the Project Innovation Fund.

3.42. The Project Coordinator will be supported by a full-time, three person staff drawn from relevant sections of the provincial government. This staff will be composed of:

- a planning officer with broad experience in agriculture and rural development;

- a monitoring/evaluation officer with professional training in economics and statistics;

- a finance officer with professional training in accounting and finance.

3.43. Each participating provincial technical service will designate a professional staff member to serve as that agencies' representative to the Project Coordination Office to insure coordination of each line agency's activities.

3.44. All requests for IBRD and USAID reimbursement for project activities executed under the authority of each provincial governor will be forwarded to USAID/IBRD, via the appropriate national ministries under the signature of the respective provincial Project Coordinator.

3.45. Technical Assistance (see Section IV) provided to each province will be assigned to the provincial Project Coordination Office and placed under the direction of the respective Project Coordinators.

c. District Level

3.46. (1) District chiefs of each participating district will be responsible to the provincial governor for the overall planning and coordinated implementation of the project in their respective districts.

3.47. The district chief will be authorized to modify and strengthen the district Forum for Coordination of Agriculture Extension (FKPP), which, in addition to its regular functions, will be the district level steering and coordinating body responsible for the overall direction and performance of the Sustained Upland Farming System (SUFS) component of the project. The FKPP will recommend appointment of a senior professional from one of the four participating technical services (i.e. Food Crops, Livestock, Estate Crops and Soil Conservation) to serve as the Sub-project Manager for the SUFS pilot project. The district chief will be responsible for the final decision on this appointment. The FKPP will meet at least quarterly to review project implementation performance and problems and to approve plans and budgets for the SUFS pilot project prior to submission to the Project Management Unit.

3.48. (2) A district Guidance Team will be created by each district chief. Its primary function will be to serve as a steering body responsible for the overall direction and performance of the UACP. The team will meet quarterly to review performance and problems and to approve, prior to submission to higher authorities:

- medium-range program plans;
- the annual project budget;
- the annual training plan;
- the annual agricultural research plan;
- quarterly progress and financial reports covering each component of the project;
- the annual project report and evaluations.

3.49. (3) The Project Management Unit (PMU) will be headed by an experienced Project Manager, recommended by the district chief and approved by the provincial governor. He will be responsible to the district chief for directing the interagency planning and program execution. The Project Manager will head a small, full-time staff composed of a planning officer, a monitoring and evaluation officer and a finance officer, who will have qualifications comparable to their provincial level counterparts. These personnel will be drawn from the existing staff of each participating district government and assigned to work full-time under the direction of the Project Manager.

3.50. The Project Management Unit will assume direct responsibility for the training component and the Project Innovation Fund at the district level.

3.51. In conjunction with participating technical agencies, the PMU is also responsible for:

- periodic generation and analysis of technical and socio-economic data for project planning (including land use and capability surveys);
- formulation and integration of annual and medium-term plans;
- preparation of a consolidated annual budget and supervision of disbursement of the budget to participating implementing agencies;
- coordination of all project components with specific emphasis on establishing communication among implementing agencies responsible for execution of individual components and between implementing agencies and project beneficiaries;
- preparation of training requests for district management personnel, technicians, and extension personnel and the coordination of district training requirements with the training component Project Manager;
- preparation of a community management program to encourage formation of community farmer groups and their involvement in program decision making;

- solicitation, review and recommendation for approval of projects to be financed under the Project Innovation Funds;

- periodic monitoring/evaluation of all component activities executed under the project.

3.52. (4) The Technical Agencies will be responsible for the two remaining components, Conservation Access Roads and SUFS, each of which will appoint a full-time Sub-project Manager. For access roads, the lead agency will be the Public Works Office in each participating district.

3.53. The SUFS component involves four technical agencies, three district technical offices, Food Crops, Livestock and Estate Crops, and the Soil Conservation Service. As noted in para. 3.48, each FKPP will appoint a representative from one of the participating agencies to serve as the full-time SUFS Sub-project Manager. In addition, each participating agency will appoint a full-time person to be responsible for its contribution to the overall field program. Coordination of the activities of these four technical agencies will be the responsibility of the Sub-project Manager and the FKPP. While the three agricultural agencies are already members of the FKPP, arrangements for the inclusion of the Soil Conservation Service in the FKPP will be required prior to disbursement of funds.

3.54. The responsibilities of the Sub-project Managers and their respective line agencies include:

- preparation of annual technical and operational plans;
- preparation of the budget to implement the plans;
- implementation of component activities in line with the consolidated implementation schedule developed by the PMU;
- preparation of quarterly progress and financial reports;
- preparation of an annual report detailing implementation performance.

d. Field Level

3.55. All component activities of the project will be implemented in designated expansion areas. All extension work, planting material development, demonstration and expansion program activities will be executed through participating RECs under the direction of each REC supervisor, advised and assisted by subject matter specialist (PPS) from the three agriculture technical services and the Sub-Center for Land Rehabilitation and Soil Conservation. On-site agriculture research carried out by AARD will be conducted in representative expansion areas. Conservation Access Roads, under the supervision of the respective district Public Works offices will likewise be constructed in designated expansion areas.

e. Agriculture Research

3.56. The Agency for Agricultural and Development (AARD) will formulate and coordinate agriculture research policy for the project. AARD will be supported in formulating its research priorities by the relevant Directorates General within the Ministry of Agriculture (MOA), the MOF Directorate General of Reforestation and Land Rehabilitation and selected agriculture colleges. Chart 2 presents the general relationship of the AARD to the overall project management structure.

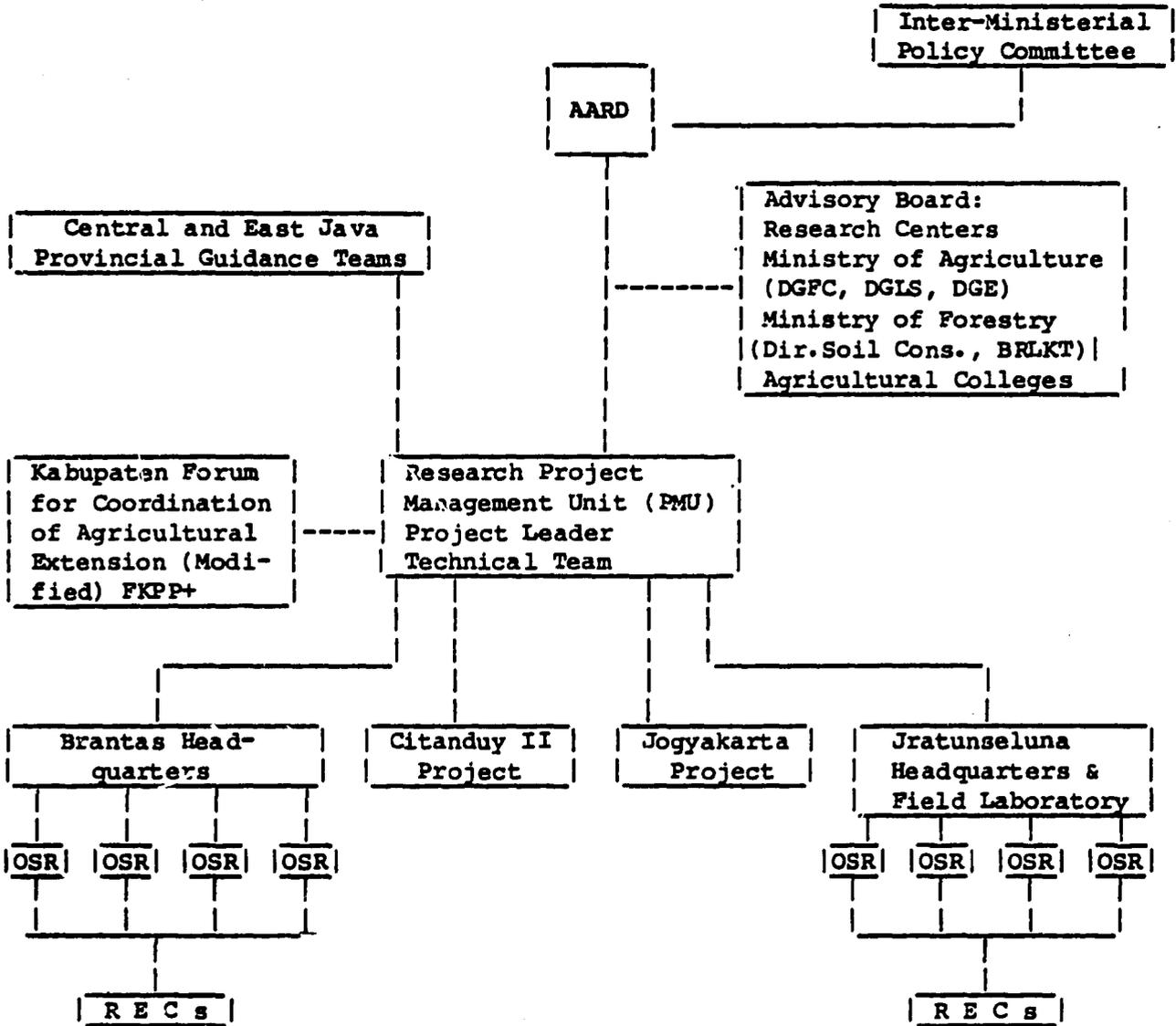
3.57. A Farming Systems Research Project Management Unit (PMU) with a team of five specialists will be appointed by the head of the AARD to provide technical support and leadership in their areas of expertise. One member of this team will be appointed full-time Project Leader. The PMU will receive technical support and leadership from the relevant research centers of AARD, as well as from elements named in the previous paragraph. In addition, the PMU will coordinate with the respective provincial Guidance Teams and the district level FKPPs, the Soil Conservation Service and other project related agencies. This will provide the necessary liaison for exchange of information on project needs and feedback on implementation of project research recommendations. Field coordination between on-site research and participating RECs will be stressed. (See Chart 3.)

3.58. The PMU also will establish close coordination with other projects involved in upland farming and soil and water conservation, particularly with the Solo, Citanduy II and Jogjakarta projects. The Solo Project is directly associated with the BRLKT soil conservation research and as such will be included in the overall research plan to be submitted to the Provincial Guidance Teams and AARD. The Citanduy II and Jogjakarta research components will be eventually incorporated into the AARD structure for farming systems research.

3.59. A headquarters with research facilities will be established within one of the target basins, on a location representative of a major ecological zone. The preferred location is within a radius of 20 km from Ungaran or Salatiga, in Central Java. This will provide communication and logistic support to the field research and support staff. A sub-headquarters will be established in the Brantas Basin, preferably in Malang. Subsequently, the Citanduy II and Jogjakarta research components will constitute the headquarters for their respective watersheds.

3.60. In addition to these facilities, eight on-site research plots (OSR) will be established on areas representative of the major agro-ecological and socio-economic conditions found in both river basins. Partitioning the target areas by biological and socio-economic categories will ensure that OSRs represent the target areas.

Chart 2
Farming Systems Research Component Organization



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Chart 3
Research Personnel

	<u>Degree</u>	<u>Number</u>
1. <u>Headquarter/Field Laboratory (Salatiga)</u>		
Project Leader	Ph.D.	1
Project Secretary	Drs./SH	1
Component Research Coordinator	Ph.D./MS	5
- Food Crop (1)		
- Tree Crop (1)		
- Livestock (1)		
- Soil (1)		
- Socio-economic (1)		
Statistician	Ir./MS	1
Training Officer	Ir.	1
Senior Staff	Ir.	2
Office Personnel	BS/SMA	8
Field Assistant	SPMA/SNAKMA	10
Driver		3
2. <u>Branch Office (Malang)</u>		
Coordinator	Ir.	1
Research Staff	Ir.	1
Office Personnel	SMA/SPMA	3
Driver		1
3. <u>Project Sites (8 sites)</u>		
Coordinator (1/site)	Ir.	8
Research Staff (3/site)	Ir.	24
Field Assistant (12/site)	SPMA	96
Office Personnel (2/site)	SMA/SPMA	16
Driver (1/site)		8

6. Key Project Staff

3.61. Table 19 lays out the key staff required on a full-time basis to implement the major project components. Additional staff will be needed in certain categories (e.g. technical agriculture personnel and extension personnel) either when there is no on-going program or where the existing programs are too thinly staffed to spare personnel. In

other cases (e.g. the provincial Project Coordination offices) it is expected that existing provincial government personnel can be reassigned to fill full-time project positions. It is not certain that district governments can free sufficient qualified personnel to staff the Project Management Units. Discussion with BAPPENAS indicates that the GOI is prepared to consider additional staff in all categories to meet the requirements of the project. This important requirement will be specifically addressed during negotiations.

IV. TECHNICAL ASSISTANCE REQUIREMENTS

A. Purpose

4.01. Technical Assistance will be provided to support the Ministries of Agriculture and Forestry and the Executive Secretariat at the national level. TA also will be provided to support development of managerial and technical capacity at the provincial and district levels. Finally, a collaborative agreement between AARD and a consortium of international agriculture research institutes will be financed by AID to strengthen technical exchange in the field of farming systems research. A profile of planned Technical Assistance is presented in Chart 4. The Technical Assistance budget is presented in Annex 5, Table 4.

1. Provincial Level Technical Assistance

4.02. Technical assistance supporting provincial and district operations will be provided by a direct USAID contract with a US or eligible 941 country company, with a joint venture or with a prime contract with sub-contracts. Joint ventures and sub-contractors must also be from eligible AID Geographic Codes. The level of effort will be approximately 70 person years of service. An effective mix of externally recruited consultants and Indonesian consultants will be encouraged.

2. Farming Systems Research Collaborative Agreement

4.03. The Farming Systems Research component will be supported by an AID financed collaborative agreement between AARD and IRRI, representing a consortium of international agriculture research centers. One long-term senior scientist will backstop the farming systems research; commodity and discipline oriented scientists will provide additional support, working with AARD counterparts for about two months each year for each commodity/discipline. The overall level of effort will be approximately 12 person years.

3. National Level Technical Assistance

4.04. Three long-term specialists from the United States Department of Agriculture (USDA) Soil Conservation Service will be assigned to the Executive Secretariat. They will assist: a) project training and materials development; b) the MOP in conservation planning, management and policy formulation; and c) the Ministry of Agriculture in upland agriculture planning, management and policy formulation. Appropriate short-term assistance in specialized disciplines will also be financed. The overall level of effort will be approximately 12 person years.

V. COST ESTIMATE AND FINANCIAL PLAN

A. Cost Estimate

5.01. Total project costs for Phase I are estimated at US\$ 50.3 million of which \$14.2 million is the foreign exchange component. Because of the tax-exempt status of the implementing agencies, these costs do not include local, provincial and national taxes. Of the total cost AID will contribute \$18.9 million, \$5.0 million as a grant and \$13.9 on a loan basis. The IBRD will provide a loan of \$11.3 million. The GOI contribution "in kind" and in rupiah will total \$20.0 million, or 40% of estimated project funding. The "in kind" contributions from the project beneficiaries, e.g., labor and land removed from production, have not been included in the project cost estimates.

5.02. Tables 20 and 21 summarize the overall project costs by foreign exchange and rupiah requirements and by sources of financing. A 10% contingency factor has been added to the project's base costs. An inflation factor of 7% compounded has been applied to the base costs and contingency line item. Total price contingencies for the seven year period will be 21% of baseline and contingency costs. A summary of project costs by year is presented in Table 22. Details of estimated costs are presented in Annex 5, Tables 1-8.

B. Methods of Financing

1. Introduction

5.03. Special attention was given during project design to the appropriate allocation of IBRD and AID funds among the various components to insure the efficient disbursement of funds and the proper accounting of both AID and IBRD resources. To judge which source of financing for each project component was appropriate, a number of factors were considered. Among these considerations were:

- GOI preference to use AID funds to finance technical assistance.

Table 19
UPLAND AGRICULTURE AND CONSERVATION PROJECT
FULL-TIME PROFESSIONAL AND EXTENSION STAFFING REQUIREMENTS*
INCREMENTAL/YEAR 1/

YEAR POSITION	IFY 1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	CUMULATIVE TOTAL
	0	1	2	3	4	5	6	
A. National Level								
1. Executive Secretariat								
a. Min. Home Affairs (BANGDA) 1/	2							2
b. Min. of Forestry 1/	1							1
c. Min. of Agriculture 1/	1							1
2. Training Component Project Manager (Agency 7)	1							1
3. Agriculture Research Component (AARD)								
- Project Leader (PhD) x 1	1							1
- Project Team (PhD/MA) x 5	5							5
B. Provincial Level (Central and East Java)								
1. Project Coordinator x 2	2							2
2. Project Planning Officer x 2	2							2
3. Project MIS/Evaluation Officer x 2	2							2
4. Project Finance Officer x 2	2							2
C. District Level								
1. PMU/MANAGEMENT STAFF								
a. Project Manager	4		4					8
b. Project Planning Officer	4		4					8
c. Project Monitoring Officer	4		4					8
d. Project Finance Officer	4		4					8
2. Agriculture + Forestry TECHNICAL STAFF 2/								
a. PPS Food Crops	4		4					8
b. PPS P3RFDAS	4		4					8
c. PPS Livestock	4		4					8
d. PPS Estate Crops	4		4					8
3. BPP MANAGEMENT EXTENSION STAFF (10 RECs) 2/								
a. Extension Managers PPM	10	16	24	22				72
b. PPL/PLP Extension Agents	50	80	120	110				360
c. Nursery Staff MOP/MOA	4		4	2				10
	115	96	180	134				525

1/ Includes staff required in 1986/87 for anticipated expansion into four more districts.

2/ Incremental staff requirements by the year required.

* Excluding AARD Research Staff (found on chart 3, p. 92)

Chart 4
TECHNICAL ASSISTANCE SCHEDULE
 (Month shows beginning of services)

1. Provincial Level Technical Assistance

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Planner/Team Leader (Sr.)	November 84						
Planner/Team Leader	Feb. 85						
Management Specialist	Jan. 85						
Management Specialist	Feb. 85						
Administrative Assistant	Jan. 85						
Administrative Assistant	Feb. 85						
Roads Engineer	Apr. 85						
Seeds Production Advisor	Jun. 84						
Agriculture Economist	Mar. 85						
Agriculture Economist	Nov. 84						
Extension Agronomist	Feb. 85						
Extension Agronomist	Feb. 85						
Treecrops Specialist	Apr. 85						
Livestock Specialist	Nov. 84						
Special Short term consultants as needed							

2) Farming System Research Collaborative Agreement

Senior Scientist for Farming Systems	Nov. 84						
Five Specialists each: two months per year	April 85						

3) Executive Secretariate Technical Assistance

Specialist for Training and Material Development	Nov. 84						
Consultant for conservation planning, management and policy (MOA)	April 85						
Consultant for Conservation planning, management and policy (MOP)	April 85						
Short-term Technical Assistance	April 85						

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Table 20
Upland Agriculture and Conservation Project
Description of Costs by Component: Foreign Exchange and Local Costs*

Project Component	Rp. Millions			U.S. \$000			% of Foreign Ex.	% of Total Base Costs
	Local	Foreign	Total	Local	Foreign	Total		
<u>Institutional Development</u>	<u>5388</u>	<u>8388</u>	<u>13776</u>	<u>5388</u>	<u>8388</u>	<u>13776</u>	<u>59</u>	<u>38</u>
National Level Executive Secretariat	(216)	(17)	(233)	(216)	(17)	(233)		
Provincial Level Organization & Mgt.	(919)	(63)	(982)	(919)	(63)	(982)		
District Level Organization & Mgt.	(1691)	(192)	(1883)	(1691)	(192)	(1883)		
Technical Assistance	(2563)	(8116)	(10679)	(2563)	(8116)	(10679)		
<u>Farming Systems Research Component</u>	<u>3283</u>	<u>333</u>	<u>3616</u>	<u>3283</u>	<u>333</u>	<u>3616</u>	<u>2</u>	<u>10</u>
Investment	(85)	(170)	(256)	(85)	(170)	(256)		
Research, Training and Recurrent Costs	(3198)	(163)	(3361)	(3198)	(163)	(3361)		
<u>Sustainable Upland Farming Systems Pilot Projects (including Cooperative Seed Development)</u>	<u>10599</u>	<u>914</u>	<u>11513</u>	<u>10599</u>	<u>914</u>	<u>11513</u>	<u>6</u>	<u>32</u>
Investment	(72)	(914)	(986)	(72)	(914)	(986)		
Recurrent Cost	(4228)		(4228)	(4228)		(4228)		
SUFS Subsidy	(6299)		(6299)	(6299)		(6299)		
<u>Human Resources Development Component</u>	<u>1213</u>	<u>1032</u>	<u>2245</u>	<u>1213</u>	<u>1032</u>	<u>2245</u>	<u>7</u>	<u>6</u>
<u>Conservation Access Roads Component</u>	<u>4344</u>	<u>66</u>	<u>4410</u>	<u>4344</u>	<u>66</u>	<u>4410</u>	<u>0</u>	<u>12</u>
<u>Project Innovation Fund (PIF)</u>	<u>400</u>	<u>100</u>	<u>500</u>	<u>400</u>	<u>100</u>	<u>500</u>	<u>1</u>	<u>1</u>
<u>Total Base Costs</u>	<u>25227</u>	<u>10833</u>	<u>36060</u>	<u>25227</u>	<u>10833</u>	<u>36060</u>	<u>76</u>	<u>100</u>
<u>Contingencies (10% of base cost)</u>	<u>2523</u>	<u>1083</u>	<u>3606</u>	<u>2523</u>	<u>1083</u>	<u>3606</u>	<u>8</u>	<u>10</u>
<u>Price Contingencies (7% compounded)</u>	<u>8234</u>	<u>2236</u>	<u>10470</u>	<u>8234</u>	<u>2236</u>	<u>10470</u>	<u>16</u>	<u>29</u>
IBRD Loan Fee		100	100		100	100		
<u>TOTAL PROJECT COSTS</u>	<u>35984</u>	<u>14252</u>	<u>50236</u>	<u>35984</u>	<u>14252</u>	<u>50236</u>		<u>139</u>
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* Due to rounding line items within components may not add.

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Table 21
Upland Agriculture and Conservation Project
Proposed Financing Levels by Component: AID/IBRD/GOI*

Project Component	A I D		IBRD Loan	GOI	Total	% Target Donor/GOI Financing	A I D		IBRD Loan	GOI	Total
	Grant	Loan					Grant	Loan			
	Rp. Million						US \$ 000				
I. Institutional Development	4400	5163		4213	13776	69/31	4400	5163		4213	13776
National Level Exec. Sec.		17		216	233			17		216	233
Provincial Level Org. & Mgt.		104		878	982			104		878	982
District Level Org. & Mgt.		328		1555	1883			328		1555	1883
Technical Assistance	4400	4714		1565	10679		4400	4714		1565	10679
II. Farming Systems Research Comp.		707	1800	1109	3616	69/31		707	1800	1109	3616
Investment		171	80		251			171	80		251
Res., Trg. & Recurrent Costs		536	1720	1109	3365			536	1720	1109	3365
III. SUPS Pilot Projects		4685	2528	4300	11513	63/37		4685	2528	4300	11513
Investment		914		72	986			914		72	986
Recurrent Cost				4228	4228					4228	4228
SUPS Subsidy		3771	2528		6299			3771	2528		6299
IV. Human Resources Dev. Comp.			1300	945	2245	58/42			1300	945	2245
V. Conservation Access Roads Comp.		66	2472	1872	4410	58/42		66	2472	1872	4410
VI. Project Innovation Fund (PIF)	500				500	100/0	500				500
VII. Total Base Costs	4900	10621	8100	12439	36060	66/34	4900	10621	8100	12439	36060
VIII. Physical Contingencies	50	1062	900	1594	3606	56/44	50	1062	900	1594	3606
IX. Total Base Cost + Physical Cost	4950	11683	9000	14033	39666	65/35	4950	11683	9000	14033	39666
X. Price Contingencies	50	2217	2200	6003	10470	43/57	50	2217	2200	6003	10470
XI. IBRD Loan Fee			100		100				100		100
XII. TOTAL PROJECT COSTS	5000	13900	11300	20036	50236	60/40	5000	13900	11300	20036	50236

* Due to rounding line items within components may not add.

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Table 22
Summary of Estimated Project Costs by Project Year*
(Rp Million)

Project Year IFY Project Component	0 84/85	1 85/86	2 86/87	3 87/88	4 88/89	5 89/90	6 90/91	Total Rp.000000	Total US\$000
<u>Institutional Development</u>	<u>930.7</u>	<u>2636.0</u>	<u>2636.0</u>	<u>2752.0</u>	<u>2188.4</u>	<u>1569.6</u>	<u>1063.0</u>	<u>13775.7</u>	<u>13775.7</u>
National Level Executive Secretariat	50.4	30.4	30.4	30.4	30.4	30.4	30.4	232.8	232.8
Provincial Level Organization & Mgt.	208.8	128.8	128.8	128.8	128.8	128.8	128.8	981.6	981.6
District Level Organization & Mgt.	245.2	152.4	152.4	418.4	304.8	304.8	304.8	1882.8	1882.8
Technical Assistance	426.3	2324.4	2324.4	2174.4	1724.4	1105.6	599.0	10678.5	10678.5
<u>Farming Systems Research Component</u>	<u>771.1</u>	<u>596.7</u>	<u>456.7</u>	<u>456.7</u>	<u>451.7</u>	<u>441.7</u>	<u>441.7</u>	<u>3616.3</u>	<u>3616.3</u>
Investment	184.0	55.0						239.0	239.0
Research, Training and Recurrent Costs	587.1	541.7	456.7	456.7	451.7	441.7	441.7	3377.3	3377.3
<u>Sustainable Upland Farming Systems Pilot Projects (including Cooperative Seed Development)</u>	<u>902.5</u>	<u>585.8</u>	<u>1241.8</u>	<u>1682.4</u>	<u>2222.7</u>	<u>2693.8</u>	<u>2184.3</u>	<u>11513.3</u>	<u>11513.3</u>
Investment	306.0	16.0	320.8	82.8				725.6	725.6
Recurrent Cost	456.7	328.6	532.0	717.8	730.8	730.8	730.8	4227.5	4227.5
SUFS Subsidy	9.8	111.2	389.0	881.8	1491.9	1963.0	1453.6	6299.3	6299.3
Seed Processing Operation	130.0	130.0						260.0	260.0
<u>Human Resources Development Component</u>	<u>40.3</u>	<u>219.8</u>	<u>392.0</u>	<u>442.6</u>	<u>456.8</u>	<u>422.6</u>	<u>270.4</u>	<u>2244.5</u>	<u>2244.5</u>
<u>Conservation Access Roads Component</u>	<u>68.0</u>	<u>75.9</u>	<u>382.1</u>	<u>632.5</u>	<u>950.5</u>	<u>1102.9</u>	<u>1198.0</u>	<u>4409.9</u>	<u>4409.9</u>
<u>Project Innovation Fund (PIF)</u>			<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>500.0</u>	<u>500.0</u>
<u>Total Base Costs</u>	<u>2713.6</u>	<u>4114.2</u>	<u>5208.6</u>	<u>6066.2</u>	<u>6370.1</u>	<u>6330.6</u>	<u>5257.4</u>	<u>36060.7</u>	<u>36060.7</u>
Contingencies (10% of base cost)	271.4	411.4	520.9	606.6	637.0	633.1	525.7	3606.1	3606.1
<u>Total Base Costs + Contingencies</u>	<u>2985.0</u>	<u>4525.6</u>	<u>5729.5</u>	<u>6672.8</u>	<u>7007.1</u>	<u>6963.7</u>	<u>5783.1</u>	<u>39666.8</u>	<u>39666.8</u>
Price Contingencies (7% compounded)		316.8	830.2	1501.4	2177.8	2803.2	2840.5	10469.9	10469.9
IBRD Loan Fee								100.0	100.0
<u>TOTAL PROJECT COSTS</u>	<u>2984.0</u>	<u>4842.4</u>	<u>6559.7</u>	<u>8174.2</u>	<u>9184.9</u>	<u>9766.9</u>	<u>8623.6</u>	<u>50235.7</u>	<u>50235.7</u>

* Due to rounding line items within components may not add.

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- ongoing AID and IBRD financing of independent projects that directly or indirectly relate to project component activities (e.g., IBRD financing under NAEP I & II in support of the national agricultural extension services).
- the comparative advantage to the GOI of IBRD vs. AID financing for specific components (e.g., the IBRD policy on long-term overseas training permits financing of the participant's spouse to accompany the participant during training).

5.04. An additional consideration, related to longer term IBRD/AID/GOI strategy, influenced the manner in which project funds from both donor sources will be allocated. The IBRD intends to finance a Phase II upland agriculture and conservation program should the pilot project executed under Phase I prove successful. Therefore, the IBRD financial participation was encouraged in as many of the replicable components of the project as possible. Consequently, the IBRD will finance all the donor costs of the Human Resources Development and Conservation Access Road components as well as a share of the Sustainable Upland Farming Systems pilot project component and the Farming Systems Research component. With the exception of the Project Innovation Fund, all component activities will be annually 100% pre-financed by the GOI from the national budget based on annual plans and budgets approved by the GOI and AID.

5.05. Reimbursement will be about 60% of the total cost. Reimbursement for the AID contribution to component activities will be made after certification by appropriate AID authorities that each component activity has been properly executed. The IBRD will reimburse following the system it currently uses in Indonesia. The project Management Information System assessment reports and USAID project reports will alert the IBRD to any problems that may arise.

5.06. Technical assistance will be via AID direct contracts with direct payment made by the USAID. A USAID Direct Letter of Commitment may be issued if required. Annual Commitment PILs will be issued for the various activities. Payment documentation for reimbursement will state expenses incurred for all parties to the agreement, i.e., AID/GOI/IBRD. The administrative/financial systems to be developed for the project's local currency costs will be reviewed and approved by the USAID Controller prior to commitment of AID funds. It is thereafter anticipated that an AID direct contract will be entered into with an Indonesian based accounting firm's management consulting division to conduct annual financial reviews. AID funded commodities will be procured by AID following direct payment procedures.

2. Sources of GOI Financing

a. Inpres Dati I

5.07. Except for salaries of civil servants, Inpres Dati I will finance recurrent overhead costs, including contract extension personnel. These recurrent overhead costs are presented in Annex 5, Tables 1-8.

5.08. In addition to recurrent overhead costs, the Inpres Dati I budget will:

- 100% pre-finance the subsidies provided under the Sustainable Upland Farming System pilot project (Annex 5, Table 6). Subsequent reimbursement will be made by IBRD/AID.

- finance the recurrent cost and training budget of the Human Resources Development component (Annex 5, Table 7). The GOI will appoint a Training Coordinator to manage this component. The ministry that assumes this responsibility will finance the salary of the Training Coordinator.

- finance the incremental project associated recurrent costs and investment requirements for the Conservation Access Road component (Annex 5, Table 8).

- finance the GOI rupiah counterpart budget for the technical assistance financed by AID and located in the two participating provinces and in Jakarta. (The rupiah counterpart for the Collaborative Research Agreement between AARD and the consortium of international agriculture research institutions will be financed separately as described in paragraph 5.11.)

5.09. The GOI has agreed to modify the appropriate Inpres Dati I Ministerial Instructions to accommodate this range of expenditure categories and will seek ways to add funding to the normal Dati I level for each participating province. All project activities financed under this Inpres budget will be 100% pre-financed by the GOI. To the extent required, the GOI will supplement the Inpres Dati I budget with funds from the National Budget (Anggaran Negara) up to the amount to be reimbursed by IBRD/AID as specified in Ministerial Decree No. 387, 1978, Ministry of Finance.

b. Ministry of Agriculture (MOA)

(1) Technical and Extension Staff

5.10. The Ministry of Agriculture's regular budget process (DUP/DIP) will finance all provincial and district agricultural personnel required to carry out the Sustainable Upland Farming Systems (SUFS) pilot project. (See Annex 5, Table 6.) Also the MOA will annually allocate the funds necessary to finance the salary of the MOA's full-time representative to the Executive Secretariat (Annex 5, Table 1).

(2) Farming Systems Research

5.11. The Farming System Research component (Annex 5, Table 5) will be 100% pre-financed annually through the normal MOA budget process (DUP/DIP) prepared and submitted to AARD by the project leader of the Research Project Management Unit.

c. Ministry of Forestry (MOF)

5.12. Through the Director General of Reforestation and Land Rehabilitation, the Ministry of Forestry will use its regular budget (DUP/DIP) to finance the annual budget for all technical staff assigned to the Upland Agriculture and Conservation Project as specified under the Sustainable Upland Farming System pilot project budget (Annex 5, Table 6). The MOF will also provide the annual budget for the salary of the full-time MOF representative on the Executive Secretariat. Incremental budgets required for land suitability, aerial photography/mapping, etc., will be financed through the regular MOF DUP/DIP process. AID and IBRD funds can be used to reimburse the GOI for mutually agreed upon equipment or activities associated with this latter expenditure category.

d. Ministry of Home Affairs and Provincial and District Government

5.13. The Ministry of Home Affairs (MHA) and participating provinces and districts will provide the necessary budget through the normal budget process to finance the incremental, full-time staff associated with the project. This includes the salary for two full-time MHA representatives to the Executive Secretariat (Annex 5, Table 1), the Project Coordinators and staff of the two provincial Project Coordination Offices (Annex 5, Table 2) and the Project Managers and staff associated with each district Project Management Unit (Annex 5, Table 3).

e. Ministry of Manpower/Public Works

5.14. The Ministry of Public Works will provide the necessary annual budget for Conservation Access Road Sub-project Managers and associated technical staff and associated Ministry of Manpower staff (Annex 5, Table 8).

3. IBRD/AID Financing and Reimbursement

5.15. The method of AID/IBRD financing varies with the project component. Each of the different methods is described below.

a. Technical Assistance

5.16. All technical assistance costs will be financed by AID and the GOI as shown in Annex 5, Table 4. AID will directly contract with three institutions/contractors to provide the full range of technical assistance programmed under the project. Short-term contracts under \$100,000, particularly for management information and evaluation studies, will also be directly financed by AID.

b. Commodities

5.17. All commodities (e.g. office equipment, data processing equipment, agriculture processing equipment, vehicles, etc.) will be financed by AID under direct payment/reimbursement procedures.

c. Training

5.18. All training, both in-country and international, will be financed by the IBRD, and the GOI will follow the applicable IBRD financial procedures.

d. Construction

5.19. All in-country construction for facilities associated with the Farming System Research and Sustainable Upland Farming Systems components will be financed by the IBRD and the GOI and will follow applicable IBRD financial procedures. The Conservation Access Road component will be entirely financed by the IBRD and GOI. Road construction will be 100% pre-financed by the GOI and subsequently reimbursed up to 60% of actual cost by the IBRD. Reimbursement procedures are discussed under para 5.27.

e. Joint IBRD/AID Local Currency Financing

5.20. Local currency costs for two project components, Farming Systems Research and the Sustainable Upland Farming System, will be jointly financed by AID, IBRD and the GOI. The financial management procedure to be applied for each component is described below.

(1) Farming Systems Research

5.21. AARD will 100% pre-finance the annual research budget through its regular DUP/DIP process supplemented by National Budget funds as required, which subsequently will be reimbursed up to 67% of actual cost by both AID and IBRD. The reimbursement procedure to be followed is outlined in para 5.27.

(2) Sustainable Upland Farming System Pilot Projects (SUFS)

5.22. AID and IBRD will jointly finance the annual subsidy provided for demonstraion farms and expansion activities under the SUFS component (Annex 5, Table 5). The GOI will 100% pre-finance the annual SUFS subsidy budget. Upon satisfactory completion of the annual SUFS program, the GOI will be 100% reimbursed by IBRD/AID following the reimbursement procedure presented in para 5.27.

f. Project Innovation Fund (PIF)

5.23. AID will finance 100% of the PIF costs on a grant basis. The Project Coordinator in each province will be the accountable officer for the management of the PIF. Disbursements under the PIF will be made only upon certification by the AID project officer. Separate accounts will be maintained by recipient institutions in a manner acceptable in form and content to AID.

C. Funds Control and Management

5.24. The Project Coordinator in each province will be designated as the authorized GOI representative responsible for the management of project activities financed by AID and IBRD, with the exception of the Farming System Research component and the Human Resources Development component. It will be the Project Coordinator's responsibility to insure that all planning and review procedures required by AID and IBRD to establish eligibility for reimbursement are followed by all district Project Managers and Sub-project Managers. It will also be the Project Coordinator's responsibility to insure that proper accounting procedures/systems are established and followed by all district Project Managers and sub-component Project Managers. To this end, each Project Coordination Office and each district Project Management Unit will have a full-time finance officer to insure proper disbursement and accounting of project funds. It will also be the responsibility of the provincial Project Coordinator to initiate requests for reimbursement to AID/IBRD.

5.25. The AARD Team Leader of the Farming System Research component will be the responsible officer accountable for the proper disbursement and accounting of project funds. It will be the Team Leader's responsibility to insure that all planning and review requirements of AID/IBRD required to establish eligibility for reimbursement are followed. It will also be the responsibility of the Team Leader to insure that proper books are maintained to account for project funds. Finally, the Team Leader will be responsible of initiating requests for AID/IBRD reimbursement.

5.26. Likewise, the Training Coordinator appointed by the GOI will be responsible for insuring that all planning and review requirements necessary to establish eligibility for reimbursement of the Human Resources Development component by IBRD are met. It will be the responsibility of the Training Coordinator to insure that proper books are maintained to account for project funds.

D. Reimbursement Procedures

5.27. The first step in the reimbursement process is the preparation of annual plans and budgets for each component activity. These plans and budgets will be prepared by each participating Project Management Unit (PMU) for each component activity for which it is directly responsible. This plan and budget will be reviewed and approved by the provincial

Project Coordinator and Guidance Team and forwarded to the MHA and USAID for review and approval. AID will subsequently issue a Project Implementation Letter (PIL) stating its approval of the plan and budget on behalf of AID and IBRD. The approval PIL will identify any items that will not be eligible for reimbursement by AID or the IBRD. Upon completion of each year's annual program, each PMU, in conjunction with the provincial Project Coordination Office and the project consultant, will carry out an assessment of each component activity and prepare an evaluation report of the effectiveness of the previous year's implementation, indicating areas for improvement that should be built into the subsequent year's annual plan and budget. Based on this assessment and field inspection by AID and provincial government staff, AID will approve those activities eligible for AID reimbursement. Subsequently, the provincial Project Coordination Office will formally submit an official reimbursement request to the MHA and the Ministry of Finance, who will officially forward the request to AID for reimbursement.

5.28. Upon approval and payment by AID of its portion of the reimbursement, the official request will be forwarded to IBRD, who in turn will make payment to the GOI for its portion. A single consolidated reimbursement request will be sent to AID and to the IBRD.

5.29. The same process will be followed for the Farming System Research component and the Human Resources Development component.

E. Audit

5.30. Assurances have been obtained from the government during project design that the GOI will furnish AID and the IBRD with any project related information and reports requested. The GOI will also maintain, in accordance with generally accepted accounting principles and practices, adequate books and records relating to the project to show without limitation the receipt and use of goods and services acquired under the respective IBRD loan and AID loan and grant. Such books and records will be audited regularly, in accordance with generally accepted auditing standards, and maintained for three years after the date of the last disbursement by AID and IBRD. Such books and records will also be adequate to show the nature and extent of solicitations of prospective suppliers of goods and services acquired, the basis of award of contracts and orders and the overall progress of the project toward completion. Finally, the GOI will allow authorized representatives of AID and the IBRD at all reasonable times to inspect the project, the utilization of goods and services financed by AID and IBRD, and books, records and other documents relating to the project.

VI. PROJECT IMPLEMENTATION PLAN

A. Schedule of Early and Key Events

6.01. Table 23 summarizes the schedule of early and key events required to initiate project operations. The more important of these events are discussed below.

1. Policy Formulation

6.02. The GOI must implement several important policy changes before the Upland Agriculture and Conservation Project can begin. These necessary changes are delineated in para 3.37.

2. Management/Planning and Management Information Systems

6.03. Early start up and implementation of the project will require:

- identification and recruitment of management staff for PCOs and PMUs and line agency component Sub-project Managers. Technically, this recruitment cannot be initiated prior to issuance of the necessary policy determinations. Interim GOI guidance will be sought to allow recruitment to begin in July 1984.

- the design of project planning, management, budgetary/accounting systems and management information systems to guide and control project management at the provincial level by July 1984. Concurrent with recruitment of key project personnel AID will finance short-term consultants to assist in completion of this activity.

- work-shops on new planning/management systems. Output: the IFY 1985/86 annual plan and budget. Initiation/completion: September-October 1984.

- recruiting technical line agency personnel and arranging for technical training available through existing institutions and on-site visits to Jogjakarta and Citanduy. Initiation/completion: October/December 1984.

- a contract with local institutions for base line socio-economic and technical surveys to identify target expansion areas for inclusion in IFY 85/86 program in four districts. Initiation/completion: June/October 1984.

- AARD appointment of the Project Leader for Farming Systems Research and design of the Year 0 (IFY 1984/85) program, including identification of headquarters and field research sites and general agriculture and economic surveys of project area.

- irrigated nursery development at 10 sites. Initiation: September 1984.

- seed production operations at selected sites. Initiation: September 1984.

3. Technical Assistance

6.04. The major actions required to initiate the project related technical assistance are outline below:

- draft Terms of Reference/Requests for Proposals for two TA contracts (i.e. provincial level technical assistance and national level PASA with USDA/SCS). Initiation/Completion: prior to September 1984.

- recruit a consultant associated with international agriculture research network to develop with AARD policy framework and institutional arrangements/protocol to govern AARD collaborative research arrangement with consortium of international research institutes. Initiation/completion: July/August 1984.

- advertise, select and negotiate TA contract for provincial level TA contract. Initiation/completion: June/December 1984.

- negotiate USDA PASA. Initiation/completion: August 1984.

- recruit short-term consultants to assist in drafting project policy guidance and designing project planning, management, budgetary and monitoring system. Initiation/completion: June-October 1984.

4. Procurement

6.05. All international procurement and equipment procurement will be financed and handled by AID. Initial procurement actions include:

- a waiver (to be included in the Project Authorization) for non-competitive contracting with USDA/SCS and with the International Agriculture Research Consortium;

- a waiver to procure locally assembled vehicles and motorcycles (to be included in Project Authorization).

B. Planning, Management, Monitoring and Reimbursement Process

6.06. Effective management of the project will require a clearly articulated planning, management and monitoring cycle/process that is fully understood and followed by all project authorities from the center down to the participating rural extension centers.

Table 23
Schedule of Early and Key Events

<u>Item</u>	<u>Primary Responsibility</u>	<u>Target Date</u>
1. USAID approval of Project Paper	Director	Jun. 84
2. GOI and USAID sign Project Agreements		Jun. 84
3. Task Force formed to organize project	Ex. Sec.	Jun. 84
4. IBRD approval of Appraisal Report	President	Aug. 84
5. Start up consultants arrive	USAID	Jul. 84
6. Management orientative workshop	Task Force	Aug. 84
7. Preliminary work begins for Sustained Uplands Farming System component, e.g., choosing nursery sites, locating seeds and seedlings	PCO	Aug. 84
8. Planning/scheduling workshop	PCO	Sep. 84
9. MIS workshop	PCO	Sep. 84
10. Conditions Precedent for initial disbursement met	PCO	Sep. 84
11. RFTP for consulting contract issued	USAID	Oct. 84
12. GOI/IBRD loan agreement signed	GOI/IBRD	Oct. 84
13. Plans and budgets for Year 1 (IFY 85/85)	PCO	Dec. 84
14. Consultants for Ex Sec arrive	USAID	Oct. 84
15. Senior scientist from IARC arrives	AARD	Nov. 84
16. Consultant Chief of Party and core group arrive	USAID	Feb. 85
17. Demonstration farm begin physical improvement	PMU	Jun. 85
18. Expansion areas begin physical improvement	PMU	Jun. 86
19. Decision re expansion of project to additional district	USAID	Nov. 86

6.07. The basic outline of this planning/management cycle and process is presented in Table 24. Each cycle, while geared to the GOI fiscal year and agriculture planting schedule, will require approximately 13 months to implement. Thus, each cycle overlaps to a certain extent with the preceding planning and management cycle.

6.08. Three important aspects of this cycle require specific mention, because they are not normally found in existing agriculture and conservation planning and management systems. First, the planning/management process will incorporate specific activities to identify expansion areas for treatment under the project, based both on technical data and on the willingness/enthusiasm of upland communities to participate in the project. Each year agro-economic profiles of potential expansion areas will be carried out followed by a series of meetings between project authorities and the communities farming the lands identified for potential inclusion in the project. Based on both the technical data and the response of the target communities, project authorities will select a sub-set of the identified levels for inclusion in the project.

6.09. Second, a mandatory annual field assessment will be carried out in March for each component activity under the project. The results of this assessment will be published and subsequently used to improve planning and execution of each component activity in subsequent cycles. The assessment will be managed by each Project Coordination Office and will include the staff from each participating PMU and technical line agencies and the project consultants. This annual assessment will serve as one of the principal tools to implement the learning-by-doing philosophy of the project. The completion and publication of this annual assessment will be an essential pre-condition to establish eligibility for reimbursement by AID and IBRD.

6.10. Third, following the completion of the annual assessment report, representatives from the national Executive Secretariat, the Project Coordinator Office and AID/IBRD will conduct a field inspection to determine which activities are eligible for reimbursement in April of each year. Each PCO will submit its formal reimbursement request through official channels in May of each year. Given this annual in-house evaluation and subsequent monitoring process by GOI/AID/IBRD, the disbursement of loan funds from AID and IBRD will proceed in a systematic and regular fashion.

6.11. Finally, a schedule will be established for the submission of plans and for approval by the GOI and AID for purposes of establishing eligibility for reimbursement. These dates will be strictly followed to insure that resources are available to PMUs well in advance of the beginning of the rainy season.

6.12. The planning and management cycle/process presented on Table 25 is only a first approximation and will be refined in conjunction with participating local government and line agencies early in Year 0 (IPY 1984/85) of project implementation. All project personnel will be given training to insure their full understanding of and ability to execute each activity comprising the annual planning and management cycle.

VII. MONITORING AND EVALUATION PLAN

A. Introduction

7.01. The UAC Project is based on a methodology of learning-by-doing. Central to this methodology is the ability to monitor the on-going implementation of the project to determine if project activities were implemented as planned and if the outputs specified in the plan were actually realized. The establishment of a Management Information System (MIS) the province and district levels capable of routinely generating data on output performance is, therefore, a central concern of the project. This information will serve as an important data source for annual planning of component activities. In addition to the on-going assessment and annual planning activities, the project will also carry out several external evaluations during the project.

B. Management Information System (MIS)

7.02. The primary purpose of the MIS is to provide project management with information relevant to project performance. Basic MIS activities can be divided into two basic types:

(a) Technical and Agro-economic profiles that will be carried out in target expansion areas to describe the pre-project physical, environmental, social, institutional and agro-economic situation.

(b) Periodic implementation performance data to ascertain project status with respect to component project performance such as hectares of expansion completed, distribution of inputs (seed, fertilizer, trees, grass) and credit extended, etc. Working Paper 2 provides an illustrative outline of the content of these inventories.

7.03. This information will provide project managers with information on "what is happening". Project managers must then address the questions, "Why is it happening?" and "How can it be improved?" To answer these questions, the project staff at both the provincial and district levels and the technical assistance contractor will carry out an annual project assessment that examines the reasons for success or failure of each project component and recommends modifications to be introduced in the subsequent year's component plans. The completion of this annual assessment will be a requirement to establish eligibility for AID/IBRD reimbursement of the succeeding year's program.

7.04. The internal annual assessment and planning process will undoubtedly uncover many issues directly related to component design and performance that require additional data and analysis before action recommendations can be formulated. Funds will be available to the project to contract for special studies through appropriate local institutions or consultants. As a general rule, these studies will be short-term, not exceeding three months, so their findings can be fed back into the planning and implementation process without undue delay.

C. External Evaluations

7.05. Several external evaluations, independent of project authorities, will be carried out during the life of the project. These evaluations will be re-appraisals of project concepts, design, allocation of funds, staffing patterns and component activities in light of performance. The first external evaluation will be carried out during the third year of project activity (IFY 1986/87). Following this evaluation, a determination will be made about if and when the additional four or more districts will be brought into the program. The second mid-term review will be during the fifth or sixth year of project activity (i.e. IFY 1988/89 or 1989/90) and will focus on whether a Phase II program should be initiated. A final project evaluation will be carried out during the last year of the project and will constitute a comprehensive assessment of the Phase I effort.

D. Organization

7.06. Primary responsibility for the design and implementation of the basic MIS and the special studies will reside with the provincial level Project Coordination Offices. The project will provide the PCOs with the necessary technical assistance, training and, as appropriate, funds and equipment.

7.07. The provincial PCO will work closely with the district Project Management Units in the design and implementation of the MIS systems. It is expected that both the provincial and district PMUs will be staffed by one individual with the appropriate background. Additional training of these individuals will also be available as part of the project. Neither the provincial PMU nor the district PMU will have the manpower or the capacity to undertake all of the activities associated with the development and management of the MIS systems. Thus, an important component of strengthening the capacity of these groups will be in the area of simple research management. Close ties with the regional universities in these activities will be encouraged as will use of indigenous consulting firms.

7.08. External evaluations will be primarily the responsibility of senior project management, the USAID project officer and his counterparts. In-country institutions will also be involved in the assessments wherever possible.

VIII. SUMMARY OF THE PROJECT ANALYSES

A. Technical Analysis

8.01. The full text of the technical analysis is presented in Annex 1.A. This section concludes that the principle short-run constraint on utilization of upland resources is the lack of an effective delivery system for improved germ-plasm for crops, grasses and trees. Hence, establishing an effective delivery system for germ-plasm and disseminating effective soil and water conservation techniques to upland areas are two major objectives of the project.

8.02. In accord with these objectives, a considerable amount of research and learning-by-doing is necessary to develop improved germ-plasm, to test alternative delivery systems and to devise the appropriate soil and water conservation measures for specific conditions of soils, slopes and farm management systems.

8.03. Development of the livestock sector in uplands areas also requires research and testing. While there is a large potential for livestock, better means of growing and storing fodder supplies for the dry season must be developed and demonstrated before this potential can be realized.

8.04. Lastly, upland areas have substantial potential for cash crops such as vegetables, fruit and spices, but processing/marketing and technological constraints must be overcome. In the case of tree products, means have to be devised to assure a reasonable income to farmers while the trees are maturing.

8.05. In sum, while there is a sufficient technical basis to proceed with the project, a major intent of the project is to learn as the project proceeds.

B. Economic Analysis

8.06. The details of the economic analysis are provided in Annex 1.B. The analysis concludes that because of the large gap between present yields of major crops in upland areas and technically and economically feasible yields the economic returns to the project are highly favorable.

8.07. The direct net benefits from the 23,000 ha of land to be included in the project are sufficient to create an internal rate of return (IRR) for the project as a whole of 12%. However, considering the following indirect benefits, the economic feasibility of the project is considerably higher.

8.08. First, the benefits of infrastructure investments in research, human capital development and roads will spill over to a much greater area than the 23,000 ha directly affected by the project and used as a basis for the economic evaluation.

8.09. Second, the analysis does not include the value of external benefits to downstream users through reduced sedimentation and flooding. Based on the analysis of a similar watershed, these external benefits could amount to more than one-third of the total costs of the project.

8.10. Given the conservative nature of the assumptions regarding direct project benefits and costs, the high potential value of the indirect benefits and assuming reasonable management, the true IRR of the project is likely to be above 15%, as shown in Annex 1.B.

C. Social Soundness Analysis

8.11. The complete text of the social soundness analysis can be found in Annex 1.C. The analysis concludes that the proposed Upland Agriculture and Conservation Project is compatible with the socio-cultural environment of the two areas and that the activity will benefit a wide array of groups but will assist most directly the rural households who own and operate farms included within the approximately 23,000 hectares of the target area.

8.12. The populations of the upland areas of the two watersheds share many of the same socio-economic characteristics. Although a hierarchy exists within the village communities, the degree of difference in the living standards of the groups is not very great. Land-ownership is the most important factor in determining wealth and status in the uplands. Absolute landlessness is relatively low in upland areas but a significant though undetermined portion of the population do not own enough land to provide for their livelihood throughout the year.

8.13. Despite a high degree of similarity among upland communities, perhaps the most remarkable feature of socio-economic conditions in these areas is the diversity. Several factors contribute to this diversity, the most obvious being variation in the agro climatic zones. Other factors contributing to this diversity include: the availability of off-farm employment opportunities, migration patterns, access to markets, proximity to urban centers and the presence of government programs promoting rural development. This degree of diversity mandates a project implementation strategy that takes into account local conditions and involves communities in the identification and testing of improved farming systems technologies. The project has been designed to encourage the direct participation of local communities in the project's planning and decision-making processes.

4. Administrative Analysis

8.14. The complete text of the administrative analysis can be found in Annex 1.D. The analysis concludes that the organizational strategy proposed as part of the Upland Agriculture and Conservation Project reflects past experience of USAID, the IBRD and the GOI, with similar interventions and appropriately focuses on sub-national levels of government as the key planning and executing agencies.

8.15. The existing structure of government, as it relates to upland agriculture and conservation, is characterized by a high degree of centralization and corresponding standardization. In addition, government services provided to upland communities are highly fragmented, with responsibilities unclearly divided among the Ministry of Forestry and the Ministry of Agriculture and local government. The rigidity imposed by the existing centralized structure and the confusion resulting from the fragmentation of government services make it extremely difficult to design and implement programs that are tailored to the diversity of agro climatic and socio-economic conditions common to upland areas not only in these two watersheds but also throughout Java and Indonesia.

8.16. The management structure and planning and management systems to be utilized under this project are in many respects new and untested innovations. Project management fully expects that as additional experience is acquired, modifications in both organizational structure and process will be required to improve the efficiency and effectiveness of project implementation. The development of this organizational structure is an explicit purpose of the project. At the same time, the proposed operational framework represents lessons learned from past experiences focusing on upland agriculture and conservation activities and attempts to build upon the strengths of these efforts while addressing well-documented weaknesses.

3. Environmental Analysis

8.17 The initial environmental examination, submitted as part of the Project Identification Document, concludes that although the project should have major positive environmental impact, an environmental assessment is needed for the rural roads component. Any procurement and use of pesticides under the project will also be subject to a formal environmental assessment, in accordance with CFR Section 216 Environmental Impact Assessment Procedures. Plans for the implementation of each of these are summarized below.

1. Conservation Roads

8.18. Most of the land in the project area is densely settled and has had intense human usage for at least several decades. None of the roads to be constructed under the project are expected to pass through areas of concern for nature conservation purposes.

8.19. Therefore, the main anticipated negative environmental impact is increased soil erosion, caused either directly by construction of the roadways or indirectly from changes in land use adjacent to roadways. These potential impacts of rural roads development in the project region have been considered seriously during final design of the project. Erosion control efforts are believed to be identical with sound engineering practices. Project design criteria for planning, construction and maintenance of the roads to be constructed are as rigorous or more rigorous than for any rural roads previously constructed on Java (see Annex 1.A).

8.20. The project component itself has been redesignated as the Conservation Access Roads component. This reflects both the erosion control emphasis assigned to construction and maintenance of the roadways, as well as the expectation that the roads will have indirect positive environmental effects. These indirect effects will arise from improved access to markets, which is believed likely to stimulate soil-conserving agricultural investments, and from the improved flow of conservation information and training into presently isolated upland villages. Easier transportation and communication access may, of course, also have countervailing negative soil erosion or other environmental impacts.

8.21. Since the overall purpose of the project is to develop Indonesia's capacity to learn from experience and to institutionalize improved pilot efforts in upland development and conservation, we intend that the Environmental Assessment will be conducted as an extended, iterative process through Phase One of the project. A joint GOI-USAID Upland Conservation Roads Environmental Review Committee will be established, comprised of representatives of the State Ministry of Population and Environment, Public Works (from Padat Karya), Interior (from the Population and Environmental Bureau from the provincial Bappeda Offices) and USAID (the Project Officer and the Mission Environmental Officer). This committee will meet at least once during Year 0 of the project. They will be responsible for producing: (1) the Environmental Assessment of the Conservation Roads component of the UAC Project, and (2) a Manual on Erosion Control for Rural Roads in the UAC Project Area. The Committee could authorize field studies, monitoring work, special training courses, or other activities as they feel appropriate. Their reports, the Environmental Assessment and the manual on erosion control for rural roads, should be completed prior to the mid-project review in Year 2. This report should address the question of general environmental impact associated with future rural roads development in the uplands of East and Central Java.

2. Pesticides

8.22. The GOI is committed to integrated pest management (IPM), which will be the basis of crop protection work under this project. All pesticides used or procured under the project, even on experimental test plots, will be subject to the regulatory procedures both of the GOI and of the USG. During Year 0 of the project, AARD will work with the USAID project officer to develop a preliminary upland crop protection research and management plan. The Mission anticipates drawing upon the AID/W Crop Protection Project to provide technical support to review this preliminary plan, and to work out any additional technical support that may be needed. This review will constitute the formal Environmental Assessment for pesticides use under the project. It must be completed prior to any procurement or usage.

A N N E X I

PROJECT ANALYSES

I. PROJECT ANALYSES

A. Technical Analysis

1. Introduction

The major technical issues in the UACP are soil and water conservation, seed and plant material availability, and livestock and fodder supplies. The following discussion outlines: 1) the major technical features and issues in each of these subject areas in terms of criteria for project design and 2) important areas for research and monitoring in the project.

a. Soil and Water Conservation (SWC)

SWC programs create essentially three kinds of benefits:

- Increased production of agricultural, forest and grass products.
- Reduced external costs of downstream sedimentation and flooding.
- Preservation of options for an uncertain future.

The second and third types of benefits are discussed in the economics section. The focus here will be on the physical basis of these effects, especially as they relate to agriculture and silvipasture systems.

Unfortunately, there is almost no scientifically reliable information concerning SWC in Indonesia (or in other tropical areas) (Hudson, 1983; Hamer, 1980). Therefore this analysis will have to be based on various estimation techniques, fitted where possible, to what little information is available.

The benefits of SWC programs to agricultural production (including forestry, grass, etc.) are of three kinds:

- Preventing loss of nutrients and other valuable characteristics of the soil.
- Preventing loss of soil-moisture holding capacity.
- Enabling better management practices through the above two factors and through such items as cultivating flat areas on bench terraces rather than steep slopes.

All of these benefits depend, directly or indirectly, on the relationship between three basic parameters: (1) the net rate of erosion before and after the SWC project, (2) the quality and depth of the soil, and (3) agro-climatic conditions, which in turn affect (1) and (2).

The net rate of erosion is the rate of loss of soil minus the natural rate of soil formation. In temperate climates, on non-agricultural land, the natural rate of soil formation is about 0.8 mm/yr, or 9.6 t/ha/yr (1 mm = 12 t/ha). However, in the tropics the rate of soil formation is about three times more: 2.4 mm/yr or 28.8 t/ha/yr (Hamer, 1982, p.5). It may also be higher in agricultural land because of greater mechanical and chemical activity, but this is not proven.

The critical depth of soil is the minimum depth at which crop yields are significantly reduced. This is mainly a function of the soil-moisture holding capacity of the soil in relation to agro-climatic conditions--precipitation, evapotranspiration of plants and the root depth of plants. Adventitious roots, which provide most of the nutrient uptake, occupy only the upper 15 cm or so of the soil. Tap roots, which provide most of the water uptake, vary by crops but can extend as far down as 2 meters under moisture stress conditions. Thus moisture stored in the C horizon can also be used by crops. It is not known what the critical soil depth is under the climatic conditions of Java, or what the quantitative effect on yield is as the critical level is surpassed.

Assuming some (presently unknown) amount of fertilizer application to partly compensate for loss of soil nutrients and favorable agro-climatic conditions, approximately 50-75 mm soil depth may be taken as the point where yields begin to be significantly reduced due to erosion.

2. Estimating the Rate of Erosion

This analysis follows Hamer's excellent discussion of the Universal Soil Loss Equation (USLE) under Indonesian conditions. As he notes, the USLE has only been verified for temperate climates and cropping systems, medium textured soils and slope gradients of 3% to 18% (pp. 3-4).

- The USLE may be written: (1) $E = f(C, S; T, L)^*$ where
- E = Average Annual Erosion (t/ha/yr)
 - C = Climatic Factor: see the estimation from precipitation data in Hamer (p.8)
 - S = Soil factor: a classification based on soil texture, organic matter, structure and, especially, permeability
 - T = Topography factor: slope gradient, in percent, slope length, and land form
 - L = Land utilization factor: plant cover in relation to bare soil

* It should be noted that the USLE usually contains a management factor (M) for conservation practises - like terracing, or grass striping. However, because $M = f(T, L)$, this term is redundant in the USLE. In a regression analysis this would cause formidable problems of multi-coliniarity since M and (T, L) are highly correlated. For regression analysis of E in relation to particular states of M, the function could be written $E = f(C, S, M)$, however, $E = f(C, S, T, L)$ is more precise for analytical purposes.

as

The first two factors, C and S, are parameters that are not changeable. The last two factors, T and L, are the instrument variables that can be changed to control erosion. T involves mechanical control through changes in the slope and form of the soil surface. L involves biological control through changes in plant cover.

Addressing biological control first, various values for L are shown in Table 1 (Hamer, 1980, p.20). Note that a value of 1 for bare land is the worst condition for L. These L values must be interpreted under the condition that all other factors in the USLE are constant. However the values may change, even in ranking, for different absolute values of the other factors, especially T.

Second, the primary function of mechanical control (T) is to decrease the slope of the land surface to lower the quantity and velocity of water run-off and, hence, soil erosion. Estimates for T are provided in Table 2 (Hamer 1982, pp. 1-3). As shown in the right column of Table 2, the rate of erosion is roughly proportional to the slope, over slope ranges greater than 15%. Over undulating terrain, slope degree and length should be estimated as a weighted average of various segments of the land surface.

Table 3 (Hamer, 1980, p.21) shows values of different combinations of L and T or management (M) factors by different quality standards (M = 1 represents the worst value). It is interesting to note that the highest quality bench terraces have the same M value (0.4) as the best grass strips. Both are 2.5 times more effective than permanent ground cover with estate crops. .

Neither the USLE nor empirical research in Indonesia has given sufficiently reliable estimates of the actual magnitudes of erosion to be used in planning. An example of this problem is cited in Hamer (1980, p.39) where the rate of erosion in the upper Solo Basin was estimated as 1800-4800 t/ha by one group, and 50 t/ha by another group.

3. SWC Treatments

There are many alternative means of controlling soil erosion ranging from tree and grass plantations, through grass striping and contour bunding, to bench terraces. The appropriate treatment depends on both physical and economic factors.

Variation in soil types is a major physical constraint in these two river basin. Soil types found in the project districts include: Regosols/Lithosols, Grumusols, Latosols, Podsoles and Mediterranean soils derived from limestone parent materials. Other types of soils such as Andosols are mainly found in higher elevations and are associated with recent volcanic activities in locations such as Malang, northern Blitar and parts of Boyolali.

Table 1
Land Utilization Factors Based on SRI Research Data

Code	Cropping/Land Utilization Detail	Rating 1 =
	Bare Cultivated Soil	1.0
S1	Irrigated Sawah	0.01
Sr	Rainfed Sawah	0.05
Dc	Upland crops (Tegalan) crop not specified	0.7
Bd	Brachiaria sp. for stock feed - Establishment	0.5
	- Subsequent years	0.02
Ca	Cassava	0.8
m	maize	0.7
bs	beans	0.6
p	potato	0.4
g	groundnuts	0.2
r	rice	0.5
Sr	Sugarcane	0.2
ba	banana (rarely as monoculture)	0.6
sw	"serehwangi" (Cymbopogon sp)-grass for oil extr.	0.4
ce	coffee, with ground cover	0.2
y	talas (yam)	0.85
Ss	Spices (chile, ginger)	0.9
ng	Mixed Garden, multistory, variable ground cover	
h	high density	0.1
	cassava/soybean	0.2
m	medium density	0.3
l	low density (cahanus sp/peanuts)	0.5
Us	Shifting cultivation	0.4
L	Estate production (poor ground cover)	
r	rubber	0.8
t	tea	0.5
o	oil palm	0.5
c	coconut	0.8
F	Natural Forest, (primary and well regenerated)	
	high litter	0.001
	low litter	0.005
P	Production Forest clear felling	0.5
	selective logging	0.2
F	Fish Ponds	0.01
S	Shrub/grassland	0.3
N	Non-vegetabled badlands	0.91

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Table 2
Topographic factors (T)

Slope gradient class (%) m	Assumed slope length (m)	Mean T rating	Range in T rating	T/Measure slope
0 - 5 0,5	45	0.35	0.00 - 0.75	0.14
6 - 15 9,5	35	1.60	0.76 - 2.40	0.17
16 - 35 25,5	25	4.60	2.41 - 6.80	0.18
36 - 50 43	20	7.90	6.81 - 8.99	0.18
50	20	9.00	8.99	0.18

Table 3

Code	Conservation Practices (M)	Rating M =
	Bench terraces	
Th	- high standard design/construction	0.04 *
Tm	- medium standard design/construction	0.15
Tl	- low standard design/construction	0.35
Tg	Traditional terraces	0.40 *
Tc	Colluvial terraces on grass strips or bamboo	0.50
	Permanent grass strips e.g. Bahlia grass:	
	- high standard design and establishment	0.04 *
	- low standard design and establishment	0.40
Ht	Hillside trenches (silt pits)	0.3
L	Croatalaria sp. (legume) in rotation	0.60 *
Cl	Contour cropping, slope gradient 0 - 8%	0.5
2	9 - 20%	0.75
3	20%	0.9
M6	Surface Mulch retention (litter or straw 6t/ha/yr)	0.3 *
3	(litter or straw 3t/ha/yr)	0.5
1	(litter or straw 1t/ha/yr)	0.8
GC	Permanent ground cover with estate crops	
h	- high density	0.1
m	- medium density	0.5
R	Early reforestation with cover crop	0.3
n.s.	Not specified	1.0
n.a.	Not applicable	1.0

* based on Soil Research Institute (Bogor) data

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Terracing in sandy-loam or loam textured soils is more difficult than on more stable clay textured soils. For soils other than clay, close planting of legume shrub hedges such as leucaena or gliricidia along the edge of the terraces with grasses to strengthen the terrace risers is highly recommended. The experiences of district Sikka on Flores Island or the SALT Project in Davao, Mindanao, are prime examples. Planting legumes on the risers both strengthens the riser and provides green manure. In both these areas, the leucaena was planted in two rows at 50 cm apart and 5 to 6 cm along the rows. The foliage from the leucaena will protrude about 30 to 50 cm on each side of the rows, thus occupying 1.10 to 1.50 m of land per terrace. In the Panawangan Pilot Watershed, where the average terrace width is less than 1.50 m, the above system is clearly impractical.

Vertical risers in clay soils with grass protection on the lips and upper 1/3 of the terrace riser have proven to be quite stable in many demonstration farms at Citanduy Watershed. However, to obtain a full grass/legume cover of the terrace risers it is recommended that risers be built on a 1/2 slope (1 horizontal to 2 vertical). There is clearly a trade-off between crop production and increased livestock carrying capacity, in the form of greater grass/legume production, between these two styles of terracing. The 1/2 slope risers are recommended on slopes at 40%.

For general purposes the privately owned lands can be classified in four broad categories:

1. Land under permanent vegetation, including those under alang-alang (Imperata cylindrica).
2. Land where soil degradation has reached such a level that agriculture production is no longer practical under local conditions.
3. Land where productive soil depth is getting so thin that, if soil erosion is not reduced to a minimum, it will fall into category 2 within a few years.
4. Land where the soil depth is such that it will take many years under the present soil management before soil production is reduced significantly.

The priority target for land stabilization should be land category 3 with attempts to establish permanent vegetation on land category 2 by using legumes and trees such as cashew capable of producing under poor soil conditions. Land category 4, although not in danger itself, is also a source of sedimentation.

Silvipasture should be encouraged on shallow soils where terracing is not practical or, because of steepness of the land, terraces are not stable or are too costly for what can be produced on them. Owners of land that is presently under Imperate cylindrica or other type of weeds and trees, who want to take advantage of the project to obtain better grass/legumes and trees, should be allowed to do so providing that they participate and work with the other farmers in the group.

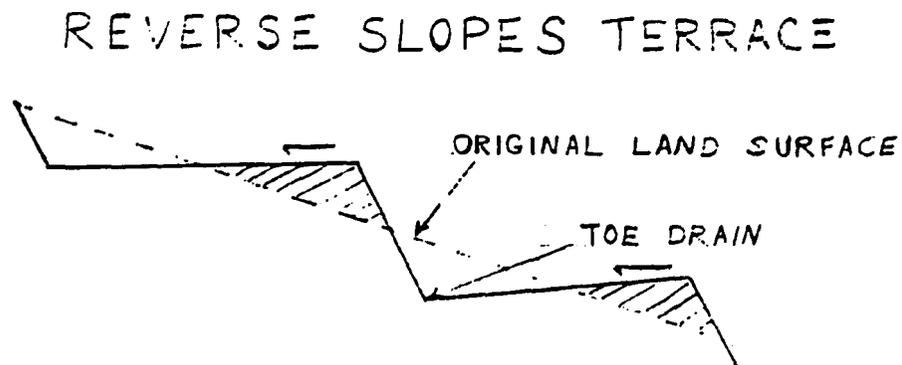
The project may give the farmers fertilizers for grass but the majority of the farmers will not use it for that purpose and almost no farmers will buy fertilizer for grass except on special occasions or where dairy is important and a market exists for grasses. This implies that outside such areas, large grass plantations are not feasible, since fertilizer is required. Thus grass production will occur only on terrace risers, utilizing some of the fertilizer provided for crops. Since farmers build very steep risers on their terraces to avoid reduction of agricultural land, the area producing grass will be low (say less than 10% of the agricultural area). Since 1977 Project Citanduy has been recommending that farmers replace top soil on the surface of their newly built terraces. Two techniques were recommended: 1) stockpiling top soil and 2) building the bottom terrace first, then throwing the top soil from above onto the already built terrace.

Farmers as a rule have not followed these recommendations nor is there data to prove that the practice of replacing the top soil on the newly built terraces actually increases production sufficiently to make it worthwhile. This issue should be closely studied in the research component to determine under which conditions it should or should not be recommended. Largely to counteract this yield-reducing effect, and to encourage establishment of grasses, the project will supply subsidized fertilizers for the first two years after terraces have been installed.

4. Estimating the Labor Requirements of Bench Terracing

The design of bench (and other) terraces has been specified by Sheng (FAO 1981). Sheng has calculated the volume of earth required to be cut, transported and compacted in bench terracing, in relation to the slope of the land and width of the terrace bench, as shown in Figures 1 and 2.

Figure 1



Row 1 at the bottom of Figure 2 shows the m^3 of earth per ha of land area under bench terracing. The 2.5 m minimum bench width figures will be used here.

Row 2 shows the amount of earth per ha of bench surface or agricultural land, net of land used in the risers. The percentage figures under the curves of Figure 1 show the percentage of total land area in benches. Row 2 is obtained by dividing these figures into Row 1.

Lastly, Row 3 shows the mandays required per ha of bench surface created. These figures are based on the assumption that one man can completely process $1 m^3$ of earth per day (about 3.6 tons). Sheng estimates 3.8-4.0 m^3 per day. Sheng's assumption may be valid in very favorable conditions where the soil is loose and moist. However, most of the terracing in the uplands project will be done in the dry season, when the hard, dry condition of the soil will adversely affect production and increase compaction costs. Data from the Citanduy Project indicates that only 0.9 to 1.4 m^3 of earth is moved per day in construction of bench terraces. Thus Row 3 may under-estimate labor requirements by a factor of 2-3.

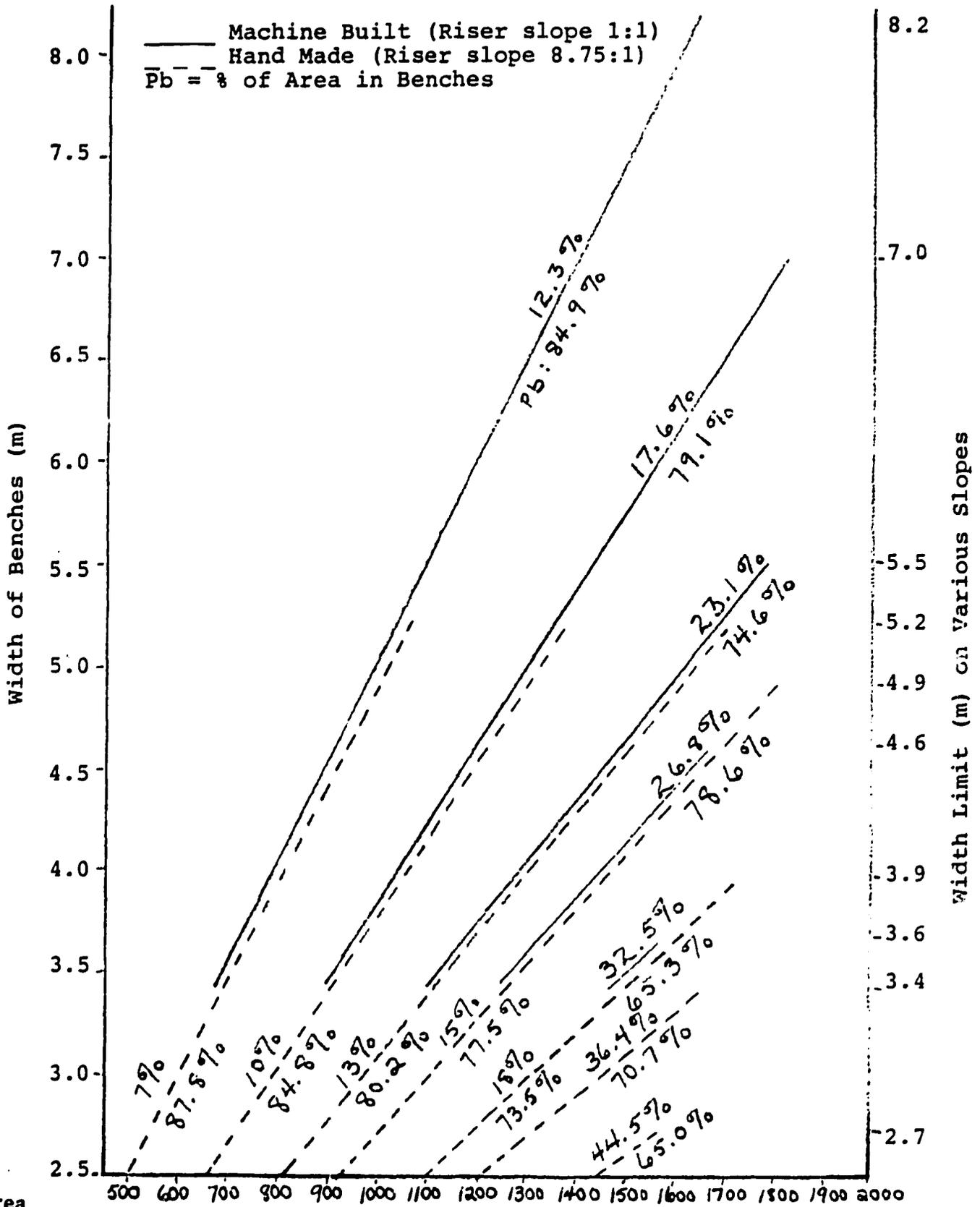
It is assumed that farmers will contribute their labor free of cost in exchange for the Rp.300,000/ha subsidy. The shadow price of labor is assumed to be Rp.500/day, while the market prices is about Rp.1,000-1,500 per day. If farmers have no alternative opportunities for their labor, the shadow prices should be used. If they have self-employment opportunities, with a value greater than the shadow price, that figure should be used. If they must be employed for the work, Rp.1,000-1,500 per day should be used. Thus at the minimum slope of 17.6%, the labor cost in shadow prices is Rp.80,000 per ha of bench surface. These figures do not include the cost of grassed waterways. In terms of market wages, the costs would be 2-3 times these amounts. (These cost figures should be adjusted down in terms of land area treated, according to the percentage of total area in bench shown in Figure 2).

If farmers are to be paid Rp.300,000 per ha of bench area, then those with the lowest slope will receive about the market wage for their labor, while those with the highest slope will receive only half this amount, or the shadow price of their labor. This inequity could be evened out by the group form of bench terracing—where all farmers work on all the slopes in their area and share the subsidy according to their work.

The amount of subsidy should be adjusted to the weighted average slope of the area to be worked by each group. A problem with this policy, however, is that since the subsidy is paid in seeds and fertilizer those working lower slopes would receive less input per unit of bench land. Clearly, policy decisions on the management of the subsidy are required here.

Figure 2

Volumes of Soil to be Cut and Filled per Hectare
for Bench Terraces



1. m ³ /ha area	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
2. m ³ /ha bench		570		800		1025	1161			1496	1690					2231
3. mandays/ha bench		190		267		342	397			499	563					744

5. Existing Crop Situation and Potential

Crop production is generally poor in the uplands. The key to improving yields is better seed stock. The following section outlines the seed situation for the four principal crops.

a. Maize is one of the most popular and by far the most widely cultivated of the several traditional home-grown food crops produced by the upland smallholder. The production of local, low producing, short maturity white varieties are currently preferred. Yields from non-intercropped plots are estimated to range from 600-1000 kg per hectare.

Test results of currently available improved (Arjuna, Geja Kertas, Harapan, etc.) and hybrid (C1) yellow kernal varieties in the project area have convinced the Department of Agriculture to intensify the production of hybrid seeds and to promote the cultivation of these higher yielding improved maize varieties. Results from numerous test plot trials with hybrid seeds and relatively low fertilizer application have produced yields as high as 10.5 t/ha, averaging 5.7 t/ha. In Blitar, East Java, demonstration yields of dry grain were 10.2 t/ha. Compared to the improved Arjuna variety, the hybrid seed required an additional Rp.15,000/ha but it increased returns by an average of Rp.332,000/ha.

Promotion efforts have met with success in most lowland surplus production areas and will have to be intensified in the upland areas in correspondence with the maize seed supply activity envisioned by the project.

(b) Peanuts are widely grown and traditionally intercropped in several of the upland areas. They are a good source of cash income when grown with improved practices and offer higher returns than other palawija crops.

High yielding quality peanut seed, although unavailable in most areas of Indonesia, offers the potential to dramatically increase yields, which currently are approximately 700 kg/ha in Central Java. The Department of Agriculture has recently demonstrated that two currently promoted varieties (Anoa and Rusa) can more than double average yields (to 1300-1500 kg/ha).

Farmers generally purchase low quality seed that has a low rate of germination and produces low yields. The seed, due to its limited seasonal compatibility, is purchased during periods of high prices and scarcity. Normally, the farmer will contract his harvest and sale through the "tebasan" system. Prior to threshing, the unshelled nuts are sold to a private trader and the plant is sold as an inexpensive livestock forage. The traders then dry, shell, manually grade and package the nuts for wholesale marketing. Usually this manual grading will separate a portion of the larger, untarnished nuts for eventual seed resale to farmers. A significant factor in the unavailability of improved groundnut seed is the tedious and costly manual sorting system.

(c) Upland Rice is commonly grown once the timing of the rainy season has become well established. Varieties generally planted are short maturing (mainly IR 35 and Sintani) because rains are unpredictable and irrigation is unreliable. Certified stock and extension seeds are rarely available and utilized in the upland areas. The seed production companies' emphasis on the Cisadane variety used in lowland irrigated areas has contributed to this situation.

Due to the rainfall sensitivity of rice and current lowland preferences toward late maturing, high yielding varieties, it is most likely that project associated research, extension and seed production efforts will concentrate on short maturing, drought resistant upland varieties. The adoption of these varieties by project participants will depend almost solely upon their availability and thus on local upland production.

(d) Several varieties of soybeans are grown (oftentime simultaneously) for resale in the project areas. Its relatively high resistance to drought and yearlong marketability makes it a necessary crop in several areas. The early maturing Lokon variety appears to offer the best potential for higher yields with good husbandry practices, fertilization and pest control. Quality certified soybean seed is rarely available and, when available, is often used by government related credit programs. Because sorting/grading of soybeans is time consuming, it is often done at the farmer producer's home and is subject to mixing with other varieties. Low germination and varietal mixing complicate planting and harvesting operations producing lowing yields.

6. Experimental Livestock Sector

An experimental sector of the project will deal with livestock. At present, livestock production often contributes 15 to 25% of farm income in these two watersheds. Brama cows are preferred by many farmers, but small ruminants, such as goats and sheep, play a more important role in the household economy. The latter are a form of savings and a readily available source of capital.

Despite the decreasing amount of land available for agricultural purposes, small ruminants continue to be widely raised. They are more adaptable to varying environments, their reproductive cycle is much faster than that of cattle or water buffalo and there is a ready market for them. Typical goat or sheep herd size for uplands families is 3 to 5 head. The average number of small ruminants/family is shown on Table 4.

Present stocking rates vary from .24 to .95 AU/ha (1 AU is equivalent to 500 kgs live weight). With project inputs, the carrying capacity could increase to 5 animal units (AU) per ha of land under grass vegetation or silvipasture with low tree density and shade tolerant grass/legumes. Table 4 demonstrates the potential for increased livestock and farm income.

Table 4
Average Number of Small Ruminants*

<u>Location</u>	<u>Area (ha)**</u>	<u>Total # SR</u>	<u>Total Cattle</u>	<u>Total AU/ha***</u>	<u>Number Families</u>	<u>SR/Family</u>
<u>Central Java</u>						
Semarang	88,870	83,881	4,538	0.11	130,477	0.64
Boyolali	42,024	98,439	17,125	0.55	46,862	2.10
Grobogan	103,686	69,513	37,588	0.40	96,050	0.72
Blora	65,911	31,665	55,182	0.91	58,758	0.54
<u>East Java</u>						
Malang	171,570	55,828	51,751	0.32	125,421	0.44
Blitar	38,776	34,555	29,282	0.81	45,773	0.75
Tulungagung	63,069	32,188	28,290	0.48	61,947	0.52
Trenggalek	98,737	83,335	27,181	0.33	97,643	0.85

* For the analysis in this livestock table it is assumed that livestock numbers reported by the districts are totals for adult and young animals. It is assumed that the livestock is supported now from all land rather than just the cultivated land. Also the "Area (Ha)" category may not include roadsides, stream banks, drainages, villages and home gardens. This land is an important source of forage in the present cut and carry system of the project area. If this is the case, the calculated stocking rate may actually be lower due to the same number of animals being supported by greater land area.

** Total land area with no distinction between agriculture and non-agriculture land.

*** 1 AU = 1000 lbs or 500 Kgs of liveweight of livestock. One head of cattle = 500 Kg = 1 AU
One goat/sheep = 30 Kgs = .06 AU

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On an experimental basis, the project will supply 4 adult small ruminants/ha as an incentive for farmers to invest their resources in soil conservation efforts such as silvipasture. Before receiving the animals, farmer recipients will be required to plant grasses, legumes and/or trees. The farmer would normally have to wait several years (up to 5 years) to realize cash benefits from tree crops, but if pastures are planted the farmer can more quickly realize a modest but steady income. Even under less than favorable soil conditions, silvipasture may support 1-2 AU/ha (10 to 20 goats or sheep).

One of the first considerations to increase stocking rates should be the year-round availability of sufficient feed. In the project areas that have rainfall of 2500 mm/yr and above, distributed over 8 months or more, there is no problem of year-round supply of forage. Where it is less than 2500 mm/yr, the availability of dry season fodder must be assessed before increasing the livestock population. Lamtoro would be an appropriate choice for this area as it is draught resistant and maintains green leaves during the dry season. On a wet basis of 85% moisture it yields 11 t/ha/yr. Other possible forages are Setaria spp (54 t/ha/yr) and Brachiaria (32 t/ha/yr), which are improved grasses, that have higher nutritive value and are higher yielding than common native grasses. In addition to these introduced forages, farmers can (and presently do) use crop by-products such as leaves from cassava, corn, peanuts and soybeans to supplement livestock feed during the dry season. There are also possibilities for cutting the excess pasture production during the rainy season and preserving it as hay for use in the dry season. Thus a higher stocking rate can be maintained throughout the year.

Small ruminants play an important role in the family farming system. They utilize crop by-products that would otherwise go unused; the family can generate cash for specific needs through sale of goats or sheep; and manure produced can be sold or used to help maintain soil fertility.

To date, few data have been taken on possible forages, but some of the promising ones include Brachiaria briantha (32 t/ha/yr) Leucaena leucaecephala (11 t/ha/yr) Septana splendida (54 t/ha/yr).* These species have relatively higher nutritional quality and higher yields than native grasses, and are appropriate for the various climatic and rainfall conditions of the project area. Specific monthly yield data is not available, so it is difficult to predict yield of each species and hence the carrying capacity, during the dry season. Only part of the project area has an extended dry season and low annual rainfall that makes year-round availability of forage a critical factor in increasing stocking rates. However, there are several indications that, although yields do decrease during the dry period, farmers presently have access to and use other feeds.

* These figures are on a wet basis of 85% moisture content.

B. Economic Analysis

1. Conceptual Background

Soil and water conservation (SWC) programs involve the use of limited public and private resources that have alternate uses. Therefore these programs are subject to the same kind of economic evaluation as any other program. It is necessary to stress this point because there is a kind of SWC "Fundamentalism" (where objectivity is replaced by a moral imperative) that holds these programs to somehow be beyond economics--that they are, so to speak, worth whatever they cost. While it is true that SWC programs are somewhat different from many other programs because they involve long-run, irreversible, and uncertain effects, conventional economic analysis provides a framework for rational decision-making--although, as in all other fields, it is never sufficient for the final decision.

SWC programs create essentially three kinds of benefits:

- Increased production of agriculture, forest, and grass products,
- Reduced external costs of downstream sedimentation and flooding, and
- Preservation of option values for an uncertain future.

The on site, external and inter-temporal dimensions of SWC programs must all be evaluated as quantitatively as possible if rational choices are to be made in this important field.

In principle, the on site and external benefits of SWC programs can be estimated with a reasonable degree of accuracy--although the data is rarely available to actually do so. The situation with respect to option values is quite another matter. For example, in attempting to estimate the need for soil on site a century from now, one must be able to forecast both consumption demand and agricultural technology at that time. Future technology, which is based on new knowledge, is impossible to predict even in principle. It simply is not known what the value of land will be beyond the horizon of present technology--it may be more than today's value, or less. In cases of uncertainty and risk it is rational to pay a certain amount in the present to preserve an option for the future. In the case of risk, where probabilities can be assigned, the value of the option can be estimated, as in insurance premiums. In cases of pure uncertainty, where no probability can be assigned, the value of the option is strictly a matter of the subjective judgement of decision-makers.

However, while economic analysis cannot tell decision-makers the value of the option, it can define the cost of the option. For example, if a project carries a favorable rate of return on the basis of the countable benefits alone, then the cost of the option is zero. Nothing is given up by having the option if the project that carries the option is desirable on other grounds. On the other hand, if the project does

not carry a favorable rate of return on the basis of the countables, then the cost of the option is the amount of additional benefit necessary to make it favorable. For example, in benefit-cost terms, if a B/C ratio of 1.2 is considered favorable, and the B/C ratio on the basis of the countables alone is only 0.9, then the cost of the option is equal to 0.3 of the total countable benefits. After this computation is finished decision-makers can decide if the project is worth doing. This is the basic methodology used here for the economic evaluation of SWC program.

2. Overview

The Upland Agriculture and Conservation Project is targeted to have direct impact on the agricultural system in the upper watershed regions of the Jratunseluna and Brantas Basins of Central and East Java, respectively. Through the Sustainable Upland Farming Systems (SUFS) component, dem plots (10 ha each) will be established on critical lands with greater than 15% slope to demonstrate improved technology appropriate for increasing agricultural productivity in upland areas. These dem plots will be developed under the supervision of the extension service, with all dem plot participants responsible for constructing bench terraces on their own land to prevent future declines in productivity and for assisting to build waterways for the contiguous terraced area. As an incentive to participate, in the first and second years, cooperators will be given improved seed varieties and inputs to increase yields and a subsidy to cover the cost for construction of waterways for establishing grass to stabilize the terraces and for improved seed varieties and inputs to increase yields. In subsequent years, credit will be available to finance input purchases.

In year 2, the technology demonstrated on the dem plot will be extended to nearby farms with participants given the same incentives provided to the initial dem plot cooperators. As appropriate technology is identified, project activities will expand to cover the steep sloped areas--say, 40% and above--through such technologies as grass and tree strip terracing, orchards, grasses and fodder trees, fuel wood and other cash crops.

To support the SUFS dem plot/expansion program, the Upland Agriculture and Conservation Project includes components in applied research, human resource development and upland village access roads.

In addition to directly increasing upland agricultural productivity, the project has secondary impact beyond the immediate project area. Stabilizing the uplands will reduce the siltation rate in down-stream dams, extending their useful life for producing hydroelectric power and irrigating the lowlands, and in the coastal estuaries, thereby increasing fisheries productivity. Technology developed through the applied agricultural research component will increase agricultural productivity in upper watershed areas throughout Indonesia. Organization and management strategies incorporated into the project will have widespread applicability for increasing project effectiveness throughout the agricultural sector.

3. Crop Systems

The primary annual crops grown in the Jratunseluna and Brantas River Basins include cassava, corn, peanuts, soybeans with some upland rice, sweet potatoes and mung beans. Economic crops include sugar cane, clove, coffee, firewood trees and fodder trees.

In each of the two target provinces, the project will focus on four districts. In each district, activities are concentrated in the sub-districts most affected by soil erosion due to annual cropping activities. Table 1 (a-d) shows estimated yields and area for each sub-district in the project area. These average yields tend to over estimate actual yields found in the project areas since 1) the data represents an average of yields in lowland and upland environments, 2) yields are generally higher in the lowlands, 3) only a portion of each sub-district is in the upper watershed, and 4) the values generally reflect pure stand yields whereas producers in the upper watershed inter-crop.

Based on Bina Marga District data, the major annual food crop cropping patterns are estimated in Table 2. While upland rice is also grown in the upper watersheds, data is not available to estimate the upland rice area. Consequently, upland rice is an additional crop in some unknown proportion in the listed cropping patterns.

4. Prices

Financial prices for material inputs are based on current government farm level supply prices. Seed prices are adjusted to reflect the cost of improved varieties. Labor costs are based on the prevailing wage rate in the area. Output prices are based on seasonal low rural market prices (1983) in Central and East Java, estimated by the Central Bureau of Statistics. Working Paper I discusses the marketing situation with respect to secondary crops in Indonesia.

Economic prices are derived from world market prices (mid-1983) backed down to farm gate prices. The minimum shadow price of under employed labor is assumed to be Rp 500/md, equal to the estimated daily minimum wage necessary for a head of household to support a family of five persons.

5. Without Project Situation

For estimating crop production in the without project situation, results in Tables 1 (a-d) and 2 were reviewed as well as studies conducted in similar upper watershed areas. The cropping pattern, cassava and corn with peanuts, was chosen for representative analysis because it is an important pattern in the area and is a more intensive existing pattern than a monoculture or two-crop pattern. Improvements achieved in this pattern would have an even greater impact on less intensive existing cropping patterns.

Input levels and yields associated with this existing cropping pattern are shown in Table 3, assuming that 20% of the first and second crops are planted to cassava and 80% to corn and peanuts, respectively. Total labor is estimated at 200 md/ha, 30% of which is hired. Input levels and yields are based on a synthesis of data shown in Table 1 (a-d), research conducted in similar areas, and the judgment of the technical personnel (Working Paper 1, Secondary Crop Marketing).

Financial and economic prices for inputs and outputs are shown in Table 4.

Under the assumed cropping pattern and input levels (Table 3) and prices (Table 4), net returns/ha are shown in Table 5. In the absence of a better yield/soil loss function for critical areas, it is assumed that net returns decline at a rate of 2% p.a. as a consequence of soil erosion in critical areas.

6. With Project Situation

Analysis of the with project situation is based on estimates of productivity increases that can be achieved in the existing cropping pattern through the introduction of new seed varieties, fertilizer and pesticide--once the soil-moisture regime is established by terracing. Input levels applied in the introduced cropping pattern are shown in Table 6. In years 1 and 2, inputs are subsidized, but in subsequent years producers are assumed to borrow or use their own capital at discount rate of 2%/month.

As a consequence of the adoption of new seed varieties, fertilizer and pesticide, cassava yields are expected to increase by 50% and corn and peanut yields by 100% compared to the without project situation. It is assumed to take five years for the existing technologies to achieve their full potential as producers will require some time to fine-tune the recommended practices. From years 6 to 15 it is estimated that cassava, corn and peanut yields will increase at an annual rate of 2%, 3% and 3%, respectively as a consequence of research activities conducted by the applied research component of the project. From years 16 to 30 it is assumed yields will remain constant without further research. The yields for years 1 to 30 projected under these assumptions are shown in Table 7.

Under the assumed cropping pattern and input levels (Table 6) and resulting yields (Table 7), net returns are shown in Table 8a (financial) and 8b (economic) for the food crop enterprise. Financial returns to farmers are shown net of subsidies under the SUFS component. Economic returns include the economic costs of the subsidies for farm inputs.

Table 1(a)
Secondary Crop area (ha) and Yields (kg/ha)
in Project Sub-Districts of the upper watershed regions
of the Jratunseluna and Brantas River Basins (1982)

Districts/ Sub-Districts	Corn		Cassava		Soybeans		Peanuts	
	Area (ha)	Yield (kg)	Area (ha)	Yield (kg)	Area (ha)	Yield (kg)	Area (ha)	Yield (kg)
<u>Malang</u>								
Pagak	NA	NA	1,410	15,820	721	698	203	729
Dampet	NA	NA	1,494	17,880	0	0	10	700
Kalipare	NA	NA	1,935	16,320	921	705	539	701
Gudangan	NA	NA	NA	NA	NA	NA	NA	NA
Sumber manjung	NA	NA	1,885	17,030	164	707	37	649
Bantur	NA	NA	4,883	15,430	196	674	21	667
Ampel gading	NA	NA	2,347	18,610	0	0	15	667
Donomulyo	NA	NA	4,234	16,790	469	693	165	752
Wajali	NA	NA	181	16,630	0	0	5	800
	NA	NA	18,369	16,650	2,462	698	995	713
<u>Cropping Pattern</u>								
NA								
<u>Blitar</u>								
Kademangan	1,448	698	2,178	7,697	170	597	204	479
Bakung	754	752	1,833	7,929	202	340	114	428
Sutojayan	200	1,242	1,125	9,393	114	523	258	553
Panggungrejo	1,460	803	1,515	4,779	1,250	388	0	0
Binangun	1,452	771	2,215	6,084	2,196	615	0	0
Wates	1,249	1,139	1,077	5,680	1,217	737	881	437
	6,563	844	9,943	6,929	5,149	533	1,457	462
<u>Cropping Pattern</u>								
Area (%)								
Cassava monoculture 33								
Cassava + corn + peanuts 17								
Cassava + corn + soybeans 50								

NA = Data not available
Source: Bina Marga

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Table 1(b)
Secondary Crop area (ha) and Yields (kg/ha)
in Project Sub-Districts of the upper watershed regions
of the Jratunseluna and Brantas River Basins (1982)

Districts/ Sub-Districts	Corn		Cassava		Soybeans		Peanuts	
	Area (ha)	Yield (kg)	Area (ha)	Yield (kg)	Area (ha)	Yield (kg)	Area (ha)	Yield (kg)
<u>Tulung Agung</u>								
Rejotangan	937	2,026	564	8,700	319	725	340	760
Tanggung gunung	624	2,626	36	8,400	0	0	266	500
Pucang laban	779	1,337	1,975	4,733	236	455	538	400
Sem dang	791	1,100	1,730	10,393	14	514	1,710	960
Pagerwajo	1,182	1,270	1,295	7,811	0	0	93	900
Kauman	78	800	37	8,500	43	553	12	650
Kali Dawir	1,047	1,726	1,508	5,147	261	655	96	700
Karang rejo	827	2,870	656	7,713	175	805	240	980
	<u>6,331</u>	<u>1,780</u>	<u>7,791</u>	<u>7,200</u>	<u>1,054</u>	<u>650</u>	<u>3,364</u>	<u>800</u>
<u>Cropping Pattern</u>		<u>Area (%)</u>						
Cassava monoculture		19						
Cassava + corn		25						
Cassava + corn + peanuts		43						
Cassava + corn + soybeans		13						
<u>Trenggalek</u>								
Pale	118	1,560	2,548	9,755	14	321	0	0
Karangan	1,266	1,891	2,374	9,787	1,588	465	71	572
Panggul	69	1,056	849	9,726	893	429	151	498
Dongko	224	1,653	996	8,496	94	450	46	576
Durenan	538	2,495	495	10,553	783	583	21	633
Tugu	1,112	1,781	1,672	9,568	803	589	37	549
Kampak	80	900	720	9,057	280	441	109	542
Watulimo	44	1,770	2,988	9,585	73	485	56	627
Bendungan	2,407	1,801	1,805	9,805	13	400	0	0
Gandusari	822	1,859	1,307	9,754	1,022	569	275	614
Trenggalek	381	1,677	723	9,591	789	579	23	600
Pagolan	372	1,561	463	9,554	739	478	95	583
	<u>7,433</u>	<u>1,827</u>	<u>16,940</u>	<u>9,607</u>	<u>7,091</u>	<u>515</u>	<u>884</u>	<u>575</u>
<u>Cropping Pattern</u>		<u>Area (%)</u>						
Cassava monoculture		56						
Cassava + corn + peanuts		39						
Cassava + corn + soybeans		5						

Source: Bina Marga

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Table 1(c)
Secondary Crop area (ha) and Yields (kg/ha)
in Project Sub-Districts in the upper watershed regions
of the Jratunseluna and Brantas River Basins (1982)

Districts/ Sub-Districts	Corn		Cassava		Soybeans		Peanuts	
	Area (ha)	Yield (kg)	Area (ha)	Yield (kg)	Area (ha)	Yield (kg)	Area (ha)	Yield (kg)
<u>Getasan</u>	1,421	2,625	147	10,565	1	100	1	600
Jambu	2,894	2,837	935	13,294	0	0	5	800
Ungaran	208	1,909	287	13,408	0	0	153	856
Klepu	357	1,675	950	13,334	7	857	217	848
Tegarun	984	2,019	232	11,237	0	0	7	343
Sumowono	1,847	2,485	347	13,225	0	0	0	0
Bawen	88	2,114	286	13,272	0	0	59	1,712
Susukan	431	2,814	221	12,534	129	798	863	650
Tuntang	109	2,119	459	11,634	0	0	0	0
Ambarawa	882	2,387	628	13,311	0	0	2	500
Bangin	437	2,261	367	10,515	2	500	363	967
Suruh	304	2,084	495	10,721	0	0	423	650
	<u>10,117</u>	<u>2,496</u>	<u>5,354</u>	<u>12,538</u>	<u>139</u>	<u>799</u>	<u>2,093</u>	<u>783</u>
<u>Cropping Pattern</u>		<u>Area (%)</u>						
Corn monoculture		47						
Cassava monoculture		31						
Cassava + corn + peanuts		1						
Cassava + corn + soybeans		21						
<u>Boyolali</u>								
Wonosegoro	2,496	1,698	1,367	9,086	605	562	249	1,072
Kemus	2,528	1,808	1,128	8,618	266	564	380	692
Klego	1,047	1,566	1,525	9,800	488	1,002	223	659
Juwangi	520	1,040	509	5,760	147	544	25	640
Karanggede	996	1,519	1,107	9,858	175	863	131	687
Andong	1,041	1,560	1,464	9,034	18	556	542	659
	<u>8,628</u>	<u>1,637</u>	<u>7,100</u>	<u>9,036</u>	<u>1,699</u>	<u>718</u>	<u>1,550</u>	<u>736</u>
<u>Cropping Pattern</u>		<u>Area (%)</u>						
Corn monoculture		18						
Cassava monoculture		44						
Cassava + corn + peanuts		18						
Cassava + corn + soybeans		20						

Source: Bina Marga

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Table 1(d)
Secondary Crop area (ha) and Yields (kg/ha)
in Project Sub-Districts in the upper watershed regions
of the Jratunseluna and Brantas River Basins (1982)

Districts/ Sub-Districts	Corn		Cassava		Soybeans		Peanuts	
	Area (ha)	Yield (kg)	Area (ha)	Yield (kg)	Area (ha)	Yield (kg)	Area (ha)	Yield (kg)
<u>Grobogan</u>								
Kradenan	3,699	1,698	325	9,791	387	814	74	554
Gabus	4,100	1,557	340	9,956	2,056	701	0	0
Geyer	1,850	1,589	1,940	13,174	78	820	84	833
Kedung jati	123	1,667	357	9,434	90	711	66	758
Torah	6,012	1,572	62	10,290	1,273	766	18	500
Karang agung	1,258	1,572	1,308	9,038	189	757	14	571
Pulokulon	<u>3,324</u>	<u>1,614</u>	<u>320</u>	<u>8,525</u>	<u>91</u>	<u>654</u>	<u>0</u>	<u>0</u>
	21,041	1,549	4,652	10,892	4,164	736	256	695
<u>Cropping Pattern</u>			<u>Area (%)</u>					
Corn monoculture			77					
Cassava monoculture			12					
Cassava + corn + peanuts			10					
Cassava + corn + soybeans			1					
<u>Blora</u>								
Jepon	12,921	625	854	7,645	1,617	413	1,749	389
Ngamen	8,382	908	882	7,496	4,736	264	923	333
Banjarejo	7,970	913	532	7,684	1,717	767	843	439
Tunjungan	5,762	803	551	7,668	3,613	450	1,712	430
Blora	<u>1,816</u>	<u>811</u>	<u>105</u>	<u>7,638</u>	<u>598</u>	<u>455</u>	<u>244</u>	<u>414</u>
	36,851	789	2,924	7,611	12,281	418	5,471	401
<u>Cropping Pattern</u>			<u>Area (%)</u>					
Corn monoculture			44					
Corn + cassava			8					
Corn + peanuts			15					
Corn + soybeans			33					

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Table 2
Relative Occurance of Major Cropping Patterns
found in the Upper Watershed Regions
of the Jratunseluna and Brantas River Basins (1982)

	Cropping Pattern						
	Corn Mono culture	Cassava Mono- culture	Cassava + Corn	Cassava + Peanuts	Cassava + Soybeans	Cassava + Corn + Peanuts	Cassava + Corn + Soybeans
Percent of area	34	19	7	5	11	16	8

Source: Estimated from Bina Marga data for respective sub-districts.

Table 3
Characteristics of the Dominant Intercropped Farmers' Cropping Patterns
in Moderately Sloped Areas in the Upper Watershed Regions
of the Jratunseluna and Brantas River Basins
 (per ha)

Cropping Pattern %	OUTPUT (kg)			INPUTS			Seed (kg)	
	Cassava	Corn	Peanuts	Labor (MD)	Hired %	Fertili- zer (kg)	Corn	Peanuts
Cassava + corn + peanuts	2,000	1,000	500	200	30	75	40	60

Note: Derived from Bina Marga data and synthesis of research reports.

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Table 4
Prices of Inputs and Outputs in the upper watershed region
of the Jratunseluna and Brantas River Basins (1983)

Factor	Unit	Price/Value		Price/Value	
		Financial	Economic	Financial	Economic
<u>INPUTS</u>					
<u>Fertilizer:</u>					
- Urea	kg	90	200	.09	.20
- TSP	kg	90	238	.09	.24
- KCL	kg	90	177	.09	.18
<u>Insecticide:</u>					
- Diazinin	lt	1500	6000	1.50	6.00
- Furidan	kg	400	1600	.40	1.60
<u>Labor:</u>					
- Farm	manday	1000	500	1.00	.50
- Public Works	manday	1000	500	1.00	.50
<u>Materials:</u>					
- Waterways	ha	60000	60000	.60	.60
<u>Seed:</u>					
<u>Local</u>					
- Corn	kg	150	150	.15	.15
- Peanut	kg	850	850	.85	.85
<u>Improved</u>					
- Corn	kg	300	300	.30	.30
- Peanut	kg	900	900	.90	.90
<u>OUTPUTS</u>					
Cassava	kg	30	30	.03	.03
Corn	kg	110	169	.11	.17
Peanut	kg	750	407	.75	.41

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Table 5
Current Returns from Farmer's Cropping Pattern
Without Project Moderately Sloped Areas in the
Jratunseluna and Brantas River Basins
(Rp/ha)

	Expenses*			Returns		
	Seed	Ferti- lizer**	Labor	Total	Gross	Net
Financial	57,000	6,750	60,000	123,750	545,000	421,250
Economic	57,000	15,950	100,000	172,950	431,500	258,550

* See Tables 3 and 4 for yields, input levels and prices used in estimating returns.

** Analysis assumes labor use declines by 3 percent/year, compared to previous year's total.

7. Livestock Experiment

In addition, during the first three years of the project, experiments will be conducted to test the technical and economic viability of small ruminants in the project areas. In steep slope areas grass and tree plantations will be established, inter-cropped with agricultural crops for the first 2-3 years, to provide fodder for livestock. Also grass production from the risers of bench-terraces may supply sufficient fodder to support livestock. The major constraint will be fodder supplies through the dry season. This constraint can only be solved through dry season production of fodder, or by storage. If the experiments are successful a livestock subsidy program will be made available in the program beginning in the fourth year. However, the livestock sector has not been included in this analysis.

8. Economic Analysis: Project Level

a. Total Net Incremental Benefit from the SUFS Component

Direct project benefits are generated as a consequence of the Sustainable Upland Farming Systems component on farm level productivity, as shown in Table 9a. Cols. 1 and 2 show the net annual return per ha with and without the project respectively. Incremental net project returns per ha are shown in col. 3. The total additional area to be improved by the project p.a. is shown in col. 4. Total net economic benefits, excluding project level costs, are shown in col. 5. The total net benefit shown in col. 5 is derived by first multiplying the net incremental benefits on one hectare for each of the project years 1-30 times the number of hectares covered by the project in years 0-6, as shown in Table 9b. The benefit streams are summed across each year to obtain col. 5 of Table 9a. To generate a 30-year flow of benefits from all dem plot/expansion hectares, six extra years are added to Table 9a and b as the 30th year of benefits from development initiated in year 6 do not occur until year 36.

b. Economic Evaluation: Direct Project Level Costs and Benefits

Total project costs (including 10% contingency), as explained in Section V of the Project Paper, are shown in Table 9a. Col. 6. The SUFS costs have been reduced by the economic value of waterways, materials, seeds, fertilizer and pesticides that have already been included in the first two years, as shown in Table 8. Col. 7 presents the net stream of project benefits after all project level costs (with the SUFS component adjusted) are deducted. As shown in col. 8 of Table 9a, the IRR of the project on this basis is slightly less than 12%.

Table 6
Inputs Levels
of the Jratunseluna and Brantas River Basins (1983)

Factor	Unit	Cropping Pattern	
		Existing	Introduced
<u>INPUTS</u>			
<u>Fertilizer:</u>			
- Urea	kg	50	200
- TSP	kg	25	200
- KCL	kg	0	100
<u>Insecticide:</u>			
- Diazinon	lt	0	9
- Furidan	kg	0	6
<u>Labor:</u>			
- Farm (total, yr. 1)	manday	200	206
- Hired	percent	30	30
<u>Materials:</u>			
- Waterways	mandays	0	30
- Terraces building	mandays	0	500
- Terraces maintenance	mandays	0	10
<u>Seed:</u>			
<u>Local</u>			
- Corn	kg	40	0
- Peanut	kg	60	0
<u>Improved</u>			
- Corn	kg	0	40
- Peanuts	kg	0	60

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Table 7
Yields in Introduced Cropping Pattern with project
in the Jratunseluna and Brantas River Basin*
(kg/ha)

Year	Cassava* with Corn	Corn with Cassava	Peanuts after Cassava
1	2,000	1,000	500
2	2,200	1,200	600
3	2,400	1,400	700
4	2,800	1,800	850
5	3,000	2,000	1,000
6	3,060	2,060	1,030
7	3,121	2,122	1,061
8	3,184	2,185	1,093
9	3,247	2,251	1,126
10	3,312	2,319	1,159
11	3,378	3,388	1,194
12	3,446	2,460	1,230
13	3,515	2,534	1,267
14	3,585	2,610	1,305
15	3,657	2,688	1,344
16	3,657	2,688	1,344
17	3,657	2,688	1,344
18	3,657	2,688	1,344
19	3,657	2,688	1,344
20	3,657	2,688	1,344
21	3,657	2,688	1,344
22	3,657	2,688	1,344
23	3,657	2,688	1,344
24	3,657	2,688	1,344
25	3,657	2,688	1,344
26	3,657	2,688	1,344
27	3,657	2,688	1,344
28	3,657	2,688	1,344
29	3,657	2,688	1,344
30	3,657	2,688	1,344

* Yields from years 1-5 are based on an estimate of the potential of existing technology. Yields from years 6-15 are based on the assumption that project research activities will develop improved technology that will increase cassava, corn and peanut yields by 2, 3 and 3% year, respectively. From year 16-30, yields will remain constant without further research.

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Table 8a
Financial Returns from Introduced Cropping Patterns with project
Moderately Sloped Areas in the Upper Watershed Areas
of the Jratunseluna and Brantas River Basin
 (Rp/ha)

Year	Expenses*					Returns (Financial)		
	Seed	Ferti- lizer	Pesti- cide	Hired Labor**	Inte- rest	Total	Gross	Net
1	0	0	0	61,800	0	61,800	545,000	483,200
2	28,000	20,000	6,000	63,654	4,660	126,914	648,000	521,086
3	66,000	45,000	15,900	65,564	10,962	203,426	751,000	545,574
4	66,000	45,000	15,900	67,531	10,962	205,393	919,500	714,107
5	66,000	45,500	15,900	69,556	10,962	207,418	1,060,000	852,582
6	66,000	45,000	15,900	71,643	10,962	209,505	1,090,900	881,395
7	66,000	45,000	15,900	73,792	10,962	211,654	1,122,709	911,055
8	66,000	45,000	15,900	76,006	10,962	213,868	1,155,454	941,586
9	66,000	45,000	15,900	78,296	10,962	216,148	1,189,162	973,014
10	66,000	45,000	15,900	80,635	10,962	218,497	1,189,162	1,005,366
11	66,000	45,000	15,900	83,054	10,962	220,916	1,223,863	1,038,669
12	66,000	45,000	15,900	85,546	10,962	223,408	1,259,585	1,072,952
13	66,000	45,000	15,900	88,112	10,962	225,974	1,296,359	1,108,242
14	66,000	45,000	15,900	90,755	10,962	228,617	1,334,216	1,144,571
15	66,000	45,000	15,900	93,478	10,962	231,340	1,373,168	1,181,968
16	66,000	45,000	15,900	93,478	10,962	231,340	1,413,308	1,182,050
17	66,000	45,000	15,900	93,478	10,962	231,340	1,413,308	1,182,050
18	66,000	45,000	15,900	93,478	10,962	231,340	1,413,308	1,182,050
19	66,000	45,000	15,900	93,478	10,962	231,340	1,413,308	1,182,050
20	66,000	45,000	15,900	93,478	10,962	231,340	1,413,308	1,182,050
21	66,000	45,000	15,900	93,478	10,962	231,340	1,413,308	1,182,050
22	66,000	45,000	15,900	93,478	10,962	231,340	1,413,308	1,182,050
23	66,000	45,000	15,900	93,478	10,962	231,340	1,413,308	1,182,050
24	66,000	45,000	15,900	93,478	10,962	231,340	1,413,308	1,182,050
25	66,000	45,000	15,900	93,478	10,962	231,340	1,413,308	1,182,050
26	66,000	45,000	15,900	93,478	10,962	231,340	1,413,308	1,182,050
27	66,000	45,000	15,900	93,478	10,962	231,340	1,413,308	1,182,050
28	66,000	45,000	15,900	93,478	10,962	231,340	1,413,308	1,182,050
29	66,000	45,000	15,900	93,478	10,962	231,340	1,413,308	1,182,050
30	66,000	45,000	15,900	93,478	10,962	231,340	1,413,308	1,182,050

* See Table 4 for input levels and prices used in estimating returns. Seed, fertilizer and pesticide are subsidized to project participants in years 1 and 2 as shown in Table 14 p.53.

** Analysis assumes a labor demand of 206 md/ha in year 1 and that labor demand will increase by 3 percent per year compared to the previous year's level.

*** Interest costs estimated as 24% of first crop's material inputs and 12% of second crop's material inputs.

Table 8b
Economic Cost and Returns from Introduced Cropping Pattern with project
Moderately Sloped Areas in the Upper Watershed Areas
of the Jratunseluna and Brantas River Basins
 (Rp/ha)

Year	Expenses 1/									Economic 1/		
	Waterways Materials	Terrace Labor			Annual Crops					Total	Gross	Net
		Labor*	Con- struct**	Main- tain***	Seed	Ferti- lizer	Pesti- cide	Labor****				
1	60,000	15,000	250,000	0	66,000	105,300	63,600	103,000	662,900	431,500	231,400	
2	0	0	0	5,000	66,000	105,300	63,600	106,090	345,990	511,800	165,810	
3	0	0	0	5,000	66,000	105,300	63,600	109,273	349,173	592,100	242,927	
4	0	0	0	5,000	66,000	105,300	63,600	112,551	352,451	732,350	377,899	
5	0	0	0	5,000	66,000	105,300	63,600	115,927	355,827	833,000	477,173	
6	0	0	0	5,000	66,000	105,300	63,600	119,405	359,305	857,090	497,785	
7	0	0	0	5,000	66,000	105,300	63,600	122,987	362,887	881,885	518,997	
8	0	0	0	5,000	66,000	105,300	63,600	126,677	366,577	907,405	540,828	
9	0	0	0	5,000	66,000	105,300	63,600	130,477	370,377	933,672	563,295	
10	0	0	0	5,000	66,000	105,300	63,600	134,392	374,292	960,708	584,416	
11	0	0	0	5,000	66,000	105,300	63,600	138,323	378,323	988,535	610,212	
12	0	0	0	5,000	66,000	105,300	63,600	142,576	382,476	1,017,178	634,702	
13	0	0	0	5,000	66,000	105,300	63,600	146,853	386,753	1,046,660	659,906	
14	0	0	0	5,000	66,000	105,300	63,600	151,259	391,159	1,077,005	685,846	
15	0	0	0	5,000	66,000	105,300	63,600	155,797	395,697	1,108,239	712,543	
16	0	0	0	5,000	66,000	105,300	63,600	155,797	395,697	1,108,302	712,605	
17	0	0	0	5,000	66,000	105,300	63,600	155,797	395,697	1,108,302	712,605	
18	0	0	0	5,000	66,000	105,300	63,600	155,797	395,697	1,108,302	712,605	
19	0	0	0	5,000	66,000	105,300	63,600	155,797	395,697	1,108,302	712,605	
20	0	0	0	5,000	66,000	105,300	63,600	155,797	395,697	1,108,302	712,605	
21	0	0	0	5,000	66,000	105,300	63,600	155,797	395,697	1,108,302	712,605	
22	0	0	0	5,000	66,000	105,300	63,600	155,797	395,697	1,108,302	712,605	
23	0	0	0	5,000	66,000	105,300	63,600	155,797	395,697	1,108,302	712,605	
24	0	0	0	5,000	66,000	105,300	63,600	155,797	395,697	1,108,302	712,605	
25	0	0	0	5,000	66,000	105,300	63,600	155,797	395,697	1,108,302	712,605	
26	0	0	0	5,000	66,000	105,300	63,600	155,797	395,697	1,108,302	712,605	
27	0	0	0	5,000	66,000	105,300	63,600	155,797	395,697	1,108,302	712,605	
28	0	0	0	5,000	66,000	105,300	63,600	155,797	395,697	1,108,302	712,605	
29	0	0	0	5,000	66,000	105,300	63,600	155,797	395,697	1,108,302	712,605	
30	0	0	0	5,000	66,000	105,300	63,600	155,797	395,697	1,108,302	712,605	

1/ See table 4 for input levels and prices used in estimating returns.

* 30 md/ha

** 500 md/ha

*** 10 md/ha

**** Analysis assumes a labor demand of 206 md/ha in year 1 and that labor demand will increase by 3 percent per year compared to the previous year's level.

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TABLE 9A ECONOMIC ANALYSIS UACP

	1	2	3	4	5	6	7	8	9
YEAR	NET RETURN /HA WITH PROJECT	NET RETURN /HA WITH- OUT PROJECT	INCREMENTAL RETURNS/HA	HA SUFS	TOTAL NET RETURNS SUFS	TOTAL PRO- JECT COSTS ADJ SPILL	NET PROJECT BENIFITS	NPV @ 12%	NPV @11%
0	0	0	0	0	0	2841961	-2841961	-2537465	-2560325
1	-231	259	-490	100	-49000	4369266	-4418266	-3522215	-3585964
2	166	254	-88	1010	-503682	5475080	-5978762	-4255565	-4371619
3	243	249	-6	2620	-1373073	6122414	-7495487	-4763517	-4937509
4	380	244	136	4912	-2629146	6007304	-8636450	-4900554	-5125313
5	477	239	238	6970	-3700316	5485988	-9186304	-4654067	-4911373
6	498	234	264	7344	-3615076	4074208	-7689284	-3478242	-3703608
7	519	229	290		903504		903504	364910	392055
8	541	225	316		3092386		3092386	1115145	1208890
9	563	220	343		5068534		5068534	1631932	1785059
10	586	216	370		6221695		6221695	1788589	1974040
11	610	212	398		6820551		6820551	1750666	1949592
12	635	207	428		7427969		7427969	1702299	1912808
13	660	203	457		8049178		8049178	1647021	1867368
14	686	199	487		8682934		8682934	1586340	1814771
15	713	195	518		9335014		9335014	1522743	1757710
16	713	191	522		10000365		10000365	1456497	1696388
17	713	187	526		10651388		10651388	1385102	1627768
18	713	184	529		11241660		11241660	1305233	1547725
19	713	180	533		11711765		11711765	1214121	1452656
20	713	176	537		11999204		11999204	1110642	1340818
21	713	173	540		12086573		12086573	998865	1216740
22	713	169	544		12172194		12172194	898161	1103927
23	713	166	547		12256103		12256103	807458	1001385
24	713	163	550		12338333		12338333	725782	908201
25	713	159	554		12418919		12418919	652252	823543
26	713	156	557		12497893		12497893	586071	746649
27	713	153	560		12575288		12575288	526518	676822
28	713	150	563		12651135		12651135	472941	613427
29	713	147	566		12725465		12725465	424750	555884
30	713	144	569		12798308		12798308	381412	503663
31	713	141	572		12869694		12869694	342446	456282
32					12882198		12882198	306052	411464
33					12370190		12370190	262400	355955
34					10929002		10929002	206990	283319
35					8162419		8162419	138029	190630
36					4198708		4198708	63394	88342
37									
TOTAL			12427	22956	285268278	34376221	250892057	-736867	3068169

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TABLE 9B PROJECTIONS OF NET RETURNS

YEAR	1	2	3	4	5	6
0						
1	-49000					
2	-8782	-494900				
3	-574	-88698	-1283800			
4	13623	-5801	-230088	-2406880		
5	23811	137594	-15048	-431372	-3415300	
6	26388	240488	356926	-28213	-612105	-3598560
7	28957	266523	623839	669155	-40033	-644950
8	31616	292462	691377	1169580	749532	-42181
9	34265	319317	758665	1296201	1659603	1000482
10	37006	346079	828327	1422352	1839275	1748655
11	39838	373760	897749	1552956	2018281	1937968
12	42761	402362	969555	1683108	2203604	2126579
13	45676	431887	1043751	1817731	2388287	2321846
14	48682	461326	1120340	1956833	2579314	2516439
15	51781	491691	1196707	2100423	2776696	2717716
16	52171	522985	1275477	2243597	2980446	2925689
17	52554	526928	1356654	2391276	3183606	3140372
18	52929	530792	1366882	2543467	3393158	3354433
19	53296	534579	1376905	2562642	3609113	3575230
20	53656	538290	1386728	2581435	3636323	3802773
21	54009	541926	1396355	2599851	3662989	3831443
22	54355	545490	1405789	2617899	3689121	3859539
23	54694	548983	1415035	2635586	3714731	3887074
24	55026	552406	1424095	2652920	3739828	3914058
25	55351	555761	1432974	2669907	3764424	3940502
26	55670	559048	1441676	2686554	3788528	3966418
27	55983	562270	1450204	2702868	3812149	3991815
28	56289	565427	1458561	2718855	3835299	4016704
29	56589	568521	1466751	2734523	3857985	4041095
30	56884	571553	1474777	2749878	3880217	4064999
31	57172	574525	1482643	2764926	3902005	4088424
32		577437	1490351	2779672	3923357	4111381
33			1497905	2794124	3944282	4133879
34				2808286	3964789	4155927
35					3984885	4177534
36						4198708

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c. Economic Analysis: Indirect Benefits

In-so-far-as the project is successful in reducing flooding and sedimentation, indirect benefits will be created for downstream beneficiaries. A major goal of the research component of the project will be to measure the quantity of these indirect benefits. Pending data from that research, only an indicative estimate is possible here. Fortunately, there exists some information from a feasible study of a similar project proposal in the watershed of the Kedung Ombo reservoir in Central Java, by the Snowy Mountains Engineering Corporation, which provides the basis for an indicative analysis.

The reservoir has a dead storage capacity of 91 MCM (million m³) and a total storage capacity of 728 MCM. It is estimated that 2.4 MM of sediment is trapped in the reservoir p.a. At this rate of sedimentation, total storage of the reservoir will be exhausted in 250 years. Thus the dead storage would be filled in 38 years. However, sediment tends to pile up at the tail of a reservoir, displacing live storage. The estimate is 1.4 MCM loss of live storage p.a. The economic analysis of the project indicates that the value of live storage is \$0.065/m³ resulting in an annual loss of live storage of \$90,000 p.a. The present value of this loss, at 12% discounted over 38 years, is \$740,000.

A more significant loss, according to the report, is due to damage to canals and irrigation facilities below the dam--from other areas in the catchment. A sediment trap on the canal might trap 1.25 MCM p.a. The cost of mechanically removing sediment is \$1.40 m³ or \$2.1 million p.a. The present value of this cost over 38 years is \$17.6 million.

The SMEC study assumes that the rate of sedimentation could be reduced by one-half by the bench-terraces and silvipasture introduced by the UACP. Thus the total present value of reduced external costs would be about \$9 million--or, \$10 million with other benefits to fisheries, turbines, etc., included. The SWC part of the project costs \$30 million. The present value of reduced external costs is about one-third of the project cost on the assumption that present rates of erosion will not increase. If, without the project, erosion increased at a rate of 2% p.a., then this value would double to \$20 million or two-thirds of project costs over the 38 year horizon. Longer horizons make no substantial difference in the present value.

9. Conclusion: Economic Viability of the UACP

There are essentially three factors to consider in appraising the economic viability of the UACP.

- a. The bench-terrace/agricultural component, SUFS.
- b. Downstream benefits of reduced flooding and sedimentation.
- c. The spillover of benefits from agricultural research and roads, to beneficiaries not formally included in the project.

TABLE 10 ECONOMIC ANALYSIS UACP ADJUSTED FOR SPILLOVER EFFECTS

	1	2	3	4	5	6	7	8	
YEAR	NET RETURN /HA WITH PROJECT	NET RETURN /HA WITH- OUT PROJECT	INCREMENTAL RETURNS/HA	HA SUFS	TOTAL NET RETURNS SUFS	TOTAL PRO- JECT COSTS ADJ SPILL	NET PROJECT BENIFITS	NPV @ 13%	NPV @14%
0	0	0	0	0	0	2841961	-2841961	-2515010	-2492948
1	-231	259	-490	100	-49000	4369266	-4418266	-3460150	-3399712
2	166	254	-88	1010	-503682	5475080	-5978762	-4143582	-4035494
3	243	249	-6	2620	-1373073	6122414	-7495487	-4597122	-4437930
4	380	244	136	4912	-2629146	3003652	-5632798	-3057257	-2925499
5	477	239	238	6970	-3700316	3675612	-7375928	-3542795	-3360373
6	498	234	264	7344	-3615076	2037104	-5652180	-2402519	-2258822
7	519	229	290		903504		903504	339862	316732
8	541	225	316		3092386		3092386	1029408	950933
9	563	220	343		5068534		5068534	1493131	1367206
10	586	216	370		6221695		6221695	1621981	1472161
11	610	212	398		6820551		6820551	1573541	1415668
12	635	207	428		7427969		7427969	1516528	1352406
13	660	203	457		8049178		8049178	1454298	1285534
14	686	199	487		8682934		8682934	1388321	1216449
15	713	195	518		9335014		9335014	1320869	1147195
16	713	191	522		10000365		10000365	1252225	1078036
17	713	187	526		10651388		10651388	1180305	1007207
18	713	184	529		11241660		11241660	1102402	932477
19	713	180	533		11711765		11711765	1016374	852168
20	713	176	537		11999204		11999204	921521	765862
21	713	173	540		12086573		12086573	821443	676700
22	713	169	544		12172194		12172194	732090	597802
23	713	166	547		12256103		12256103	652334	528002
24	713	163	550		12338333		12338333	581160	466268
25	713	159	554		12418919		12418919	517660	411678
26	713	156	557		12497893		12497893	461019	363417
27	713	153	560		12575288		12575288	410508	320761
28	713	150	563		12651135		12651135	365472	283067
29	713	147	566		12725465		12725465	325327	249763
30	713	144	569		12798308		12798308	289548	220344
31	713	141	572		12869694		12869694	257667	194363
32					12882198		12882198	228245	170659
33					12370190		12370190	193959	143751
34					10929002		10929002	151647	111407
35					8162419		8162419	100229	72987
36					4198708		4198708	45626	32933
37									
TOTAL			12427	22956	285268278	27525089	257743189	-373736	-2906841

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On the basis of (a) above, the IRR is 12%, the same as the social rate of discount and therefore, a marginal return on investment. However, the downstream benefits (b) have potential for adding benefits equal to at least one-third of project costs, as shown in the preceding section. Finally, much of the benefits of some of the components will spillover to other beneficiaries (c) not counted here. It could plausibly be assumed that the value of these spillover benefits will be equal to at least 50% of the costs of the research and roads components. Table 10 shows the effect of reducing these costs by 50% and the costs of the SUFS component by 33% to capture the potential value of downstream flooding and sedimentation. The resulting IRR is slightly less than 13%. This is perhaps the most realistic estimate possible of the real economic return to the project in the absence of better information.

C. Social Soundness Analysis

1. Introduction

The purpose of this analysis is to assess the compatibility of the Upland Agriculture and Conservation Project with the socio-cultural environment of the target areas.

Throughout most of the 19th century, produce of the estate crops was very good in upland areas of East and Central Java and the yields of upland rice were equal to those of the wet rice areas. By the beginning of the 20th century, however, economic conditions in upland areas of Java began to deteriorate. Increased population pressure forced farmers farther and farther up the slopes of the hilly regions. At the same time the average size of landholdings steadily decreased, from an average of three hectares per farm in the 1930s to a little more than one hectare in the 1960s. The carrying capacity of these regions was severely taxed so that throughout the 1960s famine-like conditions were common place in many regions. Government programs to build up food stocks have significantly reduced the risk of famine and on-going family planning and transmigration programs provide a partial solution to these problems. However, the prevalence of malnutrition in these areas is still high and environmental problems have steadily worsened. The development of sustainable, ecologically sound, upland farming systems is also critical to addressing the problems confronting upland communities.

2. Socio-Economic Environment

The populations of the upland areas of the Brantas and Jratunseluna Watersheds share many of the same socio-economic characteristics. Although there is a social and economic hierarchy in the local communities, the degree of difference that exist between individuals is not very great. Living standards for the majority of the population are quite low and material possessions are modest even at the highest levels. The way of life is simple and largely based on agriculture.

Landownership is the most important factor in determining wealth and status in the uplands. In theory there are records of landholdings, but due to changes in cultivation rights, loans, inheritance, etc., they are inaccurate. The average size of landholdings in the project area is estimated at .70 hectare divided into several small parcels. In a typical setting, a large landholder is someone who owns more than 2 hectares. Landownership of 5 hectares or more is very uncommon. A significant percentage of the population owns less than .50 hectare. The social and economic stratification of these communities is reflected not only by the size of the landholding, but also its quality and location. The villages are frequently located in the valleys and the poorest families own the most distant and least fertile plots on the mountain slopes.

Absolute landlessness is uncommon in the project area, but a significant though uncertain proportion of the population does not own enough land to provide for their livelihood throughout the year. The scope for agricultural labor is limited for these small landholders because few people own plots that cannot be worked by the family. Families whose land cannot provide year round sustenance are therefore dependent upon non-agricultural sources of income. For the older members of these families and for the young females as well, cottage industries provide one source of additional income. Many families depend upon a variety of occupations in cities and nearby towns for this income. Because of the demands of planting and harvesting their own land, off-farm employment is frequently transitory. Males, ranging in age from 15 to 40 are the primary migrants.

Animal ownership is widespread though not universal in these upland communities. They provide an additional source of income for many families, either through direct ownership or caring for other individuals' livestock. Cattle, goats and sheep are the main ruminants tended in these areas.

Despite similarities among upland communities in these two watersheds, there is a degree of diversity. Several factors contribute to this diversity, the most obvious being those derived from variation in the agro-climatic zones. Other contributing factors are the availability of off-farm employment opportunities, migration patterns, access to markets, proximity to large urban centers and the presence of government programs promoting rural development. On the basis of field trips to the two watersheds, four general types of socio-economic categories were developed.

In the first category, environmental degradation and declining agricultural productivity are in a very advanced stage. Permanent out migration is high. The population structure is heavily weighted towards young children and adults over 45. Landholdings are very large, averaging 2 hectares with some private holdings as high as 10 hectares. Agricultural labor is in short supply and off-farm employment opportunities are rare.

The second type is similar to the first with the exception that erosion and declining agricultural productivity are not as advanced. Subsistence farming, seasonal migration and limited access to markets are characteristic of this type. A variety of government assisted programs are the mainstay of new economic activity in these regions although the returns from these programs appear to be minimal and there is little hope of their becoming self-sustaining.

In the third category, households have significantly more options. Substantial numbers of farmers in these areas own wet rice fields as well as upland fields. Greater access to markets, more numerous off-farm employment opportunities (including agricultural labor) and the emergence of a commercial orientation toward the farm enterprise are everywhere in evidence. These communities are not as homogenous as those described in categories 1 and 2 and the number of landless is significantly higher.

In the last category, socio-economic conditions are quite similar to those described in the third category. One major distinction is that the majority of upland households do not own wet rice lands. However, opportunities for earning additional income through agricultural labor in the nearby wet rice areas are plentiful. Other off-farm employment opportunities in rural industries are also frequently available. As is the case in categories 1 and 2, these communities are relatively homogenous.

3. Social Organization

For many Indonesian farmers, the most important geographical unit is the hamlet in which they live. The hamlet is a cluster of 50 to 100 dwellings, housing between 250 and 1,000 people. Many of the families are closely related.

The hamlet is headed by an elected headman who represents the lowest level of authority in the rural government structure. In many cases the headman comes from the most prominent family within the community whose members have served as hamlet headmen for many years. This family invariably has a long and intimate association with the hamlet and fulfills the role of community leaders. The dynamism and community participation within the hamlet is often reflected in and dependent upon the personality and attitudes of its leader.

The hamlet is a subdivision of the village or township administrative structure. A typical township is divided into 10 to 12 hamlets and includes a population of 2,500 to 10,000 individuals. The head of the village administrative structure has a staff of 4 to 7 individuals and a number of semi-public organizations at the village level provide additional guidance. For development activities, the most important of these organization is the LKMD. The LKMD is a relatively recent addition to the village administrative structure with no clear lines of authority with regard to the development process. In the majority of cases, these organizations are dominated by the village headman.

The role of the village headman in village affairs has changed substantially in the past two decades. Traditionally, he served as a community leader with primary responsibility as intermediate between the village and the outside world. In more recent times, with the dramatic increase of government programs targetted at the village level, the headman's role as community spokesman has given way to his position as government representative at this level. In some respects, the village headmen and their staffs have become the rural elite with far less in common with the rural peoples as was the case in the past. They remain dominant figures in the political life of rural communities but often do not function as true community leaders.

4. The Project

The implementation strategy of the UAC Project focuses on community participation and flexibility in the identification of appropriate technical innovations. It also emphasizes testing farming systems for improving the profitability of the farm enterprise, as opposed to overall production levels, to ensure that the maximum benefits will be derived from the program. Further refinement and explication of these strategies will necessarily have to occur within the first year of the project's implementation. More importantly, however, the project is designed to promote continous refinements of these strategies.

The importance of flexibility in the identification of appropriate technological innovations stems from the significant degree of diversity in the socio-economic conditions within the project areas. For example, labor intensive innovations will not be as suitable in areas in which significant outmigration is occurring. Less capital intensive packages might be more appropriate in subsistence areas than in communities characterized by a commercial orientation to the farm enterprise. The focus on site-specific planning, which is central to the project implementation strategy, is essential for identifying the critical variables which will influence the acceptability of the innovation.

Community participation is an explicit element of the proposed project implementation strategy. Efforts to operationalize the concept of participation are still in the formative stage and will have to be clarified as project personnel gain additional experience in this area. Initially, emphasis should be given to building a collaborative relationship between the extension service and the farmer groups with whom they work. Such a strategy necessarily focuses on strengthening the capacity of the extension service to enlist the cooperation of the farmers in the development of the demonstration plots and the subsequent expansion of these activities in surrounding areas. It is difficult to generalize about the existing capability of the extension service to operate along these lines. A stereotype of the extension service as unresponsive to the needs of the farmers does exist. On the other hand, field trips to the two watersheds indicated that receptivity to assigning farmers a larger role in the extension system is in evidence and that initial attempts to build a collaborative relationship between the two groups are already underway.

A series of steps can be initiated at the outset of the project to effect community participation. The first is the unification of the delivery of extension services. The fragmented state of the existing extension system and the dominance of food crop extension agents makes it extremely difficult for farmers to get the information they need to improve the productivity of their farming systems. A second step is to concentrate on farm-centered data in the development of site-specific plans for extension activities. A third step is to promote the establishment of a monitoring system that will enable both extension agents and farmers to assess the results of on-going efforts to improve productivity and to adapt their activities accordingly. A fourth and final step is to focus on the hamlet as opposed to the township as the critical social unit in these activities.

5. Beneficiaries

The activities associated with the Upland Agriculture and Conservation Project will benefit a wide array of groups but principally will assist the rural families who own and operate farms in the 22,920 hectares of the target area. An estimate of the beneficiary population of the target area, based upon average landholdings of .7 hectare and an average family size of 5, is 160,000.

The immediate benefits to the principal beneficiaries will derive from the increased yields and improved productivity expected from the project activities. In the medium- to long-term, more ecologically sound farming practices will allow farmers to sustain the gains achieved from the availability of improved farming systems technologies.

The extent and nature of these gains can be expected to vary significantly from location to location, depending upon agro-climatic, environmental and socio-economic conditions. An important factor in determining the impact of the project will be the extent to which the activities have provided the beneficiaries with a greater range of options for improving household social and economic well-being.

Other direct beneficiaries of the project include the lowland households located in the two river basins. Restoring and preserving the upland regions of the Brantas and Jratunseluna Watersheds will benefit lowland populations whose farm enterprises are directly affected by soil conservation measures in these areas. Project activities that stabilize the soils in the upland areas will reduce the siltation rate in downstreams dams, extending their useful life for producing hydroelectric power and irrigating the lowlands. Similarly, reduced siltation in the coastal estuaries will increase fisheries production. It is difficult to estimate the size of this second group of direct beneficiaries. More than half of the 3.2 million of people living in the targetted areas of the 8 districts will, over time, be directly benefitted by the project. A sizeable percentage of the surrounding watershed populations will also be directly affected.

Indirect beneficiaries include the populations of the numerous watersheds found throughout Java. Their benefits will principally derive from the applied agriculture research activities carried out under the project which will have general application in other regions.

The above analysis states there may be landless population in the watersheds in which the project will work. However, the available data is inadequate to pinpoint locations and/or to estimate numbers of people. The project activities are aimed at landowners and are not intended to directly involve the landless. Of course, if data generated by the project surveys and other activities indicate opportunities to provide assistance to landless persons under the rubric of upland agriculture and conservation, there is adequate flexibility to do so.

Project road construction will provide employment opportunities to the general population in the areas, and the increased economic activity brought about by the project also will benefit the general population.

(Other USAID projects in the same geographic areas directly benefit the landless).

Institutional development is an explicit focus of the project. The effectiveness and efficiency of the extension service in the project areas will be increased and the role of local authorities will be strengthened in the design and implementation activities of development. The improved organizational and management activities that will result from this focus are expected to provide an institutional prototype that should be replicable on a very large scale and thus indirectly benefit these institutions and the populations which they serve.

D. Administrative Analysis

1. Introduction

The purpose of the administrative analysis is to assess the administrative capabilities of the implementing agencies and to determine whether specific implementation plans will be workable. The analysis focuses on three elements of the implementing agencies' operations: organization, management and staff. Assessment of the administrative capabilities of the participating agencies is subdivided along the lines of the project's four major components: sustained upland farming systems, roads, agricultural research and training.

2. Sustained Upland Farming Systems

As a general observation both agriculture and conservation programs of the government that focus on upland areas are highly centralized and standardized. The rigidity imposed by the existing centralized structure makes it extremely difficult for the relevant government services to design and implement programs that can be tailored

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to the many of agro-climatic and socio-economic conditions of upland areas throughout Indonesia. A second general observation is that government services for upland communities are highly fragmented, complicating the effective delivery of farming systems technology.

The following discussion outlines the present governmental structure and delivery system of conservation and agriculture technologies through the Ministry of Forestry and the Ministry of Agriculture and discusses the relationship of both to local government.

a. The Regreening Program

The national Regreening Program (Penghijauan) constitutes the GOI's principal delivery system focused on the conservation of the nation's privately owned lands. Responsibility for this program is shared by seven Ministries, with the Ministries of Forestry and Home Affairs playing key roles. Until recently (1983) technical management of the Regreening Program was located within the Ministry of Agriculture under the overall policy guidance of the Minister of Agriculture. Since 1983, however, responsibility for the Regreening Program has been transferred to the newly created Ministry of Forestry (MOF). Within the MOF the program is under the policy direction of the Director General for Reforestation and Land Rehabilitation (Chart I). Within this Directorate General a Directorate of Soil Conservation has been given the overall responsibility for soil and water conservation on private lands (Chart II).

Through a Ministerial Decree issued in December 1983 the MOF has authorized creation of eleven Regional Centers for Land Rehabilitation and Conservation. On Java three centers are to be located in the provincial capitals of West, Central and East Java. The geographical jurisdictions of these centers are, however, not identical to provincial administrative boundaries. For example, the regional center located in Semarang, Central Java, is responsible for most of Central Java and all of the Special District of Jogjakarta whereas the regional center located in Bandung, the provincial capital of the province of West Java, is responsible for all of the territory in West Java plus one district, Cilacap, which is administratively under the jurisdiction of the provincial government of Central Java. The rationale for this territorial division advanced by the Ministry of Forestry is that their responsibilities are properly defined by watershed rather than administrative divisions of local government.

Subordinate to the eleven regional centers are forty Sub-Centers for Land Rehabilitation and Soil Conservation which again are organized around watershed rather than district government administrative boundaries. Typically, the service area of one sub-center will cover the territory of four to nine district governments. These sub-centers (sub-BRKLIT), are responsible for the technical planning and guidance of the Regreening Program.

CHART I
ORGANIZATION CHART OF MINISTRY OF FORESTRY

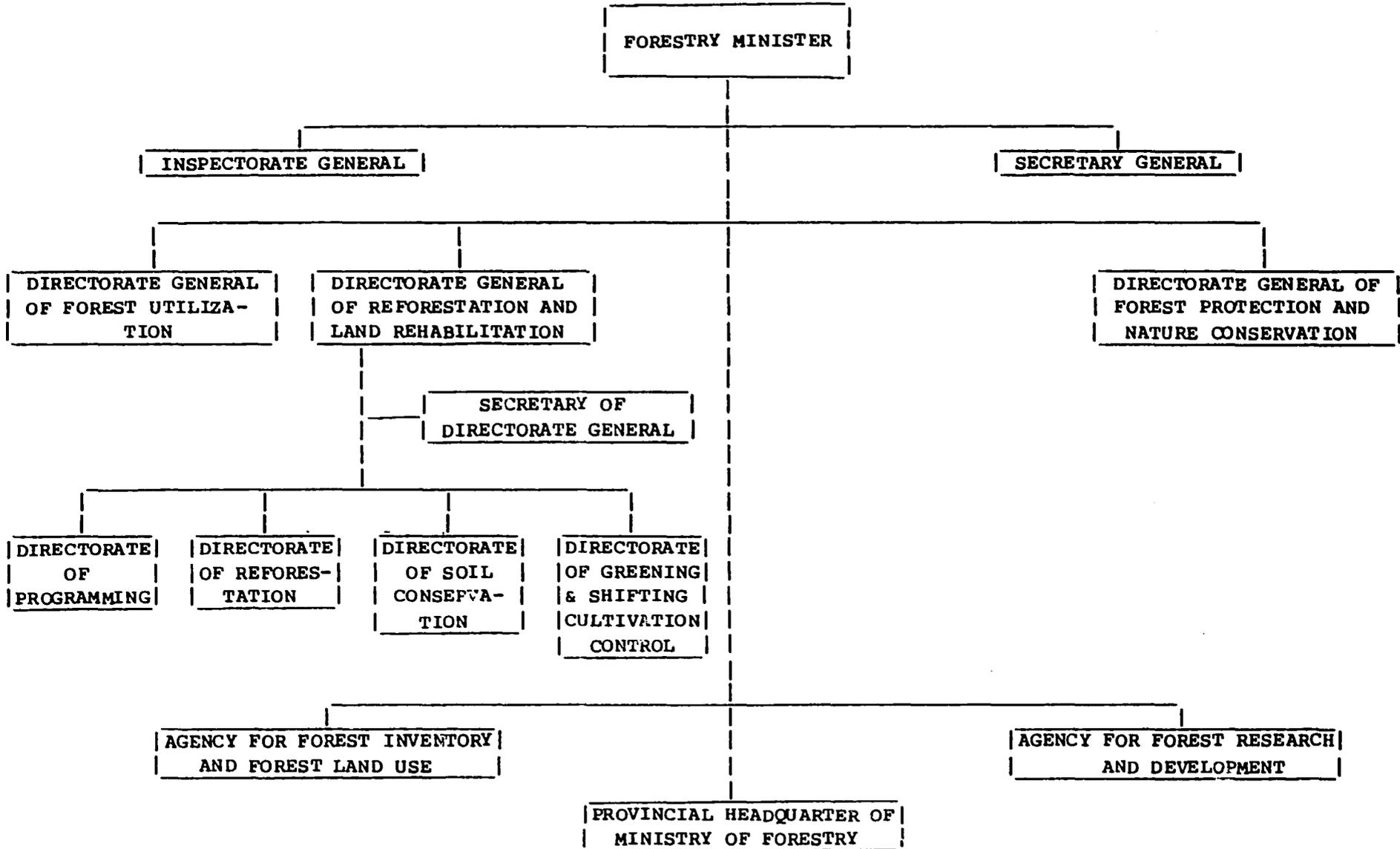
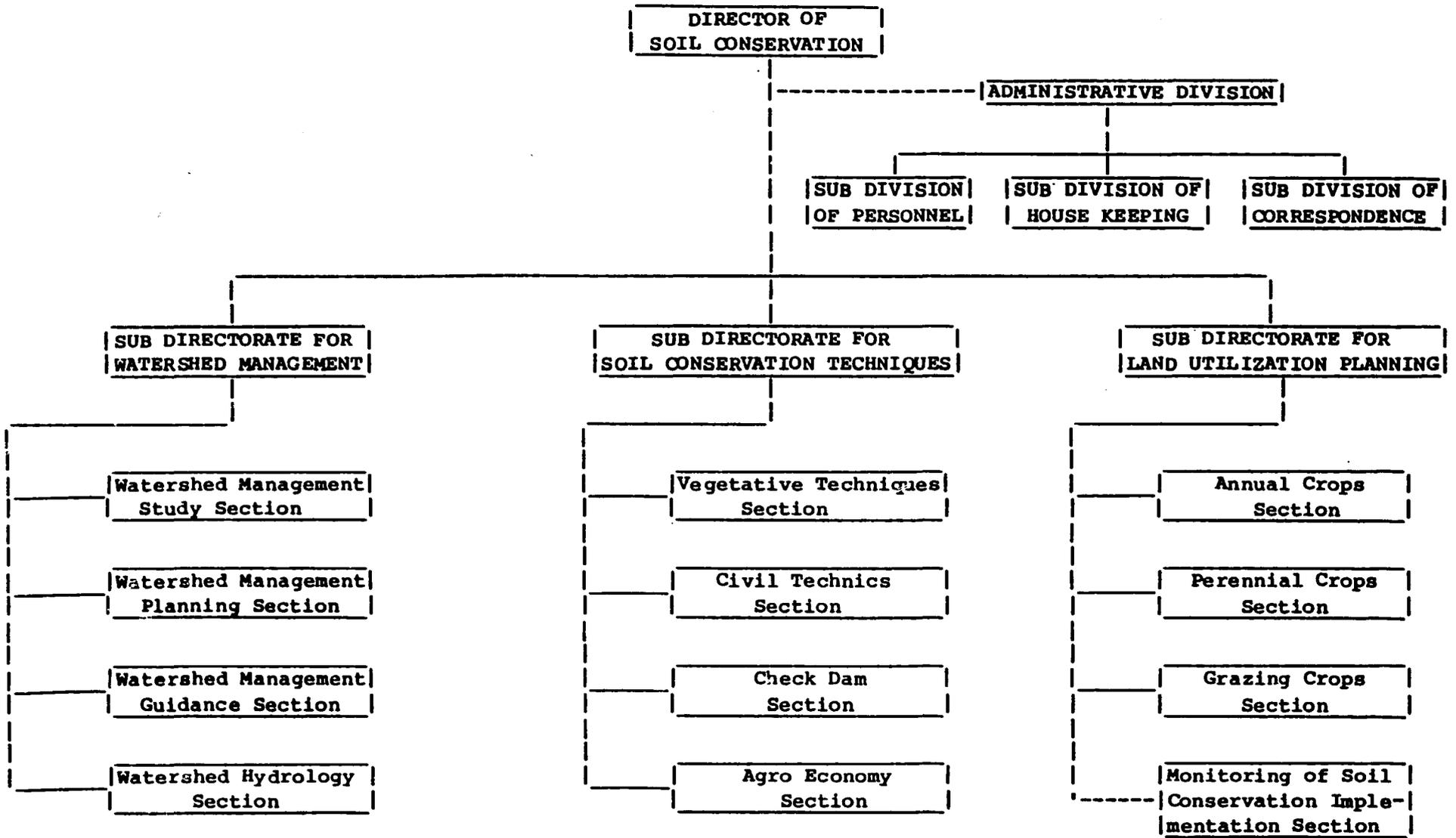


CHART II
ORGANIZATION CHART OF DIRECTORATE OF SOIL CONSERVATION
MINISTRY OF FORESTRY



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Unlike the Ministry of Agriculture, the line of authority from the Ministry of Forestry in Jakarta to the regional and sub-regional level is direct. Local governments have no authority over the regional or sub-regional centers, their budget or their personnel. This is in direct contrast to the relationship of local governments with the service agencies of the Ministry of Agriculture, which send technical agriculture personnel to work directly for provincial and district governments. The establishment of these regional and sub-regional centers for land rehabilitation and conservation represents deconcentration of Ministry of Forestry central authority, whereas the MOA field organization has elements of both central government deconcentration as well as decentralization of authority to local governments.

While the MOF and its regional and sub-regional centers are delegated responsibility for planning and guiding the technical aspects of the Regreening Program, the management and financing of the program is vested with local (district) governments. They in turn direct one of their respective agriculture technical services to be the lead implementing institution. The principal effect of these organizational arrangements has been the separation of responsibility for planning from implementation. Predictably, when the program runs into problems in the field the implementors (local governments and their agricultural services) fault the planning of Ministry of Forestry personnel and the forestry planners, in turn, argue that the implementing agencies have improperly carried out their technical plans.

At present four sets of instructions are issued annually by the GOI to effect implementation of the Regreening Program. The first instruction is in the form of a Presidential Decree that lays out overall policy objectives, the aggregate budget and calls on involved ministries to collectively issue further policy and implementation guidance of both a technical and administrative nature.

Subsequently, a second decree (SKB) is jointly issued by seven ministries that has specific roles in implementing the Regreening Program. The seven ministries involved in the formulation and issuance of the SKB are Home Affairs, Finance, Forestry, Agriculture, Environment, Public Works, and BAPPENAS.

This SKB lays out the functional responsibilities of each participating ministry; designates district level government as the responsible management entity for field implementation of regreening (conservation) efforts on private lands; specifies the level and specific uses to which the Regreening Program budget can be applied and identifies responsibilities for planning sub-BRKL, plan approval (Governor) and field implementation (local government along with extension staff directly supervised by the local government and the lead agriculture agency).

The third instruction, which is a joint Home Affairs and Forestry decree (SKB) further details the organization and management structure (Chart III a & b), planning and management system, and responsibilities of each official down to the field level.

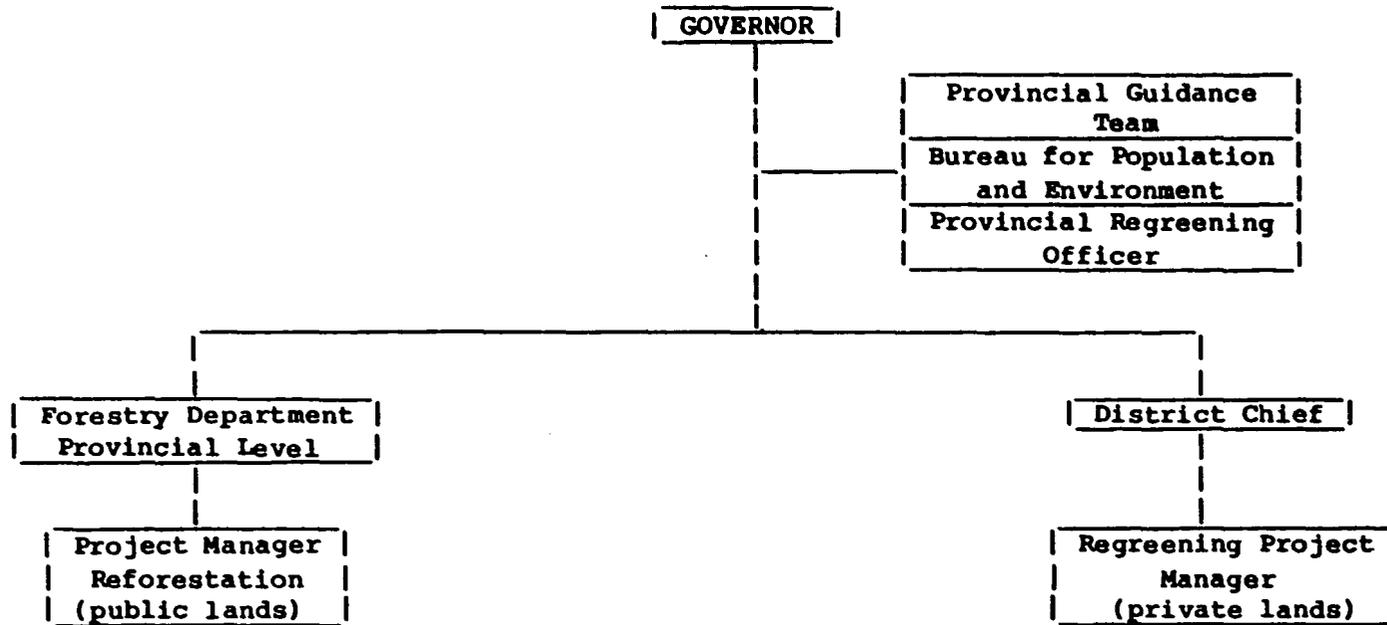
The final instruction is a provincial decree issued by the Governor of each province participating in the Regreening Program. This document further elaborates on the various Ministerial instructions and gives greater clarity to the specific responsibilities of each responsible officer involved in the Regreening Program.

In summary, the present guidance issued under the various ministerial instructions is very detailed and limiting in terms of the specific conservation measures that can be carried out using INPRES Penghijauan funds. Preparation of technical conservation plans is vested with the Ministry of Forestry and are drawn up by the Regional Sub-centers for Land Rehabilitation and Conservation. Responsibility for preparation of the annual operating plan, which is derived from the Regional Sub-center's technical plan, is the responsibility of local government, in conjunction with the lead implementing agency, which is either the district Agricultural Service or the Estate Crops Service. Implementation is the responsibility of the district government through one of the technical services mentioned above. An inherent weakness of this arrangement, beside the separation of technical planning responsibility from implementation responsibility, is that the technical agricultural agency charged with executing the program, has as its primary responsibility, in the case of the Food Crop Service, planning and execution of the national agriculture extension program or, in the case of the Estate Crops service, the execution of estate crop programs mandated by the Director General of Estate Crops. Thus, there is a tendency for the technical agriculture service to give priority to the programs directly under their control, subordinating the Regreening Program, over which they have limited technical responsibility, to a secondary position.

b. Agricultural Extension Services

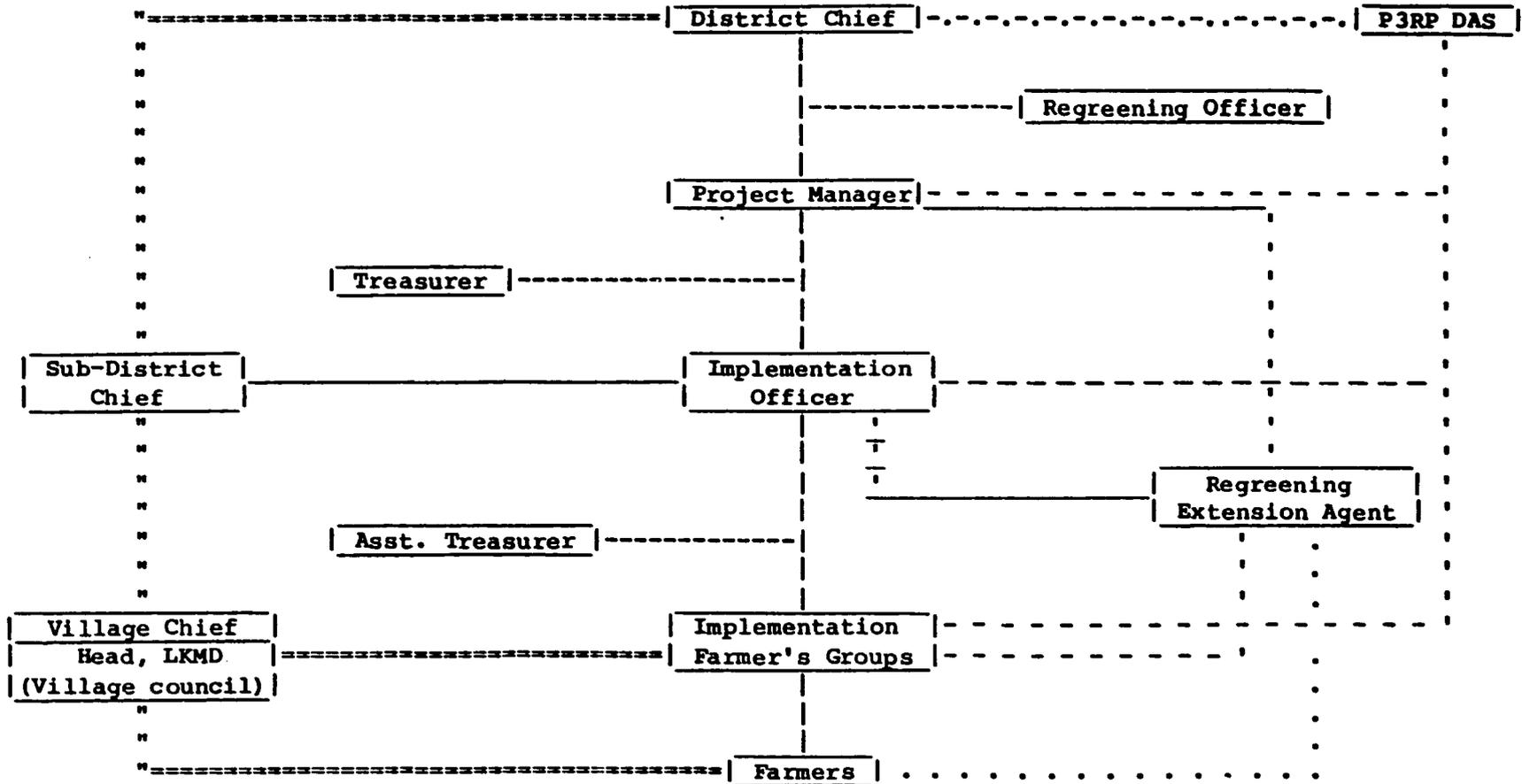
Responsibilities for agricultural extension within the Ministry of Agriculture are divided among the Agency for Agricultural Education, Training and Extension (AAETE) and four Directorate Generals (DGs) including Food Crops, Estate Crops, Livestock and Fisheries. In 1974 AAETE was given the mandate as the lead agency in the field of agricultural extension. However, it has not had operational control of the various bodies of field extension workers and has concentrated its efforts on extension methodology, production of extension material and particularly in managing agricultural education in high schools and training of agricultural staff of the other DGs.

CHART III.a.
ORGANIZATIONAL STRUCTURE FOR THE GUIDANCE AND CONTROL
OF THE REGREENING AND REFORESTATION PROGRAM



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**CHART III.b.
ORGANIZATIONAL STRUCTURE**



Information:

P3RPDAS = Project Planning and Guidance for Reforestation and Regreening of Watersheds. P3RPDAS new name: Sub-Center for Land Rehabilitation and Conservation

Project Managers are:

1. Chief, Agriculture Level II
2. Chief, Estate Crops Level II
3. KKPH

Lines Information:

1. _____ Command line
2. = = = = = Coordination/Evaluation line
3. ===== Inspection/Audit

4. -.-.-.-.- Consultation
5. - - - - - Guidance and Technical Assistance
6. ----- Operational Coordination
7. Extension

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Operational control of the extension services remains within the four DGs. This control has recently been reconfirmed under Presidential Decree No.24/1983 in which Directorates of Extension were created in all four DGs of the Ministry of Agriculture. The overwhelming majority of the extension force is under the DG of Food Crops which currently employs about 23,000 extension staff, 15,000 of whom are PPLs who are stationed in the field. Other DGs such as Estate Crops, Livestock and Fisheries have a very small number of extension agents, numbering 8,000-12,000; 1,000-2,000; and 1,000 respectively. Also the extension personnel from these offices are highly specialized in fields such as coconut production, artificial insemination, poultry or production of fingerlings. For the most part, they are stationed and work out of the district capital. At the same time, their geographic areas of responsibility are frequently not the same as the administrative boundaries of the district governments. Unlike the Food Crops extension service, the others operate more directly under the management of the particular programs and projects for which they are employed.

DG Food Crops' major role in agricultural extension dates back to 1965 and the inauguration of the BIMAS program (see Chart IV). The BIMAS program was established to take advantage of the new seeds/technologies available for wet rice production and actively supported the expansion of Food Crops' extension service to transfer these improved technologies. This history has significantly shaped the development of this extension service. The majority of their activities have necessarily focused on wet rice production areas and administration of the extension service has been the responsibility of the BIMAS program.

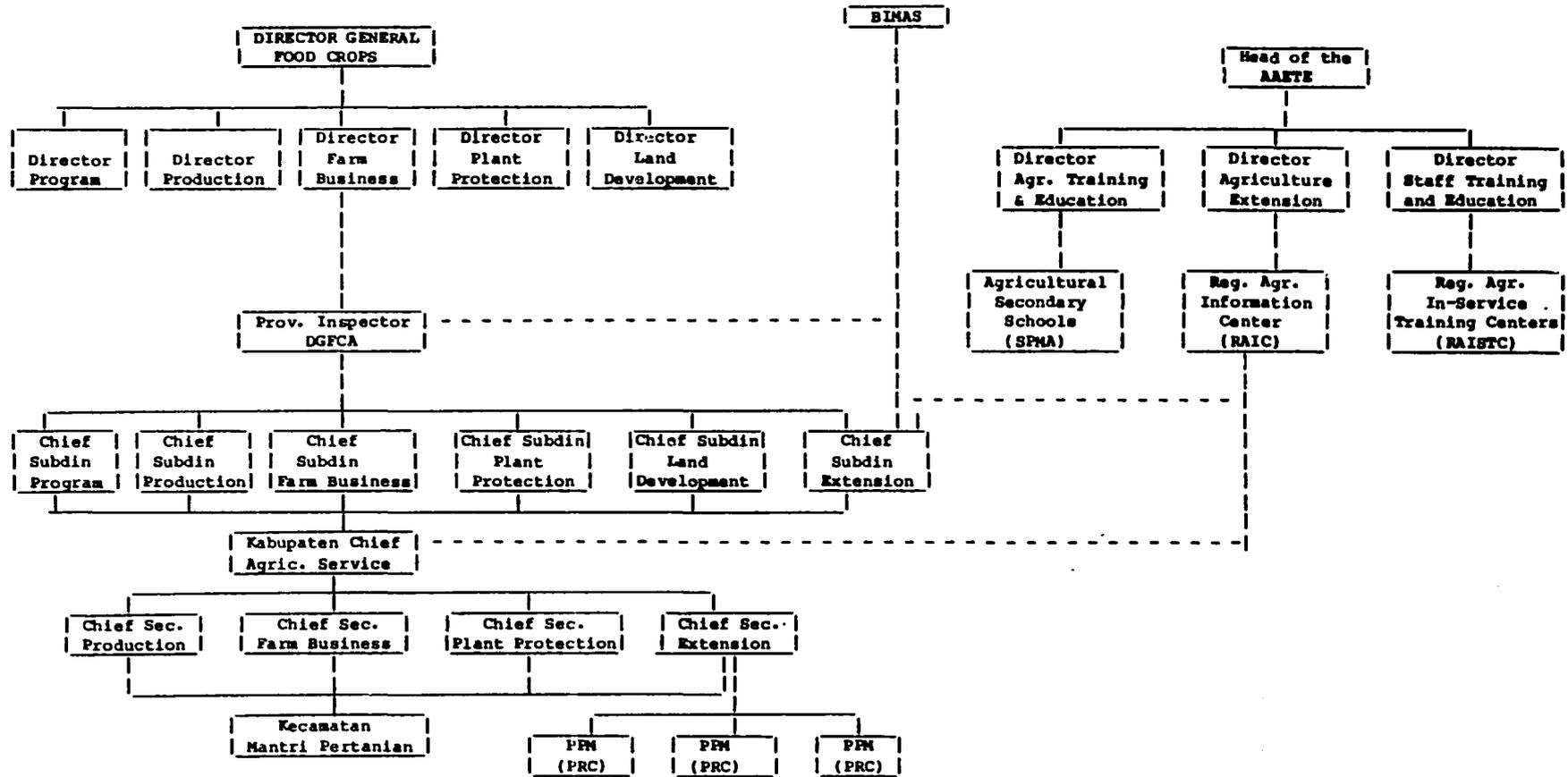
The present system of extension under the DG of Food Crops operates through rural extension centers (RECs) that cover working areas. Each service from one to several subdistricts. The REC is managed by two mid-level extension workers (PPMs), one in charge of program planning and the other the chief administrative officer. A team of 10 to 12 field extension workers (PPLs) operates from each REC. In the lowland areas one PPL typically services 800 hectares of irrigated land, or roughly 3000 farmers. In the non-irrigated areas, the ratio of PPL to farmers is to be significantly higher.

In summary, the extension service developed by the DG of Food Crops has developed a well defined system of extension and has set up a nationwide network of rural extension centers that reaches about 50% of the farmers, most of whom own and operate irrigated rice lands. The weak link in this system, particularly with reference to this project, is that the Food Crops extension agents have not established close ties with other extensions services including those working with the national Regreening Program.

Over the past few years, considerable discussion has taken place regarding appropriate measures which should be taken to address this weakness and achieve the unification of the extension services. Recent legislation provides for close coordination of extension

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Chart IV
Organization of Extension Service
 (Food Crops)



----- Command Line
 - - - - - Coordination Line

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activities among the DGs. Under the decree of the Minister of Agriculture 664/1979, an advisory working group has been set up at the central level and forums of extension coordination (FKPP) established at the provincial and district levels. Following the "Evergreen" workshop on the subject in October 1982 at which all DGs and AAETE participated, two important decision were taken as steps in the direction of unification. First, RECs were identified as the focal point for extension activities of all the DGs. Second, all DGs were requested to utilize to the maximum extent possible the nationwide network of farmers groups organized by local governments as part of the DG Food Crops extension system.

In a separate effort, the responsibilities of BIMAS, under Presidential Decree No.62/1983, have been expanded to embrace all DGs in the MOA. As a consequence, the head of BIMAS, in addition to administering the DG Food Crops extension staff, will take over the administration of the extension staff of the other three DGs over the next twelve months.

c. SUFS Assessment

The existing management system responsible for the Sustained Upland Farming System component has two critical weaknesses: The current structure has a high degree of centralization and corresponding standardization and a high degree of fragmentation in the delivery systems responsible for supporting improved upland farming systems.

A major objective of the Upland Agriculture and Conservation Project is to assist the Government of Indonesia achieve its aims to decentralize and unify management of its ongoing upland agriculture and conservation programs. The proposed management and organization structure of the UAC Project seeks to accomplish this on the one hand by delegating responsibility for the management of the SUFS activities to the district level. On the other hand a unified extension system is proposed, using the RECs as the operational level focal point and FKPPs II as the forum for coordinated planning.

The above refinements in the existing management system for SUFS activities are new and untested. What is proposed, however, does not constitute a radical reorganization of existing governmental structures. Rather, it represents a new and potentially more effective strategy for using existing systems. The GOI, IBRD and USAID all expect that, as experience with the management system is gained, modification in both organizational structure and process may be required.

4. Agricultural Research

The major responsibility for the development of technology for the rainfed upland areas of the upper river watersheds lies with the Agency for Agricultural Research and Development (AARD). This agency already has a program for research and development on watersheds and, under its

umbrella, there are nine other proposed or active farming systems projects. AARD has collaborated with watershed projects in the Citanduy and Solo river systems and in Yogyakarta. These farming systems studies have been directly useful within the project areas but have also provided methodology and experiences for more comprehensive research. In particular, research with cropping systems, bench terraces and forage management have provided the technological base for expansion programs for soil and water conservation. These initial and limited efforts also provide the background needed for further research.

AARD is at present finalizing an overall administrative system for all these research activities and the system will be applicable to the research component under the UAC Project. With specific regard to the UACP, a Project Management Unit will be established with a team of five specialists appointed by the head of the agency to provide technical support and leadership in their areas of expertise. The PMU will receive support from the relevant research centers in its implementation of project activities.

Further details on the administrative analysis will have to wait for the finalization of the re-organization of AARD.

5. Training

The training components of the project will be centered in Jakarta and managed by a full-time project officer. This centralized management is necessary given the large number of possible institutional sources of training which are, in most cases, not located in the project area. Each province and participating district will be expected to identify its training requirements annually. The Project Training Officer and an Interagency Training Committee will assist both provincial and district authorities in formulating their respective training needs and plans and will subsequently be responsible for identifying appropriate institutions to carry out the training. As much as possible the training will be field oriented and carried out within the project area whenever possible.

6. Roads

Two government agencies will be involved in the implementation of the roads component, the Ministry of Manpower and the district Public Works Office (PU). The PU will have primary responsibility for the design of the roads and for working with the district Project Management Unit on plans for the location of the roads. The Ministry of Manpower offices at the district level will be responsible for the management of the road construction. This strategy builds upon the existing strengths of the two agencies and will be an effective means for implementing this component.

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A N N E X I I

GOVERNMENT OF INDONESIA LETTER OF REQUEST



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REPUBLIC OF INDONESIA
NATIONAL DEVELOPMENT PLANNING AGENCY
2, Jl. Taman Suropati - Jakarta - Indonesia
Phone : 336207

No. : 1759 /D.I/6/1984
Encl. :



JAKARTA, June 28 , 19 84

Mr. William P. Fuller
Director
USAID Mission
American Embassy
Jakarta

Re : Upland Agricultural and
Conservation Project

Dear Mr. Fuller,

With regard to Bappenas' letter No. 1637/K/6/1984 dated June 21, 1984, I would like to inform you that the last sentence in the first paragraph should be revised to read as follows : "The Government of Indonesia will provide the rupiah equivalent of \$ 20,036,000.- in cash and in-kind to support this project over its planned seven (7) years life".

USAID ROUTING		
To	Act	Info
DIR		✓
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Sincerely yours

M. Siregar

M. Siregar
Deputy Chairman

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REPUBLIC OF INDONESIA
 NATIONAL DEVELOPMENT PLANNING AGENCY
 JAKARTA, INDONESIA

No. : 1637/K/6/1984

Jakarta, June 21, 1984

Encl. :

Mr. Willian P. Fuller
 Director
 USAID Mission
 American Embassy
 Jakarta

WORKING COPY



Re : Upland Agriculture and Conservation Project

USAID ROUTING		
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C&R		

Dear Mr. Fuller,

On behalf of the Government of Indonesia, we hereby request a loan of thirteen million nine hundred thousand dollars (\$ 13,900,000.-) and a grant of up to five million dollars (\$ 5,000,000.-) to implement the above project. The Government of Indonesia will provide the rupiah equivalent of \$ 17,500,000.- in cash and in-kind to support this project over its planned seven (7) years life.

The purpose of the project is to expand and improve institutional capacities, primarily at provincial, district and farm levels, to experiment with and to apply alternative approaches to upland farming.

The lead agency for implementing the project will be the Ministry of Home Affairs with the Ministries of Agriculture and Forestry as the primary technical agencies.

Looking forward to your favorable consideration.

Sincerely yours,



J.B. Sumarlin
 Minister of Planning/Chairman of Bappenas

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A N N E X I I I

APAC APPROVAL CABLE (83 STATE 252824)

0311

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 UNCLAS STATE 252824

OFFICIAL FILE

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E O. 12356: N/A
 TAGS:
 SUBJECT UPLAND AGRICULTURE AND CONSERVATION
 PROJECT (497-0311) PID APAC REVIEW

REFS: (A) STATE 234173 (B) STATE 209834

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1. SUMMARY: SUBJECT PID WAS REVIEWED BY APAC ON AUGUST 11, 1983. USAID WAS REPRESENTED BY DOUGLAS TINSIER. PID WAS APPROVED AND MISSION WAS AUTHORIZED TO APPROVE PP, SUBJECT TO FOLLOWING POINTS OR ISSUES BEING SATISFACTORILY RESOLVED DURING THE COURSE OF PROJECT DESIGN.

2. DETAILED DISCUSSION:

A. APAC DISCUSSED WHETHER PROPOSED PROJECT WAS PALLIATIVE RATHER THAN DEALING WITH THE ROOT CAUSE OF THE PROBLEM I.E. POPULATION PRESSURE AND THE RESULTANT CULTIVATION OF UPPER WATERSHED AREAS INAPPROPRIATE FOR AGRICULTURE. MISSION REP ACKNOWLEDGED THAT THE PROPOSED PROJECT WILL NOT SOLVE THAT BASIC PROBLEM BUT RATHER WILL REDUCE SOIL

EROSION AND INCREASE PRODUCTIVITY OF UPLAND FARMS, A NECESSARY PART OF LONG RANGE STRATEGY WHICH MUST INCLUDE EXPANSION OF OFF-FARM EMPLOYMENT, FERTILITY REDUCTION AND OUT-MIGRATION.

MRC/MER

B. APAC AGREED PP MUST PRESENT THOROUGH MACRO- AND MICRO- ECONOMIC ANALYSES TO DEMONSTRATE FEASIBILITY IN TERMS OF BENEFITS AND COSTS AT THE FARM LEVEL AS WELL AS LONG-TERM CONSERVATION BENEFITS TO UPLAND AND LOWLAND BASIN AREAS AS A WHOLE. IT WAS RECOGNIZED BY THE APAC THAT UPLAND FARMERS WILL NOT ADOPT APPROPRIATE METHODS UNLESS THEY ARE FINANCIALLY ATTRACTIVE AND HAVE ALREADY BEEN PROVEN VIABLE TO A REASONABLE EXTENT. THE CONSERVATION AND PRODUCTION PACKAGES DEVELOPED UNDER THIS PROJECT SHOULD TAKE THIS INTO ACCOUNT AND THE EXPECTED IMPACTS OF CONSERVATION PRACTICES ON PRODUCTIVITY AND FARMER INCOMES SHOULD BE ADDRESSED IN THE PP.

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DATE DUE 9/7

BY: *[Signature]*

RETURN TO C & R

C. LAND TENURE SECURITY IS IMPORTANT IN OBTAINING

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ADEQUATE LOCAL PARTICIPATION IN COMPLETING CONSERVATION AND ENGINEERING ACTIVITIES ASSOCIATED WITH THE PROJECT. THIS ASPECT OF THE PROJECT SHOULD BE FULLY EXPLAINED IN THE PP. APAC NOTED A NUMBER OF DIRECT AND INDIRECT BENEFICIARIES OF THE PROPOSED PROJECT BUT QUESTIONED ITS IMPACT ON THE LANDLESS. MISSION REP EXPLAINED THAT IF THE CONSERVATION EFFORTS ARE SUCCESSFUL, GREATER AMOUNTS OF PUBLIC LANDS WILL BE AVAILABLE TO THE LANDLESS FOR GRASSFES FOR ANIMAL GRAZING. THE PROJECT WILL ALSO PROVIDE CREDIT TO THE LANDLESS. APAC REQUESTED THAT THE PROJECT DEAL WITH THE LANDLESS WITH INTERVENTIONS TAILORED TO THEIR SPECIFIC NEEDS AND FELT THAT THE PP SHOULD DEFINE THE ESTIMATED NUMBER OF BENEFICIARIES IN TERMS OF HOW THEY ARE IMPACTED, E.G., DIRECT, INTERMEDIATE AND INDIRECT.

D. APAC AGREED THAT THE IBRD'S PARTICIPATION IN THE PROPOSED PROJECT SHOULD BE CONFIRMED IN THE PP AND THAT THE NATURE AND EXTENT OF AID/IBRD COORDINATION CLARIFIED. THE MISSION IS ENCOURAGED TO EXPLORE A SOMEWHAT GREATER IBRD FINANCING ROLE IN THE CREDIT COMPONENT OF THIS PROJECT.

E. APAC REQUESTED THAT THE PP EXPLAIN HOW AND TO WHAT EXTENT THIS PROJECT COULD BE REPLICATED TO OTHER AREAS OF INDONESIA. MISSION REP RESPONDED THAT THE PROPOSED PROJECT WOULD HAVE ELEMENTS WHICH COULD BE REPLICATED, IF

FOUND SUCCESSFUL, SUCH AS THE DECENTRALIZED APPROACH TO PROJECT IMPLEMENTATION AND THE COORDINATION MECHANISM DEVELOPED BETWEEN GCI, IBRD AND AID.

F. APAC REQUESTED THAT THE PP EXPLAIN HOW THE PROJECT WILL SERVE THE DIALOGUE ON THE DEVELOPMENT OF NATIONAL/REGIONAL POLICIES FOR UPLAND AGRICULTURE/WATERSHED DEVELOPMENT AND CONSERVATION.

G. APAC WAS INTERESTED IN HOW THE PROJECT WOULD PROVIDE FOR MAXIMUM INVOLVEMENT OF THE PRIVATE SECTOR FOR SUPPORT OF THE IMPLEMENTATION OF THIS PROJECT. MISSION REP STATED THAT IT WAS THE INTENTION OF THE MISSION TO INVESTIGATE PRIVATE SECTOR INVOLVEMENT IN AREAS OF SEED CERTIFICATION, NURSERIES, INPUT SUPPLIES AND EXTENSION ACTIVITIES IN SUPPORT OF THE PROJECT. REP INDICATED THE EXTENT OF PRIVATE SECTOR INVOLVEMENT ON THIS PROJECT WAS A MATTER OF DISCUSSION WITH THE GOI, BUT THE MISSION WOULD BE PARTICULARLY INTERESTED IN DRAWING PRIVATE SECTOR NURSERIES INTO THE PROJECT. APAC SUGGESTED THAT THERE MIGHT BE A ROLE FOR PRIVATE INFORMAL CREDIT INSTITUTIONS WITHIN THE CREDIT COMPONENT OF THE PROJECT ACCORDINGLY, MISSION SHOULD EXPLORE PROSPECTS FOR SUCH PRIVATE CREDIT INSTITUTIONS TO PARTICIPATE IN THE PROJECT, AND INCORPORATE CONCLUSIONS IN THE PP.

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H. APAC WAS INTERESTED IN THE ROLE CREDIT PLAYS IN THE PROJECT, PARTICULARLY HOW THE PROJECT ADDRESSES THE ISSUE OF ESTABLISHING A SELF-SUSTAINING CREDIT FACILITY AND HOW SUBSIDIZED AGRICULTURE CREDIT FROM OTHER SOURCES MIGHT COMPETE WITH DEMANDS FOR THE CREDIT PROVIDED UNDER THE PROJECT. MISSION REP STATED THAT THE CREDIT ENVISIONED UNDER THE PROJECT IS NOT THE TRADITIONAL SHORT-TERM AGRICULTURAL CREDIT PRESENTLY AVAILABLE BUT A MORE FLEXIBLE, IMPLICITLY LONGER-TERM CREDIT ESTABLISHED UNDER THE BKK/PKD NETWORK. IN THIS REGARD, IT IS EXPERIMENTAL IN NATURE. APAC NOTED THAT PID DID NOT SPECIFY THE IMPLEMENTING AGENCY, ALTHOUGH THE BKK AMONG OTHERS, WAS MENTIONED AS UNDER REVIEW. APAC CONCLUDED THAT AS THE CREDIT PROGRAM IS PIVOTAL TO THE SUCCESS OF THE PROJECT, A CAREFUL ANALYSIS OF THE ROLE AND POTENTIAL OF THIS PROGRAM BE INCLUDED IN THE PP AS WELL AS THE JUSTIFICATION OF THE IMPLEMENTING AGENCY.

I. APAC NOTED THAT IPRD/GOI WOULD BE FINANCING THE CONSTRUCTION OF ACCESS ROADS. GIVEN THE DESIGN, MATERIALS USED AND THE PROCEDURE EMPLOYED. THESE ROADS COULD EXACERBATE THE DEGRADATION OF THE ENVIRONMENT.

P.P. SHOULD ANALYZE THESE IMPACTS CLOSELY. FURTHER, AS THE ROADS ARE BUILT TO PROVIDE AN ACCESS TO AVAILABLE MARKETS FOR REGIONAL GOODS, THEY ALSO PROVIDE AN EASIER METHOD TO MARKET GOODS AND SERVICES COMING INTO THE REGION. THE COMPARATIVE ADVANTAGE ENJOYED BY THE UPLAND FARMERS FOR SELECTED CROPS MAY DISAPPEAR DUE TO AVAILABILITY OF CROPS PRODUCED BY LOWLAND FARMERS MARKETED BY WAY OF THESE NEW ACCESS ROADS. APAC FELT THAT THE PP ECONOMIC ANALYSIS SHOULD TAKE THIS INTO ACCOUNT.

J. APAC WAS CONCERNED THAT THE PID DID NOT INCLUDE PROVISION FOR OPERATION AND MAINTENANCE OF THE CONSERVATION/FARMING PLOTS, ACCESS ROADS, ETC. APAC BELIEVES THAT O AND M SHOULD BE ADDRESSED IN PP INCLUDING HOW THIS WOULD BE FINANCED, AND WHO WOULD BE RESPONSIBLE.

K. CLOSELY LINKED TO J. ABOVE, APAC NOTED THAT MANY IMPLEMENTATION DELAYS RESULT FROM LACK OF GOI BUDGETARY AVAILABILITIES. APAC STRESSED THAT PP SHOULD ANALYZE THE POTENTIAL CONSEQUENCES OF REDUCED GOI CONTRIBUTIONS TO THE PROJECT AND OUTLINE POSSIBLE SOLUTIONS.

L. APAC CONCLUDE; THAT. ALTHOUGH THE PID DESCRIBED THE PROPOSED PROJECT AS PHASE I OF SOME LARGER EFFORT, THE PROJECT SHOULD BE DESIGNED AND CONSIDERED AS A DISCRETE SELF-CONTAINED PROJECT. THE OBJECTIVES, AS STATED IN THE PID, SHOULD BE OBTAINABLE WITHIN THE PROJECT PACD AND AID SHOULD NOT BE COMMITTED EVEN IMPLICITLY TO CONTINUE IN THIS PROJECT BEYOND THAT POINT.

M. APAC AGREED THAT THE PROJECT SHOULD BE AUTHORIZED IN THE MISSION ON THE UNDERSTANDING THAT THE PROJECT, AS

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STATE 252924/02

DESIGNED, WILL BE CONSISTENT WITH ASIA BUREAU GUIDELINES ON RAINFED AGRICULTURE AND WILL RESOLVE THE ISSUES AND/OR INCORPORATE THE POINTS RAISED ABOVE. IN ACCORDANCE WITH THOSE GUIDELINES PER REFTEL B, PP NEEDS TO INCLUDE THOROUGH SOCIAL SOUNDNESS ANALYSIS, MARKET ANALYSIS AND EVIDENCE OF HOST COUNTRY COMMITMENT.

3. APAC APPRECIATES INPUTS OF DOUGLAS TINSLER AT REVIEW. HIS UNDERSTANDING AND THOUGHTFUL INSIGHTS ASSISTED ALL IN APPRECIATING PROBLEMS OF AND OPPORTUNITIES FOR UPLAND AGRICULTURE AND CONSERVATION IN INDONESIA. MISSION IS AUTHORIZED TO PROCEED WITH DEVELOPMENT OF THE PROJECT PAPER. SHUITZ

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A N N E X I V

LOGICAL FRAMEWORK

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Project Title: Upland Agriculture and Conservation Project : Phase I

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p><u>Program or Sector Goal: The objectives to which this project contributes: (A-1)</u></p> <p>To sustain and enhance the productive capacity of Java's up lands through improved management of soil and water resources.</p>	<p><u>Measures of Goal Achievement: (A-2)</u></p> <p>Percent of uplands in sustainable productive use (forest, silvipasture, estate crops or privately profitable, but ecologically stable, annual cropping systems).</p>	<p><u>(A-3)</u></p> <p>Land capability and use statistics. Measurements of sedimentation rates.</p>	<p><u>Assumptions for achieving goal targets: (A-4)</u></p> <p>That other development policies and activities of the GOI relevant to this area (e.g., population control, transmigration, off-farm employment generation) will be effectively carried out.</p>
<p><u>Project Purpose: (B-1)</u></p> <p>1. To expand and improve institutional capacities, primarily at provincial, district and farm levels to experiment with alternative approaches to upland farming and to apply these approaches;</p>	<p><u>Conditions that will indicate purpose has been achieved:</u></p> <p>By end of Phase 1.a. (36 months from satisfaction of major CPE)</p> <p>By end of Phase 1.b. (year 6)</p> <p>1.a. decentralized, inter agency planning system in place and functioning with annual plans produced for project years I-III and comprehensive plan produced for years IV - VI;</p> <p>1.b. unified budget system in place and routinely functioning utilizing only a single IMPRES system;</p> <p>1.c. interagency district guidance teams and Project Management Units (PMU) routinely planning and managing project;</p>	<p><u>(B-3)</u></p> <p>- Annual assessments. - Project evaluation.</p>	<p><u>Assumptions for achieving purpose: (B-4)</u></p> <p>- That Government will utilize the management system described in the Project Paper. - That Government will provide the necessary manpower.</p>

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NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
	<p>1.d. BPP and interagency extension force effectively planning and executing comprehension field program in targeted sub-watersheds;</p> <p>1.e. Farmer groups organized and dynamically functioning;</p> <p>1.f. Pattern established involving project management hiring private contractors, universities and foundations to provide supporting services, research, etc., on a routine basis to project and participating communities;</p> <p>1.g. Evidence that program has created public consciousness concerning upland productivity and conservation issues and corrective action;</p>	<p>1.d. BPP and polyvalent extension program has proven effective in disseminating improved technology through productive interaction with farmer conservation groups;</p> <p>1.e. Methodologies for actively engaging farm communities in interactive process of development in conjunction with local government have proven effective and institutional framework and process exists on both farmer/community side and local government to move into expanded phase II program;</p> <p>1.f. Proven performance record of private contractors, universities, and foundations in collaboration with local communities or PMUs in providing services to warrant judgment that such collaborative action can be substantially expanded during Phase II;</p> <p>1.g. Public information programs/campaigns routinely informing public on upland agriculture and soil and water conservation measures;</p>	

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NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS		MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>2. Increase GOI technical capacity and research processes which systematically, and on a continuous basis, improve the biological and socio-economic foundation related to upland farming conditions on Java.</p>	<p>1.b. Project Management Information Systems in place and functioning as planned.</p> <p>2. Farming system field laboratory and outreach sites in place and functioning and initial results coming "on stream".</p>	<p>1.h. A strong capacity for for execution and management of evaluation research exists at project and province level and evidence generated through this effort has established basis in part for proceeding phase II.</p> <p>2. Research program has established a diversified range of profitable, but ecologically stable technologies for upland communities including initial results on tree crops/silvipasture technology.</p>		
<p><u>Project Outputs: (C-1)</u></p> <p>1. <u>Management Systems:</u> A decentralized and unified management and budgetary systems in place and functioning which provides the institutional framework and management processes for effectively extending to upland communities information, technology & inputs required for the diffusion & sustained application of ecologically stable upland farming systems technology.</p>	<p><u>Magnitude of Outputs: (C-2)</u> By end of Phase Ia (36 months from meeting major CEs)</p> <p>1a. Policy guidance and regulations in place which authorize and define the structure and process of decentralized and unified management at the provincial, district and field levels;</p> <p>1b. A unified budgetary system in place and functioning under the control and management of district governments;</p>	<p>By end of Phase Ib (year 6)</p> <p>1a. Management system internalized into provincial management systems and routinely applied in all districts province wide;</p> <p>1b. Budgetary system internalized into overall budgeting process and routinely applied in all districts, province wide;</p>	<p><u>(C-3)</u></p> <p>Annual assessments. Project evaluation.</p>	<p><u>Assumptions for achieving outputs: (C-4)</u></p> <ul style="list-style-type: none"> - Adequate delegations of authority to the provincial and district governments. - Support from relevant Ministries. - Acceptance of responsibility and authority by the provinces and districts.

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NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>2. Applied Farming Systems Research: Execution of a comprehensive program of upland farming systems applied research designed to improve existing and develop new technologies.</p>	<p>1c. Interagency District Guidance Teams (DGT) and Project Management Units (PMU) established and functioning in four districts, evidenced by:</p> <ul style="list-style-type: none"> - preparation of annual project plans and budgets; - preparation of medium term development plan for project years IV-VI; - integration of P3RPUAS program and P2TP program into overall project management structure & systems; <p>1d. Staff of 22 participating BPP/REC have received appropriate training and planning and managing of the SUPS Pilot Projects:</p> <p>2a. One field laboratory & 8 outreach sites developing and field testing farming systems technology including components focused on: soil/water conservation and management; cropping systems; livestock, tree crops and silviculture and socio-economic evaluation.</p> <p>2b. The acceptance of recommendations developed by the research.</p>	<p>1c. Management system internalized into provincial management systems and routinely applied in all districts province wide;</p> <p>Annual assessments. Project Evaluation.</p>	<ul style="list-style-type: none"> - Sufficient and able staff and financing to carry out the program. - Methodology that moves results to farmers fields within PACO. - Institutionalization of farming systems research by AARD.

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NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p><u>3. Sustainable Upland Farming Systems Pilot Projects:</u></p> <p>Management/delivery systems established for the diffusion of farming systems technology to upland communities.</p>	<p><u>3. Sustainable Upland Farming Systems Pilot Projects:</u></p> <p>a. Up to three (3) BPP based <u>mini watershed sustainable farming system pilot projects</u> in place in each of the (4) four participating districts which include:</p> <ul style="list-style-type: none"> * a watershed development plan and program; * 4 irrigated nurseries established or upgraded and properly distributed among 8 participating district which produce sufficient grass/legume production to meet demand estimated at 700 H_a. per district or 2,800 hectares overall; * a program in place and functioning which produces "good" seed for distribution under the program sufficient to meet demand estimated at 700 H_a. per district or 2,800 hectares overall; * up to five strategically located Demonstration Farms of + 10 hec. each in each watershed; 	<p><u>3. Sustainable Upland Farming Systems Pilot Projects:</u></p> <p>a. An established program and process in place which has introduced project supported conservation and productivity increasing technology on approximately 23,000 hec., equally divided between the provinces of Central and East Java;</p> <p>Annual assessments. Project evaluations.</p>	<ul style="list-style-type: none"> - That better technology is available or can be developed according to the project plan. - That farmers will accept the better technology. - That the required inputs will be available as planned. - Sufficient and able staff and financing to carry out the program. - Timely pre-financing by GOI. - Farmers adopting the improved practices will be in contiguous groups.

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NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
	<p>* Pilot approaches to community management of upland resources executed in selected districts which utilize a range of institutions (e.g., conservation groups, village councils, religious institutions) and which utilize local institutions (e.g., NGOs and universities) to provide technical backstopping to upland communities;</p> <p>b. <u>Human Resources Develop.</u> Execution of a field training program in upland agriculture, conservation practices and community management for extension workers, farmers and community leaders and local government decision makers.</p> <p>c. <u>Access Roads:</u> Access roads established as required in sustainable upland pilot project areas. + 90 kms by end of year three;</p>	<p>* Institutionalized process in place of interactive decision-making between upland communities and local government which result in efficient application of resources and sustainable upland development and conservation;</p> <p>b. <u>Human Resources Develop.</u> c.1. 2600 local government decision-makers, technicians extension workers, and farmer and community leaders trained in upland agriculture. c.2. M.A. level training for 36 professionals through U.S. land Grant University/USDA/Soil Conservation Service work/study program. c.3. An information program of newsletters slide shows & movies will be brought to the villages.</p> <p>c. <u>Access Roads:</u> 475 kms of low grade village access road constructed and/or upgraded in sustainable upland farming systems pilot project areas;</p> <p>- Project training and financial records. - Annual assessments. - Project evaluation.</p> <p>Physical verification. Project budget and records.</p>	<p>- Adequate institutional/curricular resources/standards. - Adequate English language capability on part of appropriate staff. - Personnel management that identifies suitable trainees and provides time for training.</p> <p>- Adequate local capacity/person-power exists to carry out the construction activities. - Effective working relationship between Tenaga Kerja and P.U.</p>

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NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
	<p>d. <u>Project Innovation Fund</u> system established and each participating district extending grants in response to proposal from local institution and communities.</p> <p>4. <u>Evaluation, Planning and Project Appraisal for Phase II:</u> Periodic monitoring and evaluation of component activities; MIS in place and producing management useful results.</p>	<p>d. <u>Project Innovation Funds:</u> system established and each participating district extending grants in response to proposals from local institution & communities.</p> <p>4. Evaluations conducted annually; with major evaluation at end of third and fifth years;</p>	

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A N N E X V

BUDGET ANNEX

Budget Annex
Table 1
National Level Executive Secretariate Full Time Staff 1/
(Rps000)

	Quantity by Project Year									Base Costs by Project Year								
	Unit	0	1	2	3	4	5	6	Total	Unit Cost	0	1	2	3	4	5	6	Total
A. Investment Cost:																		20000
Office Equipment and Furniture	Set	1							1	10000	10000							10000
Vehicle 2/	No	1							1	10000	10000							10000
B. Recurrent Costs																		212450
1. Personnel																		
Home Affairs	Ann.	1	1	1	1	1	1	1	7	3000	3000	3000	3000	3000	3000	3000	3000	21000
MOA		1	1	1	1	1	1	1	7	3000	3000	3000	3000	3000	3000	3000	3000	21000
MOP		1	1	1	1	1	1	1	7	3000	3000	3000	3000	3000	3000	3000	3000	21000
Training Coord. (from Home Aff.)		1	1	1	1	1	1	1	7	3000	3000	3000	3000	3000	3000	3000	3000	21000
Secretary		1	1	1	1	1	1	1	7	2000	2000	2000	2000	2000	2000	2000	2000	14000
Clerk		1	1	1	1	1	1	1	7	1000	1000	1000	1000	1000	1000	1000	1000	7000
Driver		1	1	1	1	1	1	1	7	800	800	800	800	800	800	800	800	5600
2. Per Diem for Full Time Staff	Ann.	1	1	1	1	1	1	1	7	7000	7000	7000	7000	7000	7000	7000	7000	49000
Office Supplies	Ann.	1	1	1	1	1	1	1	7	6000	6000	6000	6000	6000	6000	6000	6000	42000
Veh. Running 2/	Ann.	1	1	1	1	1	1	1	7	800	800	800	800	800	800	800	800	5600
Vehicle Maint.	Ann.	1	1	1	1	1	1	1	7	750	750	750	750	750	750	750	750	5250
C. Total A+B											50350	30350	30350	30350	30350	30350	30350	232450
											-----	-----	-----	-----	-----	-----	-----	-----

1/ This reflects the incremental increase in staff that will be assigned to the Project full-time.

2/ This will be assigned to the office in Jakarta. Vehicle transportation in the Project areas will be provided by Project vehicles assigned to those areas.

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Budget Annex
Table 2
Provincial Level Project Management & Staff Costs (Central and East Java)
(Rp. in 000s)

	Quantity by Project Year									Base Costs by Project Year								
	Unit	0	1	2	3	4	5	6	Total	Unit Cost	0	1	2	3	4	5	6	Total
A. Investment Cost:											80000							80000
<u>Provincial Level</u>											-----							-----
<u>East & Central Java</u>																		
Vehicle	No	6								10000	60000							60000
Off.Equip/Furn(PCU)	Set	2								10000	20000							20000
B. Recurrent Costs											128800	128800	128800	128800	128800	128800	128800	901600
											-----	-----	-----	-----	-----	-----	-----	-----
1. Personnel (PCU)											31000	31000	31000	31000	31000	31000	31000	217000
Proj. Coordinator	No	2							2	3600	7200	7200	7200	7200	7200	7200	7200	50400
Project Plan. Off.	No	2							2	2500	5000	5000	5000	5000	5000	5000	5000	35000
MIS/Eval. Officer	No	2							2	2500	5000	5000	5000	5000	5000	5000	5000	35000
Proj. Fin. Off.	No	2							2	2500	5000	5000	5000	5000	5000	5000	5000	35000
Secretaries	No	4							4	1000	4000	4000	4000	4000	4000	4000	4000	28000
Drivers	No	6							6	800	4800	4800	4800	4800	4800	4800	4800	33600
2. Other											97800	97800	97800	97800	97800	97800	97800	684600
Travel Allow.(PCU)	Ann.									8500/P/y	17000	17000	17000	17000	17000	17000	17000	119000
Office Exp. (PCU)	Ann.									1500/P/y	36000	36000	36000	36000	36000	36000	36000	252000
Vehicle Running Expenses (PCU)	km/jp	20	20	20	20	20	20	20		40/pp/km	4800	4800	4800	4800	4800	4800	4800	33600
Proj. Monitoring Eval/Spes.Stud.	Ann.									20000/P	40000	40000	40000	40000	40000	40000	40000	280000
C. Total Provincial Level Costs (A+B)											208800	128800	128800	128800	128800	128800	128800	981600
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Budget Annex
Table 3
Upland Agriculture and Conservation Project
District Level Management & Staff Costs (Central and East Java)
(Rps in 000s)

	Quantity by Project Year								Total	Base Costs by Project Year								Total	
	Unit	0	1	2	3	4	5	6		Unit Cost	0	1	2	3	4	5	6		
I. Investment Cost:																			
District Level										120000				120000					240000
East & Central Java										-----				-----					-----
Jeep (Distr./PMU)	2/PMU	8			8				16	10000	80000			80000					160000
Office Equip. + Furniture	1/PMU	4			4				8	10000	40000			40000					80000
II. Recurrent Costs											152400	152400	152400	304800	304800	304800	304800		1676400
											-----	-----	-----	-----	-----	-----	-----		-----
A. Personnel (PMU)											59660	59600	59600	119200	119200	119200	119200		655600
Proj. Manager	No	4			8				8	3000	12000	12000	12000	24000	24000	24000	24000		132000
Planning Officer	No	4			8				8	2000	8000	8000	8000	16000	16000	16000	16000		88000
MIS/Eval. Officer	No	4			8				8	2000	8000	8000	8000	16000	16000	16000	16000		88000
Finance Officer	No	4			8				8	2000	8000	8000	8000	16000	16000	16000	16000		88000
Data Analyst	No	4			8				8	1500	6000	6000	6000	12000	12000	12000	12000		66000
Secretaries	No	8			16				16	1000	8000	8000	8000	16000	16000	16000	16000		88000
Clerks	No	4			8				8	800	3200	3200	3200	6400	6400	6400	6400		35200
Drivers	No	8			16				16	800	6400	6400	6400	12800	12800	12800	12800		70400
B. Other											65200	92800	92800	185600	185600	185600	185600		1020800
Travel Allow.	ann.									3600/ann	14000	14400	14400	28800	28800	28800	28800		158400
Office Exp. (PMU)	ann.									1000/mth	32000	48000	48000	96000	96000	96000	96000		512000
Vehicle Running Expenses (PCJ)	jeep	20	20	20	20	20	20	20		40Rp/km	3200	6400	6400	12800	12800	12800	12800		60800
Off. Rental (PMU)	ann.									500/mth	16000	24000	24000	48000	48000	48000	48000		256000
III. Total District Mgt+Sty/Obsta(I+II)											245200	152400	152400	424800	304800	304800	304800		1882800
											-----	-----	-----	-----	-----	-----	-----		-----

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Budget Annex
Table 4
Technical Assistance 1/
(Rps 000)

	Unit	Quantity by Project Year						T.Unit	Uni.Cost	Base Costs by Project Year						Total		
		0	1	2	3	4	5			6	0	1	2	3	4		5	6
I. Investment Costs																		100000
A. Exec. Sec.:																		
Vehicle	No	1						1	7500	7500								7500
Office Furn/equip	Set	1						1	10000	10000								10000
B. Proj. Coord. Off.:																		
Vehicle	No	6						6	7500	45000								45000
Office Furn/equip	Set	2						2	10000	20000								20000
C. Farm. Syst. Res:																		
Vehicle	No	1						1	7500	7500								7500
Off.Furn./Equip.	Set	1						1	10000	10000								10000
II. Recurring Cost 2/																		10572545
Consult. Contract	p/m								12500 2/									
A. Ex Sec. (Expat.)		10	36	36	36	12	12			125000	450000	450000	450000	150000	150000			1775000
B. Prov. Coord. Off. (LT+ST)		7.5	108+4	108+4	96+4	84+4	36+4	12+12		93750	400000	1400000	1250000	1100000	500000	300000		6043750
C. FS Research		4.5	24	24	24	24	24	12		56250	300000	300000	300000	300000	300000	150000		1706250
D. Gen. Start up Indonesian:		3								37500								37500
A. Ex. Sec.																		
Indonesian clerical unskilled		5	12	12	12	12	12		450	2250	5400	5400	5400	5400	5400			29250
B. Prov. Coord. Off																		
Professional		3	48	48	48	48	48	48	2500 2/	7500	120000	120000	120000	120000	120000	120000		727500
Clerical		1	48	48	48	48	24	24	450	450	21600	21600	21600	21600	10800	10800		108450
Unskilled		1	72	72	72	72	24	24	100	100	7200	7200	7200	7200	2400	2400		33700
C. FS Research																		
Clerical		3	12	12	12	12	12	12	450	1350	5400	5400	5400	5400	5400	5400		33750
Unskilled		3	12	12	12	12	12	12	100	300	1200	1200	1200	1200	1200	1200		7500
Vehicle run. expenses (est Rps 40 x 20,000 kms x number of vehicles annually)																		63395
A. Ex. Sec.	v/y	0.5	1	1	1	1	1	1	7.5	800	400	800	800	800	800	800	800	5200
B. Prov.Coord. Off.	v/y	0.1	6	6	6	6	2	2	29.1		80	4800	4800	4800	4800	1600	1600	22480
C. FS Research	v/y	0.3	1	1	1	1	1	1	7.3		240	800	800	800	800	800	800	5040
Vehicle maintenance																		
A. Ex. Sec.		0.5	1	1	1	1	1	1	7.5	750	375	750	750	750	750	750	750	4875
B. Prov.Coord. Off.		0.1	6	6	6	6	6	6	29.1		75	4500	4500	4500	4500	4500	4500	27075
C. FS Research	v/y	0.3	1	1	1	1	1	1	1.3		225	750	750	750	750	750	750	4725
TOTALS											426345	2324400	2324400	2174400	1724400	1105600	599000	10678545

1/ Offices are colocated with counterparts

2/ Office supplies, etal assumed under monthly costs

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Budget Annex
Table 5
Farming Systems Research Components
(Rp000)

	Unit	Quantity by Project Year								Total	Unit Cost	Base Costs by Project Year								Total
		0	1	2	3	4	5	6	0			1	2	3	4	5	6			
A. Investment Cost:											184000	55000							239000	
Vehicle	No	4	3						7	10000	40000	30000								
Pick-up truck	No	1							1	12000	12000									
Motorcycles	No	10	10						20	1000	10000	10000								
Minibus	No	1								12000	12000									
Handtractors	No	4							4	4000	16000									
Generator (7000 W)	No		1						1	5000		5000								
Office Equipment	Set	2							2	7000	14000									
Personal Computer	No		1							10000		10000								
Field Lab. facility	Var.	1								80000	80000									
B. Recurrent Costs											571960	532110	488110	450110	451610	442610	442610		3379120	
1. Personnel (PNU)											157460	159860	159860	159860	159860	159860	159860		1116620	
Project Leader	No	1	1	1	1	1	1	1	7	6000/y	6000	6000	6000	6000	6000	6000	6000		42000	
Senior Research	No	7	7	7	7	7	7	7	49	4800/y	33600	33600	33600	33600	33600	33600	33600		235200	
Junior Research	No	12	12	12	12	12	12	12	84	4500/y	54000	54000	54000	54000	54000	54000	54000		378000	
Technicians	No	24	24	24	24	24	24	24	168	1440/y	34560	34560	34560	34560	34560	34560	34560		241920	
Field Assistants	No	25	25	25	25	25	25	25	175	780/y	19500	19500	19500	19500	19500	19500	19500		136500	
Secretaries	No	5	5	5	5	5	5	5	35	1000/y	5000	5000	5000	5000	5000	5000	5000		35000	
Drivers		6	9	9	9	9	9	9	60	800/y	4800	7200	7200	7200	7200	7200	7200		48000	
2. Other											79620	81870	96870	96870	91870	81870	81870		610840	
Veh. Run. Expens.	000	40	40	40	40	40	40	40	280	Rp50/km	17120	17120	17120	17120	17120	17120	17120		119840	
Vehicle O&M	S.rep	6	9	9	9	9	9	9	60	Rp750000/y	4500	6750	6750	6750	6750	6750	6750		45000	
Travel allowance	Ann.									???	20000	20000	20000	20000	20000	20000	20000		140000	
Office and staff house rental	Ann.										18000	18000	18000	18000	18000	18000	18000		126000	
Trg/Conf./Public.	Ann.										20000	20000	35000	35000	30000	20000	20000		180000	
3. Field Res. Budget	Ann.										350000	300000	200000	200000	200000	200000	200000		1650000	
C. Total Farming System Res. Costs											771080	596730	456730	456730	451730	441730	441730		3616460	

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Budget Annex
Table 6
Upland Agriculture and Conservation Project
Sustainable Upland Farming Systems Pilot Projects
(Rps in 000s)

	Quantity by Project Year									Unit Cost	Base Costs by Project Year							
	Unit	0	1	2	3	4	5	6	Total		0	1	2	3	4	5	6	Total
I. Investment Cost											305000	16000	320800	82800				725600
Motorcycle		22	12	26	12				72	1000/motor	10000	16000	24000	22000				72000
Jeep (sub-project)	No	20		20	2				42	10000/veh.	200000		200000	20000				420000
Office Equip.	Set	40		42	2				84	400/set	16000		16800	800				33600
Office Nurs.Dempt.	3 ha	4		4	2				10	20000/nurs.	80000		80000	40000				200000
II. Recurrent Costs											467090	280320	538430	716640	748420	748420	748420	4247740
A. Personnel											66240	96720	230880	306240	324240	324240	324240	1997040
Min.of Agr (MOA):											(25080)	(37560)	(73560)	(90720)	(90720)	(90720)	(90720)	(499080)
Food Cr.Agr.(PPS)	No	4		4					8	1440/yr	5760	5760	11520	11520	11520	11520	11520	69120
Livestock (PPS)	No	4		4			4		8	1440/yr	5760	5760	11520	11520	11520	11520	11520	69120
Estate Crop (PPS)	No	4		4					8	1440/yr	5760	5760	11520	11520	11520	11520	11520	69120
Ext.Manager (PPM)	No	22	12	26	12	4			72	780/yr	7800	20280	39000	56160	56160	56160	56160	291720
Min.of Forestry(MOF)											(8160)	(8160)	(16320)	(17520)	(17520)	(17520)	(17520)	(102720)
Soil Conserv (PPS)	No	4		4					8	1440/yr	5160	5760	11520	11520	11520	11520	11520	69120
Nursery Staff(PLF)	No	4		4	2				10	600/yr	2400	2400	4800	6000	6000	6000	6000	33600
Rural Ext.Center																		
Ext.Staff(PPL/PLP)	No	110	60	130	60				360	600/yr	33000	51000	141000	198000	216000	216000	216000	1152000
B. Other Cost											400850	183600	307550	410400	424200	424200	424200	2575000
Vehicle run. expn.	000 km	40								Rp50/km	20000	40000	60000	82000	82000	82000	82000	438000
Vehicle maint.	St.rep									Rp750/yr	22200	23400	46000	49200	49200	49200	49200	186000
Motorcycle O&M	15000k									Rp100/yr	1650	4200	7050	9900	10800	10800	10800	56100
Travel allowance	Ann.									***	317000	76000	124500	173300	186200	186200	186200	1249400
PPS housing allow.	Ann.									Rp500/yr	8000	8000	16000	16000	16000	16000	16000	96000
Nursery Opr. cost	3ha.	4		6						Rp8000/yr	32000	32000	64000	80000	80000	80000	80000	448000
III. SUFS Subsidy	ha/yr		220	1990	3150	5220	6120	6120	22820	Rp300000 over 2 years	139800	241180	388960	881816	1491924	1963012	1453568	6560260
Planting Material*											9800	98980	257740	481376	683060	719712		2250668
1st yr. Dem Farm																		
+ Expansion	per/ha										22920 ha		12200	123220	319640	599264	850340	895968
2nd yr. Dem Farm**																		
+ Expansion																		
Seed Operation		1	1								130000	130000						260000
TOTAL I+II+III											902460	585800	1241780	1682436	2222664	2693752	2184308	11513200

* See following table for Seeds budget detail

** GOI will fund the second year subsidy for the last expansion segment, which will be in Year 7, therefore after PACD.

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Budget Annex
Table 7
Upland Agriculture and Conservation Project
Human Resources Development
(Rp000)

	Unit	Quantity by Project Year								Total	Unit Cost	Base Costs by Project Year						Total	
		0	1	2	3	4	5	6	0			1	2	3	4	5	6		
I. Investment Cost: (None will utilize exist. facilities & proj. provided logistics support in place. Much try. will be done under contract F)																			
II. Recurrent Costs																			
A. Training Director	No	1							7	3000	3000	3000	3000	3000	3000	3000	3000	138566	
B. Travel Allowance	annual								7	2040	1326	2040	2040	2040	2040	2040	2040	21000	
C. Newsletter	Edit.	1	2	3	3	4	4	4	21	5000	5000	10000	15000	15000	20000	20000	20000	13566	
III. Intensive Short Courses																			
A. Farmers	pra/wk		3740	5780	10200	12240	12240	12240	56440	10		37400	57800	102000	122400	122400	122400	735200	
B. Extension Workers	pra/wk	220	230	430	420	60			1360	100	22000	23000	43000	42000	6000			564400	
C. Extension Managers & superv.	pra/wk	44	24	56	24				220	100	4400	2400	5600	2400	7200			136000	
D. Subject Matter Specialists	pra/wk	16		16	32	32	32		128	100	1600		1600	3200	3200	3200		22000	
IV. In-Country Tours																			
A. Key farmers	pra/wk			100	100	100	100		400	100			10000	10000	10000	10000		48000	
B. Staff	pra/wk		20	20	20	20			80	100		2000	2000	2000	2000			40000	
V. Formal Training																			
A. Diploma (Ind.40)	pra/yr			8	8	10	10	4	40	2000			16000	16000	20000	20000	8000	1240000	
B. Masters (Ind.20)	pra/yr ^{1/}		5	5	10	10	10		40	5000		25000	25000	50000	50000	50000		80000	
C. Masters (abrd.20)	pra/yr ^{2/}		5	5	10	10	10	5	50	19200		96000	192000	192000	192000	192000	96000	200000	
VI. Workshops																			
Materials	p/wk	3	1	1	3	1		1	10	1000	3000	1000	1000	3000	1000		1000	10000	
VII. Study Tours Abroad																			
	pra/wk		18	18		18		18	72	1000		18000	18000		18000		18000	72000	
TOTAL												40326	219840	392040	442640	456840	422640	270440	2244766
												-----	-----	-----	-----	-----	-----	-----	-----

^{1/} 24 month program
^{2/} 30 month program

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Budget Annex
Table 8
Conservation Access Roads
 (Rps in 000s)

	Unit	Quantity by Project Year								DT	Uni.Cost	Base Costs by Project Year						Total	
		0	1	2	3	4	5	6	0			1	2	3	4	5	6		
A. Investment Costs																			88000
District level Vehicle	1/Dist	4			4				8	10000	40000			40000					80000
Office Furn/equip	1/Dist	4			4				8	1000	4000			4000					8000
B. Recurrent Costs																			4222880
1. Core staff	1 team	4	4	4	4	4	4	4	28	900	3600	3600	3600	3600	3600	3600	3600	3600	25200
- planner	per.yr	4	4	4	4	4	4	4	28	360	1440	1440	1440	1440	1440	1440	1440	1440	10080
- surveyor	per.yr	12	12	12	12	12	12	12	84	300	3600	3600	3600	3600	3600	3600	3600	3600	25200
- designer	per.yr	8	8	8	8	8	8	8	56	150	1200	1200	1200	1200	1200	1200	1200	1200	8400
- estimator	per.yr	8	8	8	8	8	8	8	56	100	800	800	800	800	800	800	800	800	5600
- clerks	per.yr	8	8	8	8	8	8	8	64	150	1200	1200	1200	1200	1200	1200	1200	1200	8400
- technicians	per.yr	8	8	10	18	18	24	24	126	300		2400	3000	5400	5400	7200	7200	7200	30600
- const. superv.	per.yr		4	5	9	9	12	12	63	200		800	1000	1800	1800	2400	2400	2400	10200
- draftsman	per.yr	8	8	8	8	8	8	8	56	100	800	800	800	800	800	800	800	800	5600
2. Travel allowance	per.yr	12	24	27	34	54	54	54	259	600	7200	14400	16200	20400	32400	32400	32400	32400	155400
3. Vehic. operation											2000	2000	2500	4500	4500	6000	6000	6000	27500
4. Construction <u>a/</u>	KM		5	42	66	109	127	126	475	8100		40500	340200	534600	882900	1028700	1020600	1020600	3647500
5. Maintenance <u>b/</u>	KM												125	1175	2825	5550	8725	8725	18400
6. Repairs, Misc.											2200	3200	6400	8000	8000	8000	8000	8000	43800
C. Planning Phase II																		100000	100000
T O T A L											68040	75940	382065	632515	950465	1102890	1197965	1197965	4409880

a/ Labor, material, plant hire
b/ only material

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A N N E X VI

STATUTORY CHECKLIST

ANNEX 6: STATUTORY CHECKLIST

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

A. GENERAL CRITERIA FOR PROJECT

1. FY 1982 Appropriation Act; Sec. 523; 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 amount)?

The Committees in appropriation of Senate and House were notified of the project through the FY84 Congressional Presentation and through a Congressional Notification.

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

Yes

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

No further legislative action is required.

4. FAA Sec. 611(b); FY 1982 Continuing Resolution Sec. 501. If for water or water-related land resource construction, has project met the standards and criteria as set forth in the Principles and Standards for Planning Water and Related Land Resources, dated October 25, 1973? NA

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? NA

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. It is being implemented as a multilateral project.

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; and (c) encourage development and use of cooperatives, and This project should directly encourage (b), (c) and (e).

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.

8. FAA Sec. 601(b). Information and conclusions on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise.) NA
9. FAA Sec. 612(b), 636(h); FY 1982 Appropriation Act Sec 507. Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized in lieu of dollars. Normal project disbursement procedures assure this.
10. FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release? No
11. FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise? Yes

12. FY 1982 Appropriation 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? NA
13. FAA 118(c) and (d). Does the project take into account the impact on the environment and natural resources? If the project or program will significantly affect the global commons or the U.S. environment, has an environmental impact statement been prepared? If the project or program will significantly affect the environment of a foreign country, has an environmental assessment been prepared? Does the project or program take into consideration the problem of the destruction of tropical forests? One purpose of the project is to reverse the negative environmental impact of the farmers by demonstrating more sound and productive soil conservation practices. A formal environmental assessment will be completed prior to any procurement or use of pesticides. With regard to roads, an environmental assessment will be done as roads are designed.
14. FAA 121(d). If a Sahel project, has a determination been made that the host government has an adequate system for accounting for and controlling receipt and expenditure of project funds (dollars or local currency generated therefrom)? NA

B. FUNDING CRITERIA FOR PROJECT

**1. Development Assistance
Project Criteria**

a. FAA Sec. 102(b), 111, 113, 281 (a). 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 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?

This project will provide forward steps for items (a), (b), (c) and (d). Also, the project will be a partial testing of (d) by the Mission in collaboration with USAID/Philippines and USAID/Thailand.

- b. FAA Sec. 103, 103A, 104, 105, 106. Does the project fit the criteria for the type of funds (functional account) being used? Yes
- c. FAA Sec. 107. Is emphasis 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)? Yes
- d. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or is the latter cost-sharing requirement being waived for a "relatively least developed" country)? Yes
- e. FAA Sec. 110(b). Will grant capital assistance be 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"? NA
- f. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the Yes

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increase of productive capacities and self-sustaining economic growth?

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

This project supports development of local government institutions and increasing the productive capacity and income of the rural poor. It provides for training in self-government and in technical skills. It looks to local academic institutions to assist the local governments in implementation.

2. Development Assistance Project Criteria (Loans Only)

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

GOI is able to repay the loan.

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?

NA

c. ISDCA of 1981, Sec. 724(c) and (d). If for Nicaragua, does the loan agreement require that the funds be used to the maximum extent possible for the private sector? Does the project provide for monitoring under FAA Sec. 624(g)?

NA

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 FAA Section 102?

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

c. FAA Sec. 534. Will ESF funds be used to finance the construction of the operation or maintenance of, or the supplying of fuel for a nuclear facility? If so, has the President certified that such use of funds is indispensable to nonproliferation objectives?

d. 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?

e. Section 133.

Notwithstanding any other provision of this joint resolution, none of the funds appropriated under section 101(b) of this joint resolution may be available for any country during any 3-month period beginning on or after October 1, 1982, immediately following the certification of the President to the Congress that such country is not taking adequate steps to cooperate with the United States to prevent narcotic drugs and other controlled substances (as listed in the schedules in Section 202 of the Comprehensive Drug Abuse and Prevention Control Act of 1971 (21 U.S.C. 812)) which are produced, processed, or transported in such country from entering the United States unlawfully."

A N N E X V I I

W A I V E R S

DATE: July 23, 1984

ACTION MEMORANDUM FOR THE MISSION DIRECTOR

FROM : Enrique M. Barrau, AGR/RD *EMB*
THRU : Frank L. Gillespie, AGR/RD *Frank Gillespie*
SUBJECT: Approval of Recipient Selection under a USAID Cooperative Agreement to Provide Collaborative Farming Systems Research with Agency for Agriculture Research and Development (AARD) Component of the Upland Agriculture and Conservation Project (UACP).

A. BACKGROUND

After intense study by USAID Committees, including a several hours' meeting with Dr. Brady, discussions with GOI counterparts, and contacts with International Agriculture Research Centers (IARCs) the Mission and AARD concluded:

1. To backstop the Farming System Research effort of AARD, IARCs should be involved in a truly long term "Collaborative Research" effort. The collaborative research will among others:
 - a. provide AARD better access to world banks of germ plasm and livestock semen.
 - b. provide access to international experience under similar agroclimatic and socioeconomic conditions.
 - c. allow AARD scientists to participate in sabbaticals, workshops, etc. with colleagues in the IARCs.
 - d. provide collaborative research inputs by the appropriate IARCs throughout the 7 years life of the UACP and after.
2. IRRI should be selected as the manager of the consortium. The other IARCs, already approached informally about the consortium, state that they look to IRRI to be the manager. There are a number of reasons:
 - a. IRRI has a permanent representative in Indonesia, who will be the liaison between AARD and IRRI;
 - b. IRRI is familiar with the manner of implementing an AID Collaborative Agreement; and
 - c. IRRI is located in Southeast Asia and already is involved in Farming Systems Research for the agronomic and social patterns which prevail in the region.

3. IRRI should provide the leadership by which AARD/IRRI/USAID will enter in a cooperative agreement by:
 - a. providing a long term farming system scientist and management expert for the life of the UACP to collaborate with the AARD farming systems project manager.
 - b. screening and subcontracting for collaboration with other IARCs to provide the specific expertise required by AARD for short periods throughout the life of the project, including trouble shooting temporary assistance.

B. PROPOSAL

Your approval is required to negotiate a cooperative agreement with IRRI on a non-competitive basis for the purpose of managing personnel and resources of selected IARCs involved in a collaborative arrangement with AARD to undertake farming systems research.

- a) Cooperating Country: Indonesia
- b) Project: Upland Agriculture and Conservation
- c) Anticipated Funding Sources:
 - (i) from Grant 497-0311: \$750,000
 - (ii) from Loan 497-T-083: \$750,000
- d) For: Cooperative Technical Research
- e) Approximate Value: AID Loan and Grant: \$1,500,000
GOI: \$250,000
- f) Source/Nationality: U.S. (See below)
- g) Contracting Mode: AID Cooperative Agreement

C. JUSTIFICATION

AID Handbook 13, which covers grants and includes guidance on cooperative agreements, requires that competition be encouraged in the award of cooperative agreements. Chapter 1B.1 of the handbook states that invitations for cooperative agreements limited to single entities or to a limited number of entities requires the approval of the responsible Assistant Administrator or his designee. The USAID Director has been delegated authority to sign cooperative agreements up to a value of \$5,000,000, pursuant to Delegation of Authority 99.120.

D. DISCUSSION

The research component of the Upland Agriculture and Conservation Project requires technical assistance from experts who are leaders in their specific fields and who are supported by institutions specializing in research that is uniquely adaptable to the upland conditions of Java.

The project requires that technical assistance occasionally be available on short notice and for short periods but on a long term basis; that much of the technical assistance not be scheduled or specified far in advance; and that much assistance be of the trouble shooting type, i.e., solving specific technical problems. The project envisions the development

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of collaboration among the professional staff in the project and the professional staff of outside institutions including research, seminars, and other activities at those institutions.

The Agency for Agriculture Research and Development of the Indonesian Ministry of Agriculture intends to maintain a continuing collaboration with the outside institutions after the project is completed. The USAID design team, in conducting an informal market search, has found a consortium of IARCs to have predominant capability in all the above aspects.

Since the research effort must be carried out within the agronomic and climatic conditions of the region, a cooperative effort with U.S.-based institutions would not be feasible. A source or nationality waiver is not required since, according to AID Handbook 1B, Chapter 5, Section D2, "international agricultural research centers ... are considered to be of U.S. nationality."

Total AID Loan and Grant funding required for the cooperative agreement is anticipated to be approximately \$1,500,000. With anticipated imminent authorization and obligation of project funds, funds will be available for the agreement. The agreement, of course, will not be signed until the project loan and grant agreements are signed. All goods and services provided through the cooperative agreement will arrive or be completed by the PACD.

E. RECOMMENDATION

That you approve the AARD/IRRI/USAID Cooperative Agreement by which IRRI will be the leader IARC to manage the appropriate interaction and scheduling of other IARC's in a collaborative farming systems research effort to support the UACP.

Approved: William P. Fuller

Disapproved: William P. Fuller

Date: 3/17/84

Clearances:

- RD:FGillespie (indraft)
- RD:DLTinsler (in draft)
- PRO:DZvinakis (in draft)
- FIN:RMcClure (in draft)
- RLA:LChiles cc
- CM:LKelly cc
- A/DD:JSperling AB

* valid after signing of loan and grant agreements.
8/25/84

RD:EMBarrau:joy:7/23/84
#0008P cc

A N N E X V I I I

B I B L I O G R A P H Y

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- Sheng, T.C., "Protection of Cultivated Slopes -- Terracing Steep Slopes in Humid Regions", FOA, 1981.
- Snowy Mountains Engineering Corp. (SMEC), "Report on the Serang River Project", 1982.
- USAID/GOI, "Composite Report of the Watershed Assessment Team", 3 volumes, 1983.
- World Bank/Indonesia, "Policy Options and Strategies for Major Food Crops", Report No. 3686 IND, 1983.

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A N N E X I X

LIST OF WORKING PAPERS AND BACKGROUND MATERIAL

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ANNEX 9

Working Papers and Background Materials for the
Upland Agriculture and Conservation Project

The Papers and reports listed below by and large stand on their own, but all of them define some constraints faced in the design of the UACP. Papers stemming from the Citanduy II Project are included to show why specific objectives and organizational elements, different from those of previous watershed projects, have been incorporated in this project. Other papers are proposals or "think pieces" that may provide useful ideas for the project as specific needs develop. All are on file with the UAC Project Papers.

1. "Secondary Crop Marketing", USAID/Indonesia, Ric Bernsten, 1983.
2. Management Information System Terms of Reference.
3. a. Subsidies and Credit
b. "Upland Agriculture and Conservation Project Paper Annex;
Financial Support for Project Participants", Jay Rosengard, 1983.
4. "Cooperative Seed Production and Distribution, for USAID/Indonesia", Sam Filiaci, 1984.
5. Specific Proposals for the UAC Project Training Component.
6. "Proposal for Upland Agriculture and Conservation Project", Applied Agricultural Research, Ministry of Agriculture, 1984.
7. "The Citanduy River Basin Development Project--Citanduy Upper Watershed Management Project--Feasibility Report", for the Directorate General of Water Resources Development, Ministry of Public Works, PRC Engineering Consultants, Inc., Denver, Colo., USA, 1980.
8. "The Citanduy River Basin Development Project--Panawangan Pilot Watershed Implementation and Evaluation Report", for the Directorate General of Water Resources Development, Ministry of Public Works, PRC Engineering Consultants Inc., Denver, Colo., USA, 1980.
9. "Citanduy II--Organizational Arrangements for Integrated Multisectoral River Basin Development", for USAID, Paul Bisek, 1981.
10. "Citanduy River Basin Integrated Development Project (Citanduy II) Ciamis, West Java, Monthly Reports", for USAID, Resources Management International, Inc. in association with PRC Engineering Consultants, Inc., 1982-1984.
11. "Citanduy II Detailed Component Description", Annex 3 of the Project Loan Agreement between the Republic of Indonesia and the United States of America, 1980.
12. "Analysis Social Soundness Terhadap Project Proposal Upland Agriculture and Conservation Project", di Dati I Jawa Tengah dan Jawa Timur, John J.O.I. Ihalauw, 1983.

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