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

125 p

Proposal and Recommendations
For the Review of the
Bilateral Assistance Subcommittee

INDONESIA - SEDERHANA IRRIGATION AND LAND DEVELOPMENT II

AID/BAS-022

UNCLASSIFIED

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

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AID/BAS-022

July 17, 1978

MEMORANDUM FOR THE BILATERAL ASSISTANCE SUBCOMMITTEE

SUBJECT: Indonesia - Sederhana Irrigation and Land Development II

Attached for your review are recommendations for authorization of a loan for Twenty-Five Million United States Dollars (\$25,000,000) and a grant for Four Million Five Hundred Thousand United States Dollars (\$4,500,000) to Indonesia (the "Cooperating Country") to help in financing certain foreign exchange and local currency costs of goods and services required for the project.

This loan/grant proposal is scheduled for consideration by the Working Group on Bilateral Assistance on Monday, July 24, 1978, at 2:30 p.m., in Room 3886 New State. If you are a voting member, a poll sheet has been enclosed for your response.

Working Group on Bilateral Assistance
Office of Policy Development and Program
Review

Attachments:

Summary and Recommendations
Project Analysis
Annexes A, B, C, E, F, G

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PROJECT PAPER FACESHEET

1. TRANSACTION CODE
 A ADD
 C CHANGE
 D DELETE

2. DOCUMENT CODE
PP
3

3. COUNTRY ENTITY
INDONESIA

4. DOCUMENT REVISION NUMBER

5. PROJECT NUMBER (7 digits)
497-0252

6. BUREAU OFFICE
 A. SYMBOL: **ASIA**
 B. CODE: **04**

7. PROJECT TITLE (Maximum 47 Characters)
Sederhana (Simple) Irrigation II

8. ESTIMATED FY OF PROJECT COMPLETION
 FY **80**

9. ESTIMATED DATE OF OBLIGATION
 A. INITIAL FY: **78**
 B. QUARTER: **4**
 C. FINAL FY: **80** (Enter 1, 2, 3, or 4)

10. ESTIMATED COSTS (\$000 OR EQUIVALENT \$) -

A. FUNDING SOURCE	FIRST FY			LIFE OF PROJECT		
	B. FA	C. LC	D. TOTAL	E. FA	F. LC	G. TOTAL
AID APPROPRIATED TOTAL	3,400	26,100	29,500	3,400	26,100	29,500
GRANT	3,000	1,500	4,500	3,000	1,500	4,500
LOAN	400	24,600	25,000	400	24,600	25,000
OTHER U.S.:						
1.						
2.						
HOST COUNTRY		85,100	85,100		85,100	85,100
OTHER DONORS:						
TOTALS		111,200	114,700		111,200	114,700

11. PROPOSED BUDGET APPROPRIATED FUNDS (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE	E. 1ST FY <u>78</u>		H. 2ND FY <u>79</u>		K. 3RD FY <u>80</u>		
			C. GRANT	D. LOAN	I. GRANT	J. LOAN	L. GRANT	M. LOAN	
1. FN	B 144	050	064	4,500	25,000	-0-	-0-	-0-	-0-
2.									
3.									
4.									
TOTALS				4,500	25,000	-0-	-0-	-0-	-0-

A. APPROPRIATION	N. 4TH FY <u>81</u>		O. 5TH FY <u>82</u>		LIFE OF PROJECT		12. IN-DEPTH EVALUATION SCHEDULED
	G. GRANT	F. LOAN	M. GRANT	S. LOAN	T. GRANT	U. LOAN	
1.	-0-	-0-	-0-	-0-	4,500	25,000	MM YY 110 719
2.							
3.							
4.							
TOTALS	-0-	-0-	-0-	-0-	4,500	25,000	

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

1. NO
 YES

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE: **Thomas C. Niblock** *[Signature]*

TITLE: **Director, USAID/Indonesia**

DATE SIGNED: **05 19 78**

15. DATE DOCUMENT RECEIVED IN AID/W OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION
06 05 78

SEDERHANA (SIMPLE) IRRIGATION AND
LAND DEVELOPMENT PROJECT II
Indonesia

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* The Statutory Checklist and Technical Annexes H2-H5 have been retained in the official project files of ASIA/PD/EA. They are available upon request. (235-8856).

**SEDERHANA (SIMPLE) IRRIGATION AND
LAND DEVELOPMENT II**

- INDONESIA -

ABBREVIATION/ACRONYMS USED:

- | | | |
|-----|--------------|---|
| 1. | GOI | - Government of Indonesia |
| 2. | Dep.Agr. | - Department (Ministry) of Agriculture |
| 3. | DGWRD | - Directorate General Water Resources Development |
| 4. | DGFC | - Directorate General Food Crops |
| 5. | SLWC | - SubDirectorate Land & Water Conservation |
| 6. | AAETE | - Agency for Agriculture Education Training and Extension |
| 7. | BAPPENAS | - National Development Planning Board |
| 8. | FAR | - Fixed Amount Reimbursement |
| 9. | IFY | - Indonesian Fiscal Year - April 1 - March 31 |
| 10. | BIMAS | - Crop Intensification Program - production inputs supplied on credit basis. |
| 11. | INMAS | - Crop Intensification Program - production inputs supplied on cash basis. |
| 12. | IPEDA | - Regional Development Contribution - a type of land tax. |
| 13. | Repelita | - Five-Year Plan |
| 14. | Repelita I | - April 1969 - March 1974 |
| 15. | Repelita II | - April 1974 - March 1979 |
| 16. | Repelita III | - April 1979 - March 1984 |
| 17. | IRR | - Internal Rate of Return |
| 18. | MT | - Metric Ton |
| 19. | Ha(s) | - Hectare(s) 10,000 square meters or 2,471 acres. |
| 20. | Ir. | - University graduate engineer |
| 21. | STP | - Special Tertiary Program of the DGWRD. 3 year target is 360,000 Ha. |
| 22. | CTP | - Complementary Tertiary Program of the DGFC. 3 year target is 140,000 Ha. |
| 23. | P3A | - Persatuan Petani Pemakai Air - Water users association/Irrigators association |
| 24. | Sawah | - Rice Field |
| 25. | BRI | - Bank Rakyat Indonesia |
| 26. | BIE | - University Graduate Irrigation Engineer |
| 27. | STM | - Technical High School Graduate Engineer |

Local Government Organization

- | | | |
|----|----------------------------|--|
| 1. | Province | - Headed by Governor |
| 2. | Kabupaten
(District) | - Headed by Bupati (District Chief) |
| 3. | Kecamatan
(Subdistrict) | - Headed by Camat |
| 4. | Desa (Village) | - Headed by Lurah or Kepala Desa (Village Chief) |

SEDERHANA (SIMPLE) IRRIGATION AND LAND DEVELOPMENT II

- INDONESIA -

Part I. Summary and Recommendations

A. Face Sheet

B. Project Description

Over the next five years* the project will seek to (1) increase the capability of the GOI implementing agencies to plan and implement small-scale irrigation schemes including both the physical systems and the social infrastructure essential for operation and maintenance, (2) increase rice production by up to 1,140,000 metric tons/yr. and (3) increase income and employment opportunities in the rural areas of Indonesia.

As in Sederhana I, institution building is the primary purpose of the technical assistance and training components of the project. Working together with USAID, the GOI hopes to undertake the following activities which when completed will result in the achievement of the above project purposes.

1. Weirs, Primary and Secondary Canals (Major Works)

(a) The Directorate General of Water Resources (DGWRD) will upgrade or make corrections to the major works for about 275 existing Sederhana subprojects covering about 95,000 ha. (about 1/3 of the total initiated to date). Plus this year IFY 78/79 the DGWRD plans to start construction on 30,000 ha. of new subprojects. These new starts were designed in previous years and selected on the basis that at least 50% of the area of each subproject is already a rain-fed system which simply needs to be converted to an irrigated system to achieve immediate high impact in terms of increased rice production. The GOI will finance both of these activities with their own resources. Total cost is estimated to be US \$25 million.

(b) The DGWRD also plans to undertake 60,000 ha. of new major works each year beginning in IFY 79/80. The designs for these new subprojects will include the terminal distribution/drainage systems and each entire system will be constructed as a single unit. Total cost of construction of these new major works is US \$86.8 million. The

*This PP will only serve as the basis for authorizing one year's AID support for this five-year activity. Another PP is to be the basis for the authorization of the remaining projected AID support.

proposed AID Loan will finance 50% of these costs.

2. Terminal Distribution/Drainage Systems (Tertiary)

a. Special Tertiary Program (STP)

i. The DGWRD will design and construct the terminal distribution systems on approximately 369 subprojects to serve approximately 360,000 ha. This area includes prior years (IFY 1974/75 and 75/76) Sederhana subprojects plus other GOI priority small-medium irrigation schemes. The total cost is estimated at US\$41.2 million and will be financed entirely by the GOI. USAID may support this effort in the future through Title III.

ii. The local governments will be given the responsibility for the excavation of the distribution and drainage canals of the STP under the supervision of Provincial Public Works field personnel. The labor force will be organized and the workers paid a subsidy by the local governments through the Padat Karya (Rural Works), Kabupaten Inpres programs, and/or the DGWRD budget. Total cost of the subsidy is US\$43.5 million. Financing for the STP will be provided by the GOI without AID loan assistance. However, USAID may undertake to support this effort through Title III. Technical assistance and training will be provided by the AID grant.

b. Complementary Tertiary Program (CTP)

i. The Department of Agriculture (DepAgr) in close association with the local governments and water users associations (P3As) concerned will construct terminal distribution systems to serve approximately 90,000 ha of existing AID assisted Sederhana I subprojects outside the STP for which the DepAgr has either already completed the design work or is in process of doing so under the Sederhana I program. Total cost of construction is US\$8.4 million, of which the proposed USAID loan will finance 75%. (The differences in reimbursement percentages are the result of several discussions with the GOI. The rationale is explained in Part IV).

ii. The DepAgr will design and construct tertiary systems on Sederhana subprojects under 200 ha in size which are outside the STP of the DGWRD. The total area of these subprojects is estimated to be 20,000 ha. Total cost of construction is US\$2.9 million, of which the proposed USAID loan will also finance 75%.

iii. Laborers will be recruited to excavate the distribution and drainage canals for these subprojects under the supervision of Provincial Agriculture Service field personnel. The farmers will be organized by the local Government with assistance by the Provincial Ag. extension agents thru the P3As and the laborers will be paid for this work. Total cost for this subsidy is US\$13.2 million, of which the proposed USAID loan will finance 75%.

iv. The DGWRD will design, construct and supervise the excavation of the terminal distribution/drainage systems where necessary on the 30,000 ha of this year's (IFY 78/79) new starts. As above laborers will be recruited by the local governments through P3As and paid for the excavation work. Total cost of this activity is US\$7.2 million, of which the proposed loan will finance 75%.

3. Water User Associations (P3As)

The DepAgr plans to organize approximately 950 P3As in sub-project areas covering approximately 540,000 ha which presently do not yet have actively functioning associations. This involves lengthy training and extension work with the goal of self sufficiency of the P3A within 3 year's of initial organization. Since the organizational structure and area covered by these P3As will vary in each location, the first year's effort will involve considerable experimentation. No handtools, vehicles or equipment will be provided. However, on projects over 300 hectares a small office will be built unless a rural extension center (REC) already exists and can be used to house the P3A. The estimated number of offices required is about 100. Total cost of this activity is US\$5.5 million, of which the proposed USAID loan will finance 50%.

4. Land Clearing, Levelling and Paddy Field Formation

(a) The estimated total requirements for land preparation associated with these Sederhana projects is now about 70,000 ha and will approximate 100,000 hectares by IFY 80/81. (See Annex H.2 Table 5) The total cost of this land clearing, levelling and paddy field design is US\$41.8 million, of which the loan will finance 50%.

(b) When the land has been cleared and levelled the farmers will construct their own paddy fields. The value of their contribution for this element of the project is estimated to be US\$15.1 million.

5. Technical Assistance

Experience has shown the critical need for more technical assistance than was provided under Sederhana I. Therefore, this component

will be substantially increased for Sederhana II and be provided on a grant basis. Current thinking calls for an increase of the present 12 man IECO/Sinotech expatriate team to 34 full time advisors. Additional responsibilities of the Consultants will include directly working with private sector, local survey & design firms on terminal systems as well as with the DGWRD and Department of Agriculture on the major works and construction supervision for both the Special Tertiary Program and the Complementary Tertiary Program. Total cost is US \$12.6 million proposed to be provided by the AID grant.

6. Training

Training under Sederhana I has been focussed on three target groups (1) irrigation engineers in provincial public works and central government offices, (2) agriculturalists in provincial and central government offices, and (3) key farm leaders of water users associations.

Besides continuing this effort under Sederhana II, more emphasis will be placed on in-country training courses in construction inspection, surveying, and maintenance. Additionally because of the obvious need, training will be provided to Indonesian engineering firms to improve their capability to survey and design irrigation systems. Total costs of the training element is US\$4.9 million of which \$0.6 million will be AID grant funded and the balance eligible for 50% reimbursement under the AID loan.

C. Project Justification

Indonesia has the natural resources and other factors of production which if developed could make it a prosperous nation and a major trading partner of the United States. It is already considered a political leader of the third world and an important source of vital natural resources. However, Indonesia faces severe problems of over population in its settled areas, unemployment, food shortages, unhealthy living conditions and other poverty indicators.

Probably the most alarming of its current problems is the rapidly increasing levels of food imports required in recent years, particularly rice. Indonesia is now by far the world's largest net importer of rice, buying each year about 1/4 of the total world rice traded. These imports amounted to 2.6 million metric tons in 1977 at a cost of almost US\$1 billion in precious foreign exchange. Given the existing trends in consumption, production and population growth, there is a real possibility that the rice deficit may approach five million tons by 1985.

The GOI has devoted increased attention and resources since 1968 to improving rural infrastructure, agricultural production, employment opportunities and government services in the rural areas. These efforts have been channelled through two 5-Year Development Plans (Repelita I & II) and measurable progress has been made.

One of the priority programs initiated by President Suharto at the beginning of Repelita II (1974-79) is the Sederhana (Simple) Irrigation and Land Development Program. He saw the objective of the program as a quick and relatively inexpensive way of increasing food production and rural incomes by rapidly constructing many small scale simple irrigation projects throughout the country.

On June 30, 1975, AID loaned the GOI US\$20 million to assist in the last three years of the program. An additional US\$3.7 million was added to the loan in October 1976. The loan financed technical assistance (433 manmonths over a 33 month period), training (21 DGWRD and Dep. Ag. officials in the US and Taiwan, 100 DGWRD and Dep. Ag. officials on Asian observational Tours, 236 DGWRD and 650 Dep. Ag. officials incountry, and 950 key leaders of Water User Associations) and part of the cost of construction for about 350 subprojects initiated in IFY's 76/77 and 77/78.

Since the beginning of the program in IFY 74/75 the GOI has undertaken construction of the major works (diversion weirs and primary and secondary canals) for some 676 subprojects covering approximately 240,000 ha in 24 out of 27 Provinces throughout Indonesia. These projects were chosen from an original list of projects submitted by the provinces totalling almost 1,000,000 hectares. The projects were selected on the basis of two sets of criteria; general criteria applicable to all irrigation projects undertaken by the government and special criteria applicable only to the Sederhana Program.

The special criteria for inclusion in the Sederhana program were that the subprojects had to be:

1. Simple to design and construct, including low equipment requirements.
2. Capable of rapid execution.
3. Relatively inexpensive.
4. Irrigable service area of 2000 hectares or less.

When completed these subprojects should significantly increase rice production as well as income and employment in the rural areas. While located throughout Indonesia, about two thirds of Sederhana subprojects are concentrated in some of Indonesia's least developed

provinces such as Riau, Bengkulu, Jambi, South Sumatra, East and West Nusa Tenggara. Initial indications are that they have become catalysts in the encouragement of other rural development activities in these provinces as well as in other less-developed areas of Indonesia.

Taking a number of factors into consideration including overly optimistic targets, inflated accomplishments, and overlaps between activities, the economic/social analyses of Sederhana II shows that the project should impact a net potential realizable area of 410,000 ha of irrigated rice land, including 210,000 ha with new or improved major works and all 410,000 ha with farm-level irrigation/drainage systems.

The economic analysis indicates that Sederhana II has a conservative internal rate of return on the total direct capital investment of 29 percent. This is almost twice the social cost of capital of 15 percent commonly used in Indonesia. The benefit-cost ratio is a very favorable 1.69:1.00 and the pay-back period is between 5 and 6 years after the first construction, using 15 percent social cost of capital.

Based on an average farm size of one hectare and a farm family of five, it is expected that upon completion, the presently existing projects will directly benefit some 410,000 farmers or 2,050,000 people. The net increase in rice production upon completion of the on-farm delivery systems on these subprojects will amount to an annual increase of approximately 1,140,000 metric tons of dry paddy. This rice is enough to feed about 6,175,000 people for a year and will release about US\$260 million per year in foreign exchange for other uses. Subtracting the costs of the agricultural inputs required including labor, the incremental net income at the farm level is expected to reach US\$140 million per year. This implies an average increase in net income per farmer of \$341 per year or a per capita income increase of \$68 per year (Rp.28,000). As yields increase even further, these incremental economic benefits may increase by as much as 50%.

The Sederhana Program also generates a relatively large number of employment opportunities. Construction of systems is usually by labor-intensive methods since the works are not generally susceptible to the use of heavy equipment. Even the proposed land clearing work will combine labor-intensive methods (chainsaws) and heavy equipment (dozers) methods. It is estimated that the construction of the major works over the past 4 years has created 40,000 person years of direct labor. The construction of major works plus tertiaries, land clearing, leveling and paddy formation planned for Sederhana II will mean an estimated 270,000 person years of direct labor. (See Annex H.2 Table 6.)

The project will also create a large number of employment opportunities in working newly irrigated land. The additional wet season agricultural employment opportunities created on the total 410,000 ha Sederhana II project area in the wet season is estimated to be 38 million person days. The additional dry season estimate is 69 million person days. (See Annex H.2 Table 6.)

The GOI has made substantial progress in administering and expanding the program, particularly in the construction of the major works, i.e. diversion weirs, primary and secondary canals. However, problems have surfaced in land

clearing, land leveling and on-farm development including the construction of the terminal distribution and drainage systems, as well as the establishment of effective water user associations for operation and maintenance.* The USAID procedures for approvals of plans and cost estimates, acceptance of completed subprojects, and financial reimbursement have also proven too cumbersome and difficult to accommodate the GOI implementing agency procedures.

These problems and the associated rising costs of the program, although foreseen, have given the various agencies involved within the GOI and USAID (as well as other donors) cause for some concern. A comprehensive joint evaluation of the program by the DGWRD, DepAgr. and USAID was completed on May 23, 1978. This evaluation has focussed on overall implementation constraints and several steps have been or will be taken to deal with them in order to make the program more successful. For example: (1) The GOI will undertake some pilot projects to gain some experience in land clearing and this will be done on a subsidy basis instead of the existing credit program which has proven ineffective; (2) The GOI has recently transferred the responsibility for tertiary system design and construction to the DGWRD with farmers being paid for excavation of the tertiary canals; and (3) The GOI has designated this year (IFY 78/79) to be clean-up year.

USAID supports these decisions because we are primarily interested in assuring that maximum benefits flow from prior investments in major works and more importantly that the water is being effectively used to increase rice production. Realistically, we estimate that it will require three to five years of intensive work to complete the proposed program. However, we remain optimistic that the GOI by the end of this project will develop the capability with regard to new or improved major works to bring about 60,000 ha/yr under irrigation thru the Sederhana Program. This target will be made easier also since in the future the GOI plans to undertake design and construction of whole subprojects including both major works and on-farm systems.

AID's continuing support for and participation in this priority program has been requested because the GOI perceives our assistance to be necessary to its ultimate effectiveness.

The AID Sederhana I loan is now almost fully committed for work already completed or in process. (See pipeline analysis in Part II A). The proposed Sederhana II program generates a 29percent internal rate of return to the direct capital investment. Furthermore, it is immediately responsive to the new directions of AID, including increasing agricultural production, mitigating rural unemployment and benefiting the rural poor majority. Therefore, a loan of \$116.2 million to finance part of the construction costs and training over the next four years and a grant of \$13.2 million to finance a large technical assistance effort is clearly warranted.

*Because of these problems, the Asia Bureau Review (APAC) decided to approve only FY 78 funding on the basis of this PP. A subsequent PP indicating progress under Sederhana II and clarifying how on-farm development will be addressed, will be required prior to funding the remaining projected AID support for the five-year activity.

D. Recommendations

1. The Grant/Loan and Terms

It is recommended that a grant/loan be authorized to the Government of Indonesia to finance the foreign exchange and part of the local currency costs for a second phase Sederhana (Simple) Irrigation, Reclamation and Land Development Project. The proposed grant will not exceed US \$four million five hundred thousand (\$4,500,000), and the proposed loan amount will not exceed US \$twenty-five million (\$25,000,000). Assuming satisfactory progress in implementing this second phase, we anticipate a long-term pattern of AID support for the Sederhana program, calling for additional authorization as shown below. The analysis and program description which follow in this PP relate to the proposed longer-term program (\$129,400,000 of AID financing over four years).

<u>US FY of Obligation</u>	<u>Loan</u>	<u>Grant</u>	<u>Total US Assistance</u>
78	\$ 25.0	\$ 4.5	\$ 29.5
79*	-	3.7	3.7
80*	40.0	5.0	45.0
81*	51.2	-	51.2
	<u>\$ 116.2</u>	<u>\$ 13.2</u>	<u>\$ 129.4</u>

The proposed terms of the loan are:

Maturity: Thirty (30) years including a ten (10) year grace period.

Interest: Two (2) percent per annum during the grace period and three (3) percent per annum thereafter.

Currency: Interest and principal repayable in U.S. dollars.

E. Project Implementation

The project will be implemented principally by two GOI ministries -- the Department of Public Works and the Department of Agriculture (DepAgr) through their respective provincial and field representatives. The Department of Interior will also be involved to the extent that they have direct access to the local governments concerned. The DGWRD within the Ministry of Public Works is responsible for overall planning, organization, coordination and program progress control for the physical infrastructure

* Estimates only. An annual evaluation of program progress and financial requirements will be made and these three installments adjusted accordingly.

side of the Sederhana Program. This includes responsibility for the design and construction of the major works, diversion structures, primary and secondary canals and the terminal distribution/drainage systems. The DepAgr. is responsible for overall planning, organization, coordination and program progress for land preparation and the social infrastructure of the Sederhana Program. This includes responsibility for land clearing, and leveling, plus organizing and providing guidance to the farmers so that they can properly construct their paddy fields and effectively operate and maintain the completed systems. As an interim measure the DepAgr. will also design and construct terminal distribution/drainage systems on projects outside of the DGWRD program.

The GOI capability to implement this project is demonstrated by the progress made to date on Sederhana I. A substantially larger technical assistance and training program should further improve GOI as well as private sector performance. It is clear that a binding constraint on the size of the program will be the numbers and qualifications of the technical staff assigned. Both the DGWRD and DepAgr. are planning to significantly increase their personnel assigned to the Sederhana Program.

USAID's monitoring staff would consist of two US direct-hire irrigation engineers (on board), one part-time US direct-hire agriculturalist (on board), and one full-time irrigation O&M and organizational advisor, assisted by three local hire Indonesian engineers (two on board). This level of staffing is required to adequately manage/monitor a program of this magnitude.

F. Summary Findings

This project provides for improvements to and the continuation of a nationwide program of small-scale irrigation schemes. This program has been in operation for approximately four years. A comprehensive evaluation just completed by a team of independent, outside consultants has given the program generally high marks. A copy of this evaluation is in AID/W and the executive summary is included as Part II.A.2 of this PP.

From the evaluation and other analyses conducted as a part of the development of this project proposal, USAID concludes that the project is technically, economically, financially and socially feasible. The initial environmental examination approved by AID/W recommends that the E.A. be made during the early stages of the project rather than prior to project approval. The Project meets all applicable statutory criteria including the Mission Director's 611 (e) certification concerning the country's capability to maintain and effectively use the subprojects (Annex D & E). The Project is an integral part of the

GOI's present five-year development plan, the USAID DAP and the new directions of AID. It can be carried out over a five year period according to the schedule in the implementation plan.

G. PL 480 Title III

USAID is in the process of developing a major multi-year Title III program. Because of the large local currency costs of the Sederhana project it is considered a likely prospect for inclusion in the Title III program. Sederhana could be included as part of a small initial Title III proposal for FY 79 if the implementation and monitoring requirements can be resolved. However, throughout Repelita III (FY 80 - FY 84) it is contemplated that Sederhana will be included as one of 4 or 5 major irrigation efforts that will comprise a \$350 million multi-year program. The program is being designed so that the AID project plus the Title III funding will not exceed 75% of the total GOI program funding. See Annex G.5.

H. Project Issues

All the issues identified by AID/W in its approval of the PRP (State 306271, December 18, 1976) have been discussed and resolved at various places in the PP (Annex B). There are no other outstanding issues.

USAID Project Committee

Mr. William C. Larson, Chief Rural Development Division, Chairman
 Mr. Richard G. Kriegel, Deputy Chief Rural Development Division, Deputy
 Chairman
 Mr. Walter H. McAleer, Sederhana Project Officer
 Mr. David W. Devin, Coordinator for Evaluation of Sederhana I and
 Development of Sederhana II
 Mr. Archibald Withers, Program Officer
 Mr. John J. Pinney, Engineer
 Mr. Jimmy Jasim, Local Engineer
 Mr. Gunawan Widjaja, Local Engineer
 Mr. John Duewel, Rural Sociologist under PSC
 Dr. Douglas Caton, TDY Economist, AID/W
 Dr. Richard A. Johnson, Mission Economist
 Mr. Edward Bolling, Agriculturist
 Mr. Robert F. Zimmerman, Mission Evaluation Officer
 Dr. Paul Weatherly, Environmental Advisor under PSC
 Mr. Martin Sirait - Annexes

Part II

A. Background

1. Sederhana I

The Sederhana Irrigation Program was proposed by President Suharto in 1974. He saw the objectives of the program as increasing food production by undertaking small, relatively inexpensive irrigation systems which could be rapidly executed. Beginning with the start of Repelita II (Indonesia's Second Year Five-Year Plan extending from 1974-1979), the Sederhana Program was added to the GOI's two other major irrigation programs: the Special Projects, which were the larger, often basin-wide, foreign donor-assisted projects; and the Sedang-Kecil (small, medium-scale) Irrigation Program, which generally included projects between 1,000 and 7,000 hectares in size.

The original inquiry by the Central Government to the provinces requesting identification of irrigation projects for the proposed Sederhana Program brought recommendations totalling approximately one million hectares. Upon screening, about 550 thousand hectares were proposed for inclusion in the GOI's Repelita II Sederhana Program.

Ir. Suyono Sosrodarsono, Director General of Water Resources Development (DGWRD), set the tone of the Sederhana Program when he established the following criteria for screening and selecting specific subprojects:

- (1) Suitable soil.
- (2) Suitable quantity and quality of water.
- (3) Adequate manpower to construct the subproject and to farm the area.
- (4) Proximity to markets.
- (5) No land-status problems.
- (6) Low flood risk.

In addition the following special criteria were also to be followed in selecting subprojects:

- (1) Simple to design and construct, including low equipment requirements.
- (2) Capable of rapid execution, preferably capable of being constructed within one year but generally not over two years.
- (3) Relatively inexpensive.
- (4) Area of 2,000 hectares or less.

Since 1974, the DGWRD has continued to improve its selection process for approving new subprojects (see part III, A 2).

In 1975, a limit of Rp.100,000/ha was established as the cutoff point for the cost of any individual subproject. Since 1975, the cost of most subprojects has been kept within this amount if one discounts the inflation factor which has raised costs nearly 40% in Indonesia between July 1975 and May 1978. The subprojects which have exceeded this figure have been justified and accepted because of pressing social needs.

During the first four years of Repelita II, DGWRD has constructed the major irrigation works (diversion, headworks, and primary and secondary canals) for 676 subprojects in 24 of Indonesia's 27 provinces and special areas, thus providing a potential irrigated area of 238,396 hectares at a total cost of approximately \$ 53 million. These achievements are shown by IFY as follows:

MAJOR WORKS

<u>IFY</u>	<u>Subprojects</u>	<u>Area</u>
1974/1975	135	39,208 ha.
1975/1976	190	49,184 ha.
1976/1977	166 (New) & 49 carried for- ward to 77/78	57,452 ha.
1977/1978	136 (New) & 49 carried over from 76/77	92,552 ha.
	<u>627</u>	<u>238,396 ha.</u>

AID has limited its financial commitment to those subprojects contracted for construction on or after January 26, 1976, which was the date the conditions precedent were met. These include the subprojects in IFY 76/77 and 77/78, for a total of 351 subprojects covering an area of 150,004 hectares, and having an estimated total cost of \$36.8 million. AID's potential reimbursement is 42½% of this amount or \$15.7 million, plus an additional \$770,000 for subproject design.

AID and the GOI signed Loan 497-T-037 for \$20 million in June 1975 and increased the funding by amendment in October 1976 to \$25.7 million. The AID funding was to assist both the DGWRD and the Dep.Agr. in executing their portions of the Sederhana subprojects. Basically DGWRD was to construct the major works while the Dep.Agr. was to assist the farmers in the construction of tertiary and quaternary canals and drainage, land leveling, land clearing, and land shaping. The farmers were also to receive credit from the Bank Rakyat Indonesia (BRI) to enable them to fund these on-farm elements. Unfortunately there have been very few loans from the BRI. Although construction of the major works has proceeded adequately, the agricultural elements have progressed slowly.

USAID's participation in the Project was initially delayed because the GOI was unable to negotiate a mutually acceptable technical assistance agreement with the US Bureau of Reclamation and another consultant arrangement had to be obtained. This caused a delay of approximately one year in the arrival of consulting personnel. In addition, there were delays in the approval of the selection criteria due to lack of agreement on how to handle environmental factors, and what factors should be considered during the selection process. While these problems were being resolved, the GOI had meanwhile proceeded with the construction of 75/76 and 76/77 subprojects. Under the Loan Agreement AID was required to approve designs and cost estimates for all subprojects prior to the commencement of construction. Further the Loan Agreement did not permit AID's approval of plans and cost estimates before AID had approved the selection criteria. If the GOI had waited for these requirements to be met it would have meant the loss of at least one year's construction program. A second amendment to the Loan Agreement was finally executed in July 1977, which allowed AID to waive the loan requirement of approval of designs and cost estimates before construction.

Implementation Letter No. 6 establishing these new procedures for acceptance of completed subprojects, was finally issued on January 16, 1978.

It was contemplated under the Sederhana I PP that agricultural development activities would follow on behind the construction of the major work by about one year. This assumption has proven to be basically correct. Farmers tend not to proceed with the installation of on-farm works until they can actually see that water is available from the major works. Since the first year for the AID-funded major works was IFY 76/77, and many of these subprojects were not completed until IFY 77/78, on-farm development could not be expected to get underway until around August 1977. To date, progress has been confined mostly to the design of on-farm systems and the organization of water users (irrigators') associations. On-farm systems have been designed by local consultants with assistance from the Dep. Agr. and their SINOTECH engineering advisors for 61 subprojects covering approximately 29,000 hectares. Contracts for the design of an additional 60,000 hectares have been awarded by Dep. Agr., and should be finished within calendar year 1978. Construction work has started on the terminal distribution/drainage systems of a few subprojects. However, to date, no subproject is known to have a technically designed on-farm system completely constructed and functioning. There are, however, many systems where land is being irrigated from the major works with paddy-to-paddy distribution, or by simple farmer-initiated distribution systems. In the Sederhana I PP, it was anticipated that a little over forty percent of the irrigable land would be under irrigation within a year after completion of the major works. Out of the IFY 76/77 subprojects there are 31,600 hectares reported as being irrigated out of a potential of 57,500 or 55%.

Besides the usual start-up difficulties one would expect in a program as dispersed and complex as Sederhana, AID and the GOI have been experiencing frustrating problems in meshing AID's requirements for reimbursement with GOI operating procedures. Despite Amendment 2 to the Loan Agreement and Implementation Letter No.6, there are still problems in the reimbursement process. USAID has to satisfy itself that the subprojects were adequately constructed. This requires as a minimum, possession of layout drawings for the major works and the cost estimates for such works. Many of the subprojects were constructed with major modifications of the submitted plans, and with final cost estimates often varying widely from those originally proposed. Sometimes this basic documentation is missing when the requests for reimbursement are submitted to USAID. To deal with these difficulties, the DGWRD and the Consultant have begun a review of all the subprojects for which construction commenced after January 1976. As of March 31, 1978, the consultant had certified 103 such subprojects. The initial review indicates that AID should be able to approve for reimbursement approximately \$7.8 million, by September 30, 1978, with an additional approval of \$5.2 million between October 1, 1978 and July 1, 1979. Thus the total reimbursement for construction of major works for subprojects commenced between January 26, 1976 and March 31, 1978 is estimated to be \$13.0 million.

Reimbursement was also intended to be made for certain on-farm development activities, including; (1) the design of tertiary canals and drains, (2) construction of tertiary canals and drains, (3) the establishment of water-users associations, and (4) farm extension services. As of May 28, 1978 there have been no requests from the Dep.Agr. for reimbursement other than for training. However, the current review indicates that over \$300 thousand will be reimbursed over the next year for such activities.

The accomplishments in the construction of major works, on-farm development and training, as well as actual and anticipated disbursement for the Sederhana I Project, are detailed in Annex H.1 Table 3b.

Presently, \$22.1 million are committed for project costs including; (1) the Consultant's contract, (2) training and equipment, or (3) potentially committed to FAR payments for major works, training courses and agricultural components already begun or completed. Actual disbursements have been made only for consulting services, which includes overseas training and vehicle procurement. These disbursements total approximately \$3 million. The present pipeline exists because of the difficulties mentioned above and because procedures only recently have been established by the GOI enabling them to accept FAR payments. This has affected not only the Sederhana Project, but other USAID projects as well. In fact, although AID has been making loans based on the FAR concept to the GOI since 1974, the first actual FAR payment to the GOI was made in April, 1978.

Since this reimbursement hurdle has been overcome, BAPPENAS and the Ministry of Finance are pressuring DGWRD and Dep.Agr. to present the required documentation to AID for reimbursement for all completed Sederhana work. This pressure, together with procedures established in Implementation Letter No. 6 and assistance from the consulting team, is accelerating subproject approval.

To expedite reimbursement, the DGWRD, the Consultants, and USAID have initiated an intensive program of inspection visits to the subprojects to collect the necessary plans and cost estimates. This joint effort will enable the backlog of 120 subprojects with completed major works to be reviewed between June 1 and September 30, 1978.

2. Evaluation of Sederhana I

a. Introduction, Background, General Conclusions

The Sederhana I evaluation prepared by Dr. Clive Gray (Team Leader and Economist), Mr. John Duewel (Rural Sociologist) and Mr. Henry Gembala (Engineer) is summarized in the following paragraphs. The evaluation is based upon over 220 total person-days in-country, including 70 person-days spent in the field. Actual field inspections covered 47 individual sub-projects in 14 provinces. Detailed discussions were conducted at all levels from individual farmers up to top GOI officials. Field trips included detailed inspection of subprojects, participation in Sederhana training programs, seminars and evaluation workshops, discussions with local contracting firms, educational institutions and other foreign donors. The full report on the evaluation is available as a separate document entitled "Evaluation of the Irigasi/Reklamasi Sederhana Program", dated May 1978.

Further, it is recognized that the above contract evaluation team is only the cutting edge of the Sederhana I Evaluation process. The major inputs have been provided by the DGWRD and the DGFC. Both Departments have devoted many person-hours to the design and preparation of evaluation questionnaires, the subsequent training of enumerators and the conducting of the surveys. Many additional person-hours have been devoted by key GOI data processing and evaluation technicians to building a new and significant data base for the Sederhana Program.

Finally, a significant contribution to the evaluation has been made by the contract team since their direct involvement in all aspects of the program gives them a unique perspective of policies, progress and problems.

The Evaluation Team has concluded that the Sederhana Irrigation and Reclamation Program (IRS), although relatively young and unique, is proving to be a worthwhile and effective program promoting increased rice production, increased incomes for the rural poor and a strengthening of GOI and village institutional capacity to develop simple irrigation systems.

The Sederhana Irrigation and Reclamation Program (IRS) was launched in Indonesia in FY 74/75 with 100% local financing. In June 1975, AID approved a \$20 million loan for the program which was later increased to \$23.7 million. By late 1977, IRS had expanded irrigated rice hectareage by 18,000 hectares and gross crop rice hectareage by 26,000 hectares in irrigation systems scattered throughout Indonesia. In the 1976/77 crop year a subset of 132 "mature" subprojects accounted for an annual production increase of 20-30,000 tons of milled rice. A study of 517 subprojects, 90% of those undertaken in the program's first three years, pointed to an anticipated expansion of 75,000 hectares of rice paddies, 153,000 gross crop hectares and about 400,000 tons of milled rice upon completion of Sederhana I. The 132 mature subprojects are already yielding a net return to labor about equal to the social opportunity cost of labor (62-90 cents per day) after allowing for a 15% opportunity cost of capital invested in IRS infrastructure. This can be expected to increase as more land comes into production in the areas concerned. The return to labor at maturity for the 517 subprojects is even more favorable (\$1.10 per day), assuming an average social cost of about \$1,000 per hectare for clearing and paddy formation on 70,000 hectares required to achieve the full revised hectareage target.

Pari passu with its contributions to increasing Indonesia's rice output, which is one of AID's three main purposes for Sederhana I, the program has clearly also served a second purpose of enhancing income for several hundred thousand farm families, nearly all of them cultivating less than a full hectare of paddy. Progress toward AID's third purpose, strengthening the institutions responsible for implementing IRS, while readily observable, appear nevertheless to have been slower than projected. This can be attributed to the inherent difficulty of administering a program spread over hundreds of sites, about 80% of them in the Outer Islands, where the establishment of functioning irrigation systems and the absence of site feasibility studies put a premium on individual judgment of irrigation officials. A major benefit is the experience gained by these officials in the course of the program. Not surprisingly, recruitment

and assignment of staff and administrative follow-ups by the provincial irrigation services has been closer to target than in the case of the agricultural services. Agricultural services contribution has been primarily the development of tertiary networks, water management and water-user associations. This contribution appears to be more one of providing supplemental return on additional expenditure than by being an indispensable link in ensuring the attainment of reasonable economic returns in infrastructure investment. (In some cases, the rate of return involved may be even higher than that on the initial investment.)

The evaluation report advances the following principle recommendations:

I. Improvement of Current Procedures, Project Implementation and Follow Up

A. Subprojects Design Feedback. The functionality of many subprojects' design can be improved by requiring contractors to return to the field to evaluate preliminary design concepts and layouts in consultation with local engineers. The associated costs of such feedback would bring a high return.

B. Operation and Maintenance. Lack of significant movement towards instituting a formal system of O&M for IRS subprojects is not an unmitigated portent of disaster for the system. In the long run, projects on IRS' scale are more likely to succeed if the beneficiaries find themselves obliged to handle O&M of components which are technically within their capabilities. However, the team recommends instituting, on a trial basis, an O&M budget allocation, of which the 1978/79 budget "improvement" allocation for half the first three years' subprojects may be regarded as a precursor, to service major structures in lieu of handling this as new project activity, with its attendant delays.

C. Monitoring. It is desirable to continue both the comprehensive monitoring of IRS subprojects by irrigation and agricultural officials, and the collection of more reliable data on a scientifically selected sample of locations along lines pursued hitherto by the Survey Agro-Economi (SAE).

II. Future IRS Investment Policy

A. Subproject Selection Procedures. There is general agreement on the need to intensify consultations by irrigation officials with local farmers and authorities, as well as with other technical agencies (who already enter at a later stage by having centrally organized Appraisal Teams). The BAPPEDA (Provincial Development Planning Boards) should be involved in the process of clearing subproject proposals before they are considered at the national level.

B. Project Selection Criteria. Planning diligently is a useful way to achieve program objectives. Social benefit-cost analysis is an accepted technique of project evaluation that might be applied systematically in the IRS selection process, to some degree offsetting higher nominal returns perceived by establishing subprojects in previously existing village irrigation schemes.

C. Supplemental Investment in IRS Subprojects. Incremental benefit/cost analysis should be applied in evaluating proposed investments in tertiary network, land clearing and paddy formation. Each extension of development brings benefits, but should not be viewed as invariably required to make initial investments in major works economic. Optimal targets for government activity in these areas cannot be determined without further investigation and experimentation, designed to learn, among other things, how much investment the farmers will realize themselves, once water is available to them.

III. Staff Development

The team received concrete proposals from several provincial irrigation officials as to the further duration and content of training required to remedy shortcomings in the training required for different categories of staff members. In the time available, the team was unable to map out and cost alternative programs for training development but it believes a high return is obtainable here. This should be the first priority for expanded technical assistance.

IV. Future AID Assistance to IRS

A. Technical Assistance

(i) Training. Technical assistance extended so far has been deficient in its concern with past training. A full time advisor on programming and curricular development of technical training is needed. The curricula of the respective training programs should be reinforced with materials drawn from IRS case studies.

(ii) Engineering. The team supports the proposal to station additional engineering advisors in major provincial offices. The advisors could make strategic contributions, not only to execution of IRS, but also to the sedang/kecil (medium, small-scale irrigation programs) and other programs consistent with the Congressional Mandate. Serious study of the Indonesian language should be made part of the advisors' preparations. The team feels that AID dependence on the consultants' certification of subproject completion places them in a complicated dual role and the possibility of using an alternative mechanism is recommended.

(iii) Agriculture. The team felt the SINOTECH contribution had probably given a favorable return on expenditure up to the present. The Directorate General of Food Crops has indicated his desire that the SINOTECH input continue at approximately the same level.

(iv) Social Science. There would be a constructive role for three social science advisors, including the educator already referred to; an advisor on the institutional aspects of water management, and an economist to assist in subproject selection procedures and monitoring the program.

B. AID Reimbursement Procedures. Reimbursement procedures under Sederhana I have been subject to lengthy delays without any apparent compensating social benefit via increased efficiency of program implementation. The problem arises from trying to match AID's minimum engineering standards with a program necessarily involving widespread field operations. Since the question is essentially one

of attributing AID assistance rather than determining which subprojects actually get carried out, the team suggests that future capital assistance be met with a subset of projects, chosen on the basis of convenience for AID's inspection and approval and reimbursed at a higher rate than in Sederhana I.

USAID VIEWS

USAID notes all the recommendations made by the evaluation team. The GOI has been furnished and is now in the process of reviewing the final evaluation. The issues raised and the recommendations made by the evaluation team will be discussed, negotiated and, where possible, resolved prior to the execution of the loan agreement. USAID takes no issue with any of the conclusions or recommendations at this time. In fact, some are already being implemented, e.g., renegotiation of reimbursement procedures. Others are included in the Sederhana II proposal. USAID believes that those recommendations implemented as a result of discussions/negotiations with GOI will make for a more effective overall Sederhana Program.

3. Other GOI Irrigation Programs

Other GOI irrigation programs include Padat Karya (labor-intensive rural works). Sedang-Kecil (medium-small scale), river development and control, reclamation of tidal and swampy areas and larger special projects. About 30 percent of the Padat Karya program, administered by the Ministry of Manpower and Transmigration, is devoted to small irrigation projects, mostly to rehabilitation or improvement of existing systems. The provincial public works offices are also involved in the design and construction of the Padat Karya irrigation projects.

The Sedang-Kecil projects range in size from 1000 to 7000 hectares and include rehabilitation and extension of existing systems as well as new construction. They are implemented by the provincial public works offices as are the smaller river development and tidal/swamp reclamation projects. Many of the special projects are implemented by special organizations set up for the purpose.

The DGWRD budget expenditures in support of these programs has grown rapidly in the past few years, from \$58,385,100 in IFY 1973/74 to \$301,916,000 in IFY 1978/79. As shown in the table below, the special projects claimed the largest share of the program in IFY 1978/79, accounting for 65% of the budget.

GOI Budget Expenditures for Irrigation Projects

	<u>Budget Expenditures</u> (<u>\$ 1000</u>)	
	<u>1977/78</u>	<u>1978/79</u>
Padat Karya (irrigation and flood control portion)	13,268	18,100
Sedang-Kecil	25,496	32,790
River Development and Control	12,090	22,344
Tidal/Swamp Reclamation	25,714	31,381
Special Projects	141,788	197,301
	<hr/>	<hr/>
TOTAL	218,356	301,916

4. Other Donor Assistance

Considerable assistance for the GOI irrigation programs has been provided by other countries, particularly with the larger special projects. The World Bank is providing the financing for seven irrigation projects now under implementation with a total cost of \$250 million and the Asia Development Bank is involved in three ongoing projects which are valued at \$36 million. Japan, the Netherlands, France, the United Kingdom, West Germany, Canada, Australia, Yugoslavia and the United Nations Development Program are or have been active in providing the GOI with project aid, buyer's credit, or technical assistance for irrigation projects. This assistance totaled \$66,942,000 for IFY 1977/78. The total foreign aid funding for irrigation improvements during Pelitas I and II is given in the following table.

Foreign Aid for Irrigation Improvements
during Pelita I and Pelita II

Lending Agency/ Donor Country	Loan/Technical Assistance (\$)
<u>PROJECT AIDS</u>	
World Bank (IDA)	81,862,600
World Bank (IBRD)	190,500,000
USAID	45,189,000
Asian Development Bank	54,530,000
United Kingdom	7,842,600
France	1,377,300
Canada	10,230,000
Netherlands	30,575,800
Overseas Economic Cooperation Fund	136,518,300
<u>BUYER'S CREDIT</u>	
United Kingdom	55,927,300
France	52,289,000
Canada	11,459,300
Yugoslavia	2,939,800
U.S.A.	31,450,200
West Germany	12,116,800
<u>TECHNICAL ASSISTANCE</u>	
United Nations Development Program	5,265,000
United Kingdom	9,131,200
Netherlands	9,204,700
Canada	4,600,000
Australia	4,442,500
Japan	14,627,400
TOTAL	<u><u>771,178,800</u></u>

5. FUTURE ASSISTANCE:

The Sederhana II program has been designed to enable A.I.D. to work in partnership with the GOI in developing systems and approaches to problems associated with expanding and improving irrigated agriculture in Indonesia. A.I.D. and the GOI share two goals which facilitates this cooperative effort, (1) increasing Indonesia's food production, and (2) improving the lot of the rural poor. The Sederhana Program is but one of many efforts underway which are directed at these purposes. From the studies and works assisted under the Sederhana Program will come continued and expanded programs, each in turn leading closer to the realization of the two goals. It is not expected that these would necessarily be funded by A.I.D. At the completion of Sederhana II or maybe after a third program it may be appropriate for funding of the infrastructure to be transferred to one of the international lending institutions. This will depend in large measure on the effectiveness of the institution building component of the program. It is also felt that portions of the Sederhana Program might be appropriate for Title III programs. This might include land clearing, leveling, shaping, and paddy formation as well as tertiary and quarternary canals and drains. It is expected that there will continue to be a place for technical assistance, particularly in water management, and operation and maintenance of irrigation systems. As the irrigators' associations mature there will be the opportunity to assist them in providing new services to their members. The Sederhana II program is but another step in developing small irrigation systems with the necessary social and physical infrastructure required for their proper management, operation, and maintenance. Most importantly, the completion of Sederhana II will provide the GOI improved capability in meeting an ongoing need to increase the land being irrigated in Indonesia.

The GOI presently plans to continue the Sederhana Program through their third five year plan, Repelita III. The Sederhana II project will assist the last year of Repelita II and the first two years of Repelita III.

6. COMPLEMENTARY AGRICULTURE PROGRAMS:

The main GOI production support program on rice and some other crops, in farm credit related to a prescribed "package"

of inputs is called BIMAS. The purpose of the BIMAS Program is crop yield intensification. As BIMAS areas become capable of functioning without the credit component, they are converted to the INMAS Program. Combined BIMAS/INMAS areas now total 3.6 - 4.0 million hectares of largely irrigated lands.

A main effort in support of these two programs is the cropping systems research being conducted by the Central Research Institute for Agriculture located in Bogor. A cooperative CRIA-IRRI program for rice and secondary crops production is partly financed by A.I.D. This support is being consolidated and expanded in FY 78/79, to helping support the research and on-farm demonstration work presently underway, in the Outer Islands' agricultural cropping systems research program.

A.I.D. is also providing other direct support on the agricultural component of the Sederhana Program through two area development projects which have irrigation and on-farm development as major components. They are the Luwu Area and Transmigration Project, L-038 and the Citanduy River Basin Development Project, L-039.

B. Project Description

1. Program or Sector Goal

The goal of this project is to increase Indonesia's domestic food production, particularly rice, as to be able to feed its growing population and increase the well-being of the country's poor majority.

Discussion

Based on an average farm size of one hectare and a farm family of five, it is expected that upon completion the planned subproject will directly benefit some 410,000 farmers or 2,050,000 people. With an average expected initial increase of 2.78 MT/ha, the net increase in rice production upon completion the on-farm delivery systems on these subprojects will amount to an annual increase of approximately 1,140,000 metric tons of dry paddy. This rice would be enough to feed 11,300,000 people for a year and thus the project will benefit the entire nation. Subtracting the costs of the agricultural inputs including labor required, the incremental farmers net income is expected to reach \$139.7 million per year. This implies an average increase in net income per farmer of \$341 per year or a per capita income increase of \$68 per year (Rp.28,244). As yields increase these incremental economic benefits may increase by as much as 50%.

The Sederhana Program also generates a relatively large number of employment opportunities. Construction of systems is usually by labor-intensive methods since the works are not generally susceptible to the use of heavy equipment. Even the proposed land clearing work will combine labor-intensive methods (chainsaws) and heavy equipment (dozers) methods. It is estimated that the construction of the major works over the past 4 years has created 40,000 person years of direct labor. The construction of major works plus tertiaries, land clearing, leveling and paddy formation planned for Sederhana II mean an estimated 270,000 man years of direct labor.

The project will also create a large number of employment opportunities in working newly irrigated land. The additional wet season agricultural employment opportunities created on the total 410,000 ha Sederhana II project area is estimated to be 38 million person-days per year.

Additionally, there are indications that these projects are already stimulating rural development in and around the subproject sites. For example, plans are being formulated, in many of these areas for improved farm to market roads, grain drying, milling and storage facilities, etc., and there are encouraging indications of increased marketing activities and government

services. Key assumptions for achieving the goal include (a) the present conditions of political stability continue to prevail, (b) the GOI's Family Planning Program meets its targets, (c) the transportation and marketing systems are adequate, (d) other GOI food production programs meet their targets, and (e) there are no major national disasters; i.e., floods, drought, etc.

2. Project Purpose

The purpose of this project is to (1) increase the capability of the GOI implementing agencies to plan and implement small-scale irrigation schemes including both the physical systems and the social infrastructure essential for operation and maintenance, (2) increase rice production by up to 1,000,000 metric tons/yr., and (3) increase income and employment opportunities.

End of Project Status

By the project activity completion date (PACD) the following conditions and improvements are expected to be achieved:

(1) All the GOI implementing agencies will be better able to plan and execute a small-scale irrigation program which is bringing about 60,000 ha. of rice field under irrigation/yr. This includes the capability to both construct the necessary physical infrastructure i.e. major works, terminal distribution systems, land clearing, land leveling etc. and to establish the necessary social infrastructure at the local level to bring about paddy field formation and the productive operation and maintenance of the completed systems.

(2) The physical and social infrastructure mentioned above on an estimated 650 subprojects covering about 360,000 ha. will be essentially completed and these systems will be producing an average of two metric tons/ha. per year of additional rice for a total of about 1,040,000 metric tons of rice per year for Indonesia. The production of other secondary crops will also increase as a result of these subprojects. These subprojects are located in 24 of Indonesia's 27 provinces and special areas but the majority are concentrated in the less developed areas of the country.

(3) Approximately 375 new projects covering about 150,000 ha will be nearing completion. It is planned that by the PACD the major works and terminal distribution systems for these projects will be completed and some of them may be functioning. However, the completion of all of these systems is planned for a future follow-on project.

There is a direct linkage between the purpose and the goal of this project. However, success depends on how valid certain assumptions prove to be. The key assumptions for reaching the described end of project status and thus achieving the project purpose include (a) the GOI implementing agencies recruit and assign an adequate number of technical personnel to carry out the program at the target levels, (b) the momentum generated during implementation of Sederhana I is further accelerated, (c) GOJ closely adheres to its agreed upon project monitoring plan and its selection criteria for initiating new projects, (d) rice and input prices are kept at a level adequate to maintain farmer incentives, (e) the Bimas production input package is provided to farmers upon completion of the systems, (f) the implementation of the subprojects is carried out in a labor-intensive manner and most importantly, (g) the GOI implementing agencies are able to mesh with and achieve participation and support for the project from the local governments and farmers involved.

3. Outputs

The project will finance the following discrete interrelated outputs.

a. Institution Building Outputs

i. The most important output of the project will be the managerial and technician personnel assigned to the project who receive training. These people include GOI implementing agency staff, private sector survey, design and construction personnel and key local officials and farmers.

ii. The project will establish or improve existing in-country training programs.

iii. During the course of the Project the annual evaluation program will be further developed to measure progress and the effects of the Project at both the goal and purpose level. These joint DGWRD/DepAg evaluations will be conducted with technical and financial assistance from the AID grant.

b. Rice Production Outputs

Completed and functioning subprojects are the main rice production outputs. The elements of a completed subproject for reimbursement purposes include (a) Designs for major works and terminal irrigation systems, (b) completed major works i.e. weirs, main and

secondary canals and other major structures for the entire planned area to be served (c) completed terminal irrigation systems (d) completed contracts for any necessary land clearing, land leveling, and the design of paddy fields and (e) functioning water-user associations. Other outputs include (a) paddy fields producing rice (b) effective on-farm water management and (c) adequate operation and maintenance of both the major works and the terminal distribution systems. The GOI will finance the completion of the major works for all subprojects covering approximately 95,000 ha. without any additional financial support from AID other than that provided in the first loan, (Sederhana I) They will also finance the design and construction of the terminal distribution drainage systems on all sub-projects included in their Special Tertiary Program without AID financial assistance. The loan funds provided for in this project are sufficient to complete the terminal distribution/drainage systems on the AID-assisted Sederhana Projects from prior years including land clearing where necessary, and the water user associations for both the STP and CTP plus finance items (a), (b) and (c) above for approximately 375 new projects covering an estimated 150,000 ha.

The linkage between the outputs and project purpose is obvious and the magnitude of outputs is adequate to achieve the purpose. Key assumptions for achieving these outputs are (a) that the GOI implementing agencies given all the required inputs can produce the desired outputs and, (b) adequate financing is provided for operation and maintenance.

Inputs

The provision of the required funds by the GOI and AID is described in Part IVA. Technical assistance and Training inputs are described in Part VC.

PART III

A. TECHNICAL ANALYSIS

1. General

Both the engineering and agricultural technology required to implement the Sederhana Program are available. The technological problems are in the technical judgements required in determining the degree of sophistication which should be incorporated into individual subprojects. Sederhana I appears to have assumed that all subprojects would have the same degree of sophistication, both in regards to the technical as well as the social infrastructure. As Sederhana I has progressed, it has become apparent that there are differences in the needs of individual subprojects. If these differences are not recognized, there is the possibility of installing unnecessary or over designed works and in establishing redundant organizations. Sederhana II is designed so that it addresses the major difficulties encountered in implementing Sederhana I and maintains sufficient flexibility to deal with the wide variety and range of problems which will occur during implementation.

Most of the subprojects undertaken in Sederhana I have been in the anticipated size range, 100 to 1,000 hectares. There have been 126 subprojects of less than 100 hectares. These have often been the more successful, for they are in reality, a single tertiary block. On the small subprojects, the farmers have often taken it upon themselves to construct the required additional quaternary and related distribution systems. This would seem to support the recent decision of the GOI to construct tertiary systems along with the primary and secondary canals.

There have been a greater number of subprojects over 1,000 hectares in size than anticipated. There have been problems and delays in designing and constructing these larger subprojects. These have been resolved with the assistance of the technical advisors, but this has drained the services of short term specialists in hydrology, structures, and foundations. Construction of these larger subprojects has also taken longer than the one to two years called for in the Sederhana I selection criteria.

Subprojects have often been in the upper reaches of the river basins. Special considerations are required in the design of subprojects in such terrain including the construction of flumes or closed conduits.

A major part of the DOWRI's 78/79 construction program is their improvement program. AID will not be involved in funding any construction to be executed under this program, but AID will provide technical assistance in design and construction. The improvement program will design and

construct, (1) facilities which were not constructed with the original subproject, usually due to lack of funding, (2) additional facilities which were found necessary during the construction of the subproject, and (3) correction of damage such as that caused subsequently by slides and floods. Many of the works to be constructed would be funded as cost overruns in the States, and perhaps the best way to view this program is as a consolidated cost overrun program for previously completed Sederhana subproject. The program is needed and is well conceived.

2. Selection Criteria

Since 1974 the DGWRD with assistance from the consultant and USAID has continued to improve its selection process for approving new sub-projects. The questionnaire for subproject proposals has been lengthened and is more detailed. It now exceeds 40 pages. The provincial public works must answer detailed questions on: (1) soils, (2) meteorology, (3) hydrology, (4) topography, (5) current and projected land use, crop patterns, production techniques and yields, (6) marketing, (7) communications, (8) manpower availability, (9) project status, (10) construction requirements, (11) construction budget and (12) implementation plan. The DGFC has also been invited to participate thus it is now a joint inter agency GOI selection process.

The DGWRD and DGFC with the assistance of the Consultants and AID are presently completing a review of the selection criteria for Sederhana II subprojects, based generally upon Sederhana I Selection Criteria. However the Selection Criteria has been reorganized so that they may be computerised. The important changes in the selection criteria will be (1) a greater input by the provincial agricultural offices and (2) the requirement that the lowest levels of local government in the project area agree to and sign off on the subprojects data forms. The ultimate selection criteria will establish the presumption that each subproject selected will be technically, economically, environmentally, and socially sound. However provision will be made for AID to waive any of these requirements if the GOI provides sufficient data to show that the subproject in question remains sound even with the waiver of such criteria.

3. Design Standards:

Most subprojects are designed by Indonesian engineering firms selected and supervised by the provincial public works offices. From a field survey a topographic map is prepared from which the designer lays out the irrigation system. Unfortunately the topographic maps are often inaccurate and this results in design errors. The provincial public works staff with the assistance of the Consultants field check the designs. These field checks often require the redesign of portions of the project by provincial public works staff.

During the implementation of Sederhana I the plans submitted to AID were often the original plans and not the plans revised by the provincial public works. These original plans had been forwarded DGWRD to AID in order to meet the requirement for AID's approval before the start of construction. The result was intensive reviews of plans which were never used : in short this was an exercise in futility.

The emphasis under Sederhana II is work with the Indonesians during the surveys and preparation of the designs rather than on approval phase. The Consultant's provincial irrigation advisors will be able to assist in and review the surveyor's field and the project designs work.

During the Sederhana I Program, the Consultants have prepared design and hydrological manuals for use in the design of small irrigation works. Part of the Consultant's efforts during Sederhana II will be to review and improve the manuals and to familiarize the public works and private sector engineers with these references.

4. Construction:

Construction of Sederhana subprojects has been, and will continue to be by labor intensive methods. The quality of construction has generally been satisfactory with only a small percentage of subprojects found unacceptable. Of the approximately 155 subprojects inspected by USAID, not one was considered to be so poorly constructed as to be uncorrectable. The major construction problems are lack of compaction and poor concrete and mortar. It is intended to address these problems by offering short in-service training courses to construction inspectors working on Sederhana subprojects. Now, when problems are noticed during inspections by the Consultants, DGWRD or USAID staff, they are brought to the attention of the local public works staff and the contractors with recommendation for corrective action. This monitoring effort has improved workmanship. With the assignment of provincial irrigation advisors this monitoring assistance will be more effective.

Compaction will remain a problem due to the use of labor intensive methods. Extra effort is required to see that compaction around and under canal structures is sufficient to minimize the possibility of damage due to settlement. The problem of compaction of canal banks is less critical and has been shown to be adequate in most cases.

5. Land Development:

Under Sederhana I it was proposed that the farmers be made responsible for clearing, leveling and shaping the land. The

provincial agricultural services were to provide the farmers with technical assistance while the Bank Rakyat Indonesia (BRI) was to provide loans to enable the farmer to do this work. So far only a few farmers in approximately five subproject have received loans. This low number of loans has led to new policies in the selection of subprojects as well as to proposals for a new approach to the land development work.

In selecting new subprojects for the current Indonesian fiscal year (IFY 78/89), the GOI has decided that only subprojects which are already at least sixty percent rain fed paddy will be considered. The continuation of this restriction will depend upon the number and availability of acceptable subprojects.

AID proposes to assist the GOI implementing a trial program of land clearing and shaping covering approximately 6,000 hectares in subprojects outside of Java. The program will be administered and supervised by the Department of Agriculture. The costs of the program will be reimbursed 50% by AID and 50% by GOI. There will be no cost to the farmers for this work, but they will be required to do the final land shaping and paddy formation.

6. Water Users Associations

Any irrigation system, no matter what the size, must have a continuous program of operation and maintenance (O&M) in order for it to remain effective. The organization or grouping of farmers to achieve this purpose may vary from informal and unstructured modes to highly developed formal organizations. The Sederhana I evaluation has revealed that the effectiveness of any and all forms of organization varies from grossly ineffective to highly effective. In this paper the terms water users association, irrigators association and P3A are synonymous. They are regionally characterized by specific names: West Java, Mitra Cui, Central Java, Dharma Tirta and Bali, Subak.

Only three provinces to date have established regulations for the formation of water users associations. There is often variation in structure and administration from one province to the next. The DepAgr perceives a need for more thorough analysis of existing institutions and organizational modes in order to accommodate policies to the diversity of conditions (cultural and otherwise) found in Indonesia. Such analysis would also have an action research design component.

Under the proposed Sederhana II program, 3 expatriates (2 rural sociologist and a water management engineer) will be provided under grant assistance to work with the GOI to perform such an analysis. They would work with approximately twelve Indonesian engineers and social scientists. The study will be used to help derive recommendations

as to the nature of existing organizations and how they can be modified (where needed) to better facilitate local operation and maintenance.

7. Water Management

In the Sederhana I Program, water management was given considerable prominence. It appears now that this was premature. Most of the Sederhana I subprojects were located upstream where inefficient use of water actually had little effect upon the overall use in the river basin. In fact, the retention of excessive amounts of water by upstream irrigators may have had an advantageous effect upon the availability of water in the lower reaches of the basin by lengthening the duration of flows in the stream. In areas outside of Java and Bali, water conservation is not yet considered a serious problem so the farmers have little need for sophisticated water management systems. Future developments will undoubtedly increase the competition for water but it is unwarranted at this time to place restrictions upon the irrigators in those areas which now have adequate water.

Better water management along with improved varieties, fertilizers and insecticides are essential when the high yielding varieties of rice are grown. However, it is doubtful whether this sophisticated type of rice culture should be promoted for Sederhana I at this time.

8. Operation and Maintenance (O&M)

Traditionally the responsibility for irrigation systems (O&M) was with the village. Today the responsibility for operation and maintenance can be viewed as being divided between the several government agencies and the local farmers. The provincial public works is responsible for the operation and maintenance of the major works, weir, headworks, and primary and secondary canals. The farmers are responsible for the operation and maintenance of the tertiary and quaternary canals. The provincial agricultural services together with the local governments assist the farmers in organizing irrigators organizations and advise the farmer regarding water management and cropping patterns.

Funding for maintenance is from the provincial land tax (IPEDA), the central government and the farmers. The IPEDA is a flat rate charge per hectare and varies with land use. While water user charges are not normally used in Indonesia, there are some water users associations on Java where the farmers pay an assessment to support the maintenance of the tertiary and quaternary systems. Local farmers also use gotong royong (self help) to repair major works as well as tertiary canals usually by the provincial public works.

Presently the budget from the nation government in support of O&M for irrigation systems is Rp. 2,000 (\$4.83) per hectare, which is generally considered to be insufficient to fund adequate maintenance. The Consultants estimate that for the first several years of operation of a subproject about ten percent of the construction cost should be provided for O&M, or Rp. 15,000 per hectare. In subsequent years the O&M cost could be reduced to about half of this amount. Actually expenditures for maintenance is unknown at the present time. Furthermore what is called rehabilitation is really deferred or heavy maintenance which is now funded from non-maintenance sources by the government.

Many officials recommend that most of the maintenance of irrigation systems should be turned over to local authorities. The extent of O&M maintenance which the local farmers can effectively perform varies considerably among systems. The minimum to be expected of the local community is the operation and maintenance of the tertiary systems. Even here technical assistance may be required to repair or replace structures (public works) or in water management (agricultural extension). On smaller systems the primary and secondary canals can be maintained by the local farmers. On most systems however, the weir and headworks remain under the control of public works. The assumption of the O&M responsibility of irrigation systems by local communities is looked upon as a desirable evolution. The Sederhana program will build upon this by assistance in the formation of water users associations and the training of association/village leaders and staff. Public Works will continue to have maintenance responsibility for the weirs and other structures, and for the primary canals on the larger systems. The training programs for public works will be expanded to include water masters and other maintenance personnel. The training emphasis will be on upgrading personnel and organizations to ensure better operations to maintenance.

Under Sederhana I the Consultants prepared a general operation and maintenance plan for the sub-project major works. They have submitted in draft a proposal for the operation and maintenance of tertiary and on-farm systems. This will be soon finalized and will serve as the basis for O&M procedures of Sederhana subprojects.

9. Technical Assistance

The Sederhana I Loan is providing the foreign exchange costs for technical assistance for the IKWRD and DepAgr contract which was signed between the GOI and International Engineering Company, Inc. (IECO) of San Francisco on March 24, 1976. IECO is the principal or lead firm of a three firm affiliation. The other firms are SINOTEC Engineering Consultants, Inc. of Taiwan, and SANGKURIANG Ltd., Architects and Consulting Engineers of Jakarta. The contract calls for 670 manmonths of technical assistance including 433 manmonths of expatriate services and 237 manmonths of Indonesians technicians. The services of seven of

the twelve long term expatriate staff are due to be terminated between July and August, 1978. These staff members are predominantly associated with the design and construction of the major works. The remaining staff are funded through April 1979 and consist of the resident manager and agricultural advisors. This is consistent with the premise in Sederhana I that agricultural activities/facilities would lag behind the construction of major works by about one year. Assuming that Sederhana II is to be implemented, the GOI has indicated a desire for the uninterrupted services of the Consultants.

During May-June, 1978, the Consultant and the GOI will negotiate an extension to the existing contract. This will continue the services of the twelve expatriate advisors until July 1979. The eight local engineers from SANGKURIANG will also be similarly extended. To immediately provide some additional technical assistance the present staff will be increased by two expatriate engineers plus four Indonesian engineers from SANGKURIANG. When funding becomes available for Sederhana II, a new contract will be executed with either the present Consultants or possibly a new competitively selected consulting firm to provide modified and significantly increase technical advisory services.

The new technical services contract for Sederhana II contemplates total of twenty four engineers to work with the DGNRD. Sixteen expatriate irrigation engineers will be assigned to work directly with twenty three provincial public works irrigation offices. Eleven of these engineers will be assigned full time to a single province. The other five engineers will cover two or three adjacent provinces, one or more of which do not have a large enough Sederhana Program to justify the assignment of a full time advisor.

The contract will also provide a five man central team to assist the DGNRD in administering the Sederhana Program. This team will be headed by a resident manager who will be responsible for overseeing and coordinating the technical services provided to DGNRD and the DGFC. In addition he will serve as the advisor to the DGNRD's Project Manager. The central team will have two irrigation engineering advisors who will work directly with the DGNRD's two engineers responsible for the eastern and western regions of Indonesia. A third irrigation engineer will be assigned to work with the DGNRD's Project Manager for the Special Tertiary Program. The other member of the central team will be an executive officer who will relieve the resident manager of most administrative chores. This will permit the resident manager to concentrate on his technical and advisory duties.

The third component of technical assistance to the DGNRD will be three long term expatriate irrigation design engineers whom the DGNRD could assign on a rotational basis to work with various Indonesian

engineering consulting firms on the design of subprojects, including tertiary systems. During their present contract, the Consultants have assisted local engineering firms with the design of tertiary systems. The results of this program have been significant, and all parties feel that expansion is warranted.

The Sankurian input to the consulting services will be considerably reduced in Sederhana II. Presently there are two Sangkurian engineers assigned to each of the four regional teams. In the new program Sangkuriang will provide engineering assistance only to the central team. This will probably require four engineers who will work as assistants to the three irrigation engineers and the resident manager.

The dual purpose of these proposed consulting services is (1) to strengthen the DGWRD's and provincial public works capabilities to administer the irrigation programs, and (2) to assist the private sector to improve its capability to provide engineering service to the GOI, particularly in the design of irrigation facilities. These ends are also being furthered through the training programs which are assisted under the Sederhana Program.

The engineers assigned to work with the provinces will also assist and instruct the staffs of local engineering firms in surveying and in subproject design reviews. Consultant services in the future will emphasize assisting and instructing Indonesian engineers rather than reviewing and approving work, as has too often been the case under Sederhana I. The aim of the ongoing program is to upgrade and increase the capability of the private Indonesian engineering consultants to provide design services for irrigation systems.

In addition to the technical advisors provided to the DGWRD, the Consultant will continue to provide advisors to the DGFC. To assist the DGFC with the implementation of the Complementary Tertiary Program and with water management practices, there will be four regional teams of two expatriates each. One will be an irrigation engineer thoroughly versed in tertiary design, construction and operation. The second member of the team will be a water management expert familiar with crop water requirements and rotational scheduling of water deliveries. The tentative locations of these two man teams are Medan, Palembang, Ujung Pandang, and Jakarta. In addition to these eight advisors there will be a central team based in Jakarta consisting of one agricultural engineer and one water management expert to advise and assist the DGFC in administering the agricultural components of the Sederhana Program.

It is proposed that the technical assistance furnished under Sederhana II be grant funded. Grant funding should permit a more

adequate positive response to the technical assistance needs of the program as well as to the basic needs of the consultant staff. It should eliminate the friction between the GOI and the Consultant which have resulted from the Consultants' complaints about inadequate local support (e.g. housing, vehicles, education allowances, etc.) and the Government's view that the Consultants' demands are excessive. USAID's view is that technical advisors that are reasonably content with the logistic and administrative support and amenities provided them function more effectively in their technical duties. Also, the turnover of personnel should be reduced and continuity and general technical assistance effectiveness enhanced. The DGRPD and DGFC have indicated that they wish the present Consultant to continue to provide technical services for the Sederhana Program. Therefore, the Consultant's services will be continued on the basis that their performance to date has been satisfactory, the GOI desires their continued services, and the services are a follow-on of their present contract and as such are in conformance with AID's requirements.

Besides the technical services to be provided above, it is contemplated that AID will fund technical advisory services to help the DGFC establish a program for assisting water users associations. This program is initially intended to run for two years, and will require two expatriate sociologists: one water management engineer, and approximately twelve Indonesian assistants, all of whom would be grant funded in Sederhana II. A description of the program is contained in Section III A.6.

In addition, it is contemplated that additional, specialized technical assistance in training will be provided under Sederhana II. Depending on his ability to provide these services, they may or may not be included in the present Consultant's contract. It is expected that up to three man years of services will be provided to assist the Ministries of Public Works and Agriculture to upgrade their training programs. These advisors would review and recommend training programs for technical personnel charged with implementing this program and for personnel who will be responsible for managing, operating, and maintaining the facilities constructed. Special emphasis will be placed on surveying and maintenance in this assistance. These advisors would also be grant funded in the proposed Sederhana II Program (see Section 10, Training).

The total requirement for expatriate technical assistance for both DGRPD and DepAgr is shown on the following table.

Number of Expatriate Experts for
Technical Assistance to Sederhana II Program

	<u>Central Team</u>	<u>Assistance to Private Sector</u>	<u>Field Advisors</u>	<u>Total</u>
I. <u>Staffing Of Extended Services of Present Consultants</u>				
DGWRD	5	3	16	24
DGFC	<u>2</u>	<u>0</u>	<u>8</u>	<u>10</u>
Subtotals	7	3	24	34
II. <u>Other Consulting Services</u>				
Water Users Associations	3	0	0	3
Training Advisors	<u>2</u>	<u>0</u>	<u>0</u>	<u>2</u>
Subtotal	5	0	0	5
III. Total Technical Assistance Personnel Proposed				<u>39</u>

10. Training

Training has been an important, and the most successful, element under the Sederhana Program. It has been focused on three target areas under the first loan: (1) irrigation engineers working in provincial or central government Public Works offices, (2) agriculturists working in provincial or ministry offices, and (3) farm leaders of Water Users associations. Training has taken place in Indonesia through short courses and on-the-job training, and overseas through training/observation tours in Taiwan, the Philippines, and the U.S. The short courses range in length from two weeks to six months and have included: project planning and design, construction and supervision, irrigation and maintenance, irrigation water management, and water user association leader training.

The on-the-job training has been provided by the Consultants. In each province a demonstration subproject has been selected on which the consultants work with local public works staff on the complete design package including the surveys. On some of these demonstration subprojects there was an Indonesian engineering consultant who worked with the provincial public works staff. The Consultants farm irrigation advisors worked with the staffs of local consultants and instructed them in the proper design of tertiary irrigation works.

This training will be continued and expanded under Sederhana II. More emphasis will be placed on short courses for construction inspectors including such courses as concrete and masonry construction, soil mechanics, field modifications, and contract administration. Increased emphasis will be put on training in surveying and drafting, mapping, design, operation and maintenance, and hydrological analysis.

Surveying was a major problem in Sederhana I and this problem area will be carefully reviewed in Sederhana II. Under Sederhana II the Consultants will assist in implementing upgrading programs, in surveying and drafting at the Public Works Training Centers in Medan, Bandung, Yogyakarta and Ujung Pandang. This will include a combination of technical assistance to the training center and providing training in the U.S. for the teaching staff. In addition to training an assessment of the need for surveying equipment will be undertaken.

The Indonesian private engineering sector plays an important part in the Sederhana Program. Most of the survey and design work for the Sederhana systems has been done by local consultants. There is a great need to help these local firms to upgrade their staff. Grant and/or loan funds as well as technical assistance will be provided to the GOI to enable it to offer local engineering firms short courses in surveying and design of irrigation systems.

The present on-the-job training by the Consultant in tertiary design has proven to be very effective with both the GOI and the local engineering firms endorsing. This program should be continued, and in light of the GOI's Special Tertiary Program, possibly expanded. If so the consultant's staff should be expanded in order to provide greater assistance to local engineering firms doing the design of tertiary irrigation systems.

The Surabaya Training Center is Public Works' main institution for training in the operation and maintenance of irrigation facilities.

A technical training advisor attached to this Center will review the needs for technical training and propose a comprehensive training program for Public Works personnel working with various aspects of maintenance. This study would be completed during the GOI FY80/81. Components mutually agreed to by the GOI and AID and which are obtainable from in-country sources would be funded 50% by the GOI and 50% from the AID loan. Equipment and supplies purchased from the US or 941 countries would be funded 100% from the AID Loan.

The DepAgr is responsible for the training of local farmers in the operation and maintenance of tertiary and on-farm irrigation systems. Technical Assistance will be provided to assist and assess the farmers' training requirements. This TA shall be coordinated with that provided to Public Works, and will provide a training program to be considered by the GOI for funding during the IFY 80/81. Components of this program which are mutually agreed upon by the GOI and AID and which are obtainable from in-country sources would be funded 50% by the GOI and 50% from the AID loan. Equipment and supplies purchased from the US or 941 countries would be funded 100% from the AID loan.

Another important element of the training program funded under Sederhana I has been the training/observation tours of agriculturist and irrigation engineers to Taiwan and the Philippines. This program will be continued through the present GOI fiscal year, but the need for such training will be assessed annually.

There are no plans for long term training or short term Stateside training under Sederhana II during the GOI FY 78/79 and the need for such training will be reviewed annually.

B. Economic Analysis

The economic evaluation of Sederhana I¹⁾ clearly indicates that this type of project is economically viable in the Indonesian setting. Even by 1976-77, the first subprojects to reach "maturity" were "already yielding a return sufficient to cover the social opportunity cost of both labor and capital." As the production of rice from these "mature" subprojects expands with improved technology and increased sawah brought under production, so the return becomes even more favorable. Taking all of the subprojects funded in fiscal years 1974-76 and assuming that only a reasonably attainable level of land development and transformation is achieved, these subprojects are expected to cover the social opportunity cost of all of the invested capital and still provide for "a relatively high labor opportunity cost."²⁾

Sederhana II is a continuation of Sederhana I but utilizing the skills developed and knowledge gained from Sederhana I. As a result, the returns will probably be even more favorable. For example, the selection of subprojects will be more systematic, something not possible in the first years of the Project. In addition, GOI policy has changed towards favoring an integrated approach to infrastructure development, including support of farm-level works, access roads, and land transformation. The early subprojects emphasized only the development of the major irrigation works. As a result, the benefits under Sederhana II will be realized more rapidly and will include additional social benefits. Finally, with the experience gained in the survey and design of subprojects and with increased emphasis on coordination between the design engineers, the provincial subproject engineers, the foreign consulting engineers, and the farmers in the subproject areas, the improved designs and implementation procedures will result in a substantially longer expected life for subprojects.³⁾

1) Clive Gray, "Economic Benefit-Cost Analysis of Irigasi/Reklamasi Sederhana", Evaluation of Irigasi/Reklamasi Sederhana, Section IV, May 22, 1978.

- 2) If only the actual level of benefits achieved at the time of the survey for the evaluation are considered and no further land development is assumed, then the subprojects cover the social opportunity cost of capital invested through 1978/79 but do not provide a return to labor. The land transformation that has already taken place since the survey indicates that the benefits will be substantially greater than this.
- 3) The economic evaluation of Sederhana I assumed that each subproject will last only 5 years with 100 percent replacement of facilities at that time.

a. Scope and Cost of Sederhana II

Sederhana II is expected to comprise the following inter-related activities:

Activity	Implementing GOI Agency	No. Subprojects	Area Covered (1,000 ha)
1. Improve major works of existing subprojects.	DGWRD	275	95
2. Construct farm level irrigation/drainage for existing subprojects and other GOI projects.	DGWRD	369	360
3. Construct both major works and farm level systems for new subprojects.	DGWRD	375	150
4. Construct farm level irrigation/drainage systems for existing subprojects where the design work is already complete or in progress.	DGFC	225	90
5. Construct farm level irrigation/drainage systems for existing subprojects under 200 ha that do not qualify under (2) above).	DGFC	160	20

The above activities cannot be strictly added as the farm-level irrigation/drainage systems of activity #1 will be constructed as part of activities #2, 4 and 5. Hence, the total gross area expected to be covered by GOI under Sederhana II is about 620,000 ha, comprising 245,000 ha with new or improved major works and 620,000 ha with farm level irrigation/drainage systems. However, it should be noted that it is more likely that something significantly less than this will be actually achieved.

In all cases, the cost of previous investments in irrigation facilities is considered sunk and correctly ignored in this analysis. As a result, the concern is with a comparison of the incremental benefits and costs associated with the proposed activities.

For the purpose of this analysis, the cost of Sederhana II is as follows:

Fiscal Year Beginning April 1	FUNDING			Total
	USAID	GOI	Farmers	
	(US\$ million)			
1978	10.3	57.4	.7	68.4
1979	48.4	69.7	5.0	123.1
1980	55.7	72.6	7.5	135.8
Total	114.4	199.7	13.2	327.3

This is based on the financial projections detailed elsewhere (Part IV A) and includes the 10 percent contingency for fiscal years 1979 and 1980 but excludes the effect of inflation. The effect of inflation on the cost of Sederhana II is not considered as all benefits and cost are expressed in terms of 1978 US dollars. It should be noted that the above costs include the cost of technical assistance training programs, assistance in the formation of water user associations, and land transformation as well as the cost of constructing the major works and farm level works.

b. Assumptions Used in Analysis

As is usual in such an analysis, numerous assumptions are made regarding the magnitude, impact and timing of the expected benefits and costs. As a result, it must be cautioned that the analysis represents only a best approximation of what is expected to materialize given the knowledge available at the time of the analysis. To claim otherwise would be in error.

1. Scope of benefits. The only benefits included in this analysis are those associated with increased rice production. This results in a significant understatement of the full social benefits of Sederhana II. For example, it ignores the fact that upland crops may be grown on the sawah during the dry season where insufficient water is available for rice but sufficient is available for less water demanding crops, such as peanuts, soybeans, tobacco, and vegetables. It ignores the

fact that livestock production is closely integrated with crop production at the farm level through the utilization of crop wastes; increased crop production will lead to increased livestock production. It ignores the secondary income and employment generation effects of increased crop and livestock production, particularly that associated with the marketable-surplus production. It ignores the secondary social benefits associated with (a) improved access to villages as a result of subproject construction activities, (b) increased income levels and the effect of this on improved well-being, (c) the educational and motivational effects of increased extension support for water management and crop production, and (d) the integrating effect of such infrastructural development on the village into a larger politico-socio-economic sphere.

2. Expected Increase in Rice Yields. GOI policy is to provide agricultural extension support to subproject areas once they became functional. As a result, these areas can be expected to achieve the average national yield of rice using intensive (BIMAS) production methods for equivalent-type irrigation systems (semi technical systems) at the time of reaching full agricultural benefits⁴). The expected increase in rice yields under various levels of irrigation system development is as follows:⁵)

Previous Land-Use Condition	Condition Achieved under Sederhana II	Previous Yield	Expected Yield under Sederhana II	Yields Increase	Increase
(Kg of unhulled, undried rice)					
1. Village-irrigated sawah	semi-technically irrigated sawah	3825	4193	368	10
2. Rainfed sawah	"	3052	4193	1141	37
3. Rainfed sawah-upland rice	"	2739	4193	1454	53
4. Undeveloped land	"	0	4193	4193	-

- 4) The evaluation report used the average national yield of rice weighted by the actual production methods for village (simple) type irrigation systems. This is satisfactory where subprojects are in the early stages of generating agricultural benefits but will understate the rice yield once full agricultural benefits of subprojects is achieved.
- 5) These increases are directly from the Central Bureau of Statistics (CBS) data reported in the evaluation report (Table IV-5). These data are for all of Indonesia and are from the nationwide crop cutting survey. The weighted average yield for all areas is used for the previous condition as well as for the Sederhana II yield.

For the purpose of this analysis, it is reasonable to use these incremental increases in rice yield as a measure of the probable impact of Sederhana II. In the case of the farm-level irrigation/drainage systems, the incremental increase in rice yield is assumed to be the difference between the yields under village and semi-technical irrigation systems. This permits those subprojects already achieving yields significantly higher than village irrigation systems to be offset against those that are significantly less.

3. Area Expected To Actually Achieve Increased Rice Yields. This is, perhaps, the most difficult estimate to make in this analysis. To begin with, it is safe to assume that the GOI will not be able to achieve the full area of farm-level irrigation/drainage system development that is expected (and already indicated). But what is a reasonable estimate of the gross area to be covered? Based on the achievement of Sederhana I and allowing for an increase in implementation capacity under Sederhana II, it is estimated that approximately 80 percent of the expected area will actually be covered; that is, about 500,000 ha. In the case of the major works, DGWRD does appear to already have the capability of achieving the expected area. Hence the gross area of 245,000 ha is not adjusted.

The gross area, however, does not necessarily represent cultivated sawah. In fact, the evaluation of 517 Sederhana I subprojects begun between 1974/75 and 1976/77 indicates that only about 82 percent of the gross area will actually be converted into sawah over time. Applying this proportion to the expected actual gross area for Sederhana II gives the following estimate of net potential realizable sawah:

Area subject to major works and farm level construction	= 200,000 ha
(245,000)x(.82)	
Area subject to only farm-level construction	= 210,000 ha
(500,000 - 245,000)x(.82)	
	410,000 ha

This net area must be further adjusted as follows:

Previous land-use condition	% of net potential realizable sawah
Irrigated sawah - double cropped	9
- single cropped	24
Rainfed sawah	27
Dry arable (upland)	12
Grass-land or bush-land (alang-alang)	13
Forest	10
Swamp and marshland	5
Total	100

These are the same proportions as experienced by the 517 Sederhana I subprojects surveyed for the evaluation.

Land Use Condition	Expected Rice Production (1,000 M.T.)		Change
	Without Sederhana II	With Sederhana II	
<u>Area subject to major works and farm-level works construction</u>			(+848)
Irrigated sawah - double cropped	138	1,124	+986
- single cropped	184	277	+ 93
Rainfed sawah	165	0	-165
Upland crop land	66	0	- 66
Undeveloped land	0	0	0
<u>Area subject to farm level instruction only</u>			(+674)
Irrigated sawah - double cropped	214	1182	+968
- single cropped	291	289	- 2
Rainfed sawah	262	0	-262
Upland crop land	30	0	- 30
Undeveloped land	0	0	0
Total	1350	2872	1522

As shown, the expected gross increase in rice production is 1.52 million metric tons (unhulled undried basis) as a result of Sederhana II. Using a conversion ratio of 85 percent between wet and dry paddy (gabah) rice⁶⁾, gives an expected gross increase in rice production of 1.29 million M.T. (unhulled dry basis) as a result of Sederhana II. Since this represents the increase in rice production standing in the sawah, not all of this rice will actually be available for increased consumption because of losses in harvesting, threshing, hauling, milling, and storage. In addition, some is used for seed. Allowing 12 percent of the gross to cover all of these factors gives a net increase in rice production of 1.14 million M.T. (unhulled dry basis).

6) Quoted by Clive Gray from BPS "Daftar Konversi". The estimated increase in dry basis terms is preferred because paddy rice produces joint products, milled white rice and bran, each with its own value. Later, however, only the price of milled rice is used to derive the unit price of rice. Hence, the value of the increased rice production is underestimated.

5. Value of Increased Rice Production⁷⁾ The social value of additional rice production in Indonesia is the foreign exchange cost of equivalent imports thereby averted. The long-term world market price (discounting general price inflation) for the standard quality of rice imported by Indonesia is estimated as \$330/M.T. f.o.b. Bangkok or \$350/M.T. c.i.f. Jakarta. At the prevailing exchange rate (Rp. 415/\$1.00), this translates to a c.i.f. price of Rp.145 per kilogram (milled basis). However, if the purchasing power parity formula were used to convert the import price to rupiah, then the price would be 30-40 percent higher.⁸⁾

The c.i.f price can be converted to an equivalent value for dried paddy rice at the farm level of Rp.85.5 per kilogram. This is based on the price margins decreed for official rice marketing agencies starting February 1, 1978 where the ratio between the wholesale price of milled rice and the price of unhulled rice delivered to village stores is 1.00/0.59. Applying this price to the increase in rice production of 1,138,000 M.T. gives a value of Rp. 97.3 billion. From this value must be subtracted the cost of inputs used in achieving this increased production. Using the BPS average ratio of inputs to sale value of wet land rice in Indonesia of 0.075⁹⁾ gives a value of Rp.90.0 billion.

The additional labor used in producing this rice does have a social opportunity cost. Because of the tremendous variation throughout Indonesia in the return to alternative employment opportunities and the value placed on the disutility of working, it is very difficult to even roughly estimate the social opportunity cost of this labor. Nevertheless, a cost of Rp.300 per man-day may be used as an indication

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- 7) The assumptions used in this section parallel those of Clive Gray, Op.Cit. A more detailed discussion of the assumptions is available in the above reference.
- 8) This represents the amount by which Indonesian prices have risen faster than the weighted average price level applicable to Indonesia's trading partners since 1972 and is one indication of the degree to which the rupiah is overvalued.
- 9) BPS, Survey Pertanian, January-April 1976, p.27. This cost includes all production costs except labor and taxes.

of the social opportunity cost of this labor. The amount of labor employed in the production of one ton of dry stalk paddy on irrigated sawah in Indonesia is estimated to average about 83 person-days.¹⁰⁾ Applying these two values to the total increase in rice production gives a total social opportunity cost of labor of Rp.32.1 billion. This possibly overestimates the cost by up to Rp.1.7 billion because 68,000 M.T. (unhulled dry basis)¹¹⁾ comes from increased yields on pre-existing irrigated sawah where the total labor input will probably not change except for harvest labor. Also, the labor input per ton of rice currently produced on rainfed sawah and upland land will probably drop once the land is converted to irrigated sawah.

6. Timing of Net Benefits. The net benefit of Sederhana II when the full agricultural benefits are being realized is conservatively expected to be about Rp.52.9 billion.¹²⁾ It is assumed that the pre-existing area in sawah (both rainfed and irrigated) will begin to produce full benefits as soon as the construction activities are complete. This area amounts to 310,000 ha and accounts for Rp.8.6 billion of the full agricultural benefits.¹³⁾ The remainder of the full benefits, Rp. 49.3 billion, are derived from land requiring land transformation. It is assumed that one-half of these benefits will be obtained in the first full year after construction activities are complete and the remainder will be added equally over the following two years. It is further assumed that these benefits will be derived throughout the year so that the actual time fixed for the receipt of benefits is the middle of the year.

In summary, the net benefits are assumed to flow as follows:

Construction Activities	Increased Agricultural Production		
Start benefits	↑	End of Year 1	↑
	Rp. 8.6 b.	Rp. 8.6 b.	Rp. 8.6 b.
	+Rp.24.5 b.	+Rp.37.0 b.	+Rp.49.3 b.
	<u>Rp.33.1 b.</u>	<u>Rp.45.6 b.</u>	<u>Rp.57.9 b.</u>

- 10) Based on a study by Prabowo-Nyberg-Sardi and quoted in Clive Gray, op cit.
- 11) That is the increased production (368 kg/ha) from 46,000 hectare of double cropped sawah and 124,000 hectare of single cropped sawah that will be upgraded as a result of Sederhana II.
- 12) This is derived by adjusting the expected value of the net increase in rice production (Rp.97.3 billion) for purchased input costs (Rp.7.3 billion) and the social opportunity cost of the labor (Rp.28.3 billion).
- 13) The associated increase in rice production is 239,000 M.T. (unhulled wet basis) or 179,000 MT (unhulled dry basis) after allowing for all losses with a gross value of Rp.15.3 billion.

7. Timing of Capital Costs. It is assumed that all of the construction involving major works will be funded in only one budget year and that the construction will be completed within 12 months.¹⁴⁾ This means that the actual time fixed for the payment of costs is in the middle of that year.

The construction of the farm-level works and the land transformation work are assumed to follow by one year the construction of the major works. In some cases, these activities may be concurrent with the major works whereas, in other cases, they may be delayed; these effects are assumed to balance out. By assuming that these activities will be funded in only one budget year and that they will be completed within 12 months means that the actual time for the payment of these costs can be fixed at the middle of that year.

The remaining costs - Rp.9.6 billion for water user associations, technical assistance, training, and equipment - are assumed to be allocated between the two construction periods in proportion to the costs in each year (40:60). Converting the costs (shown earlier in this section and in annex) to rupiah gives the following timing of costs:

	Construction of Major Works		Construction of Farm-Level Works and Land Transformation	
Start Costs		End of Year 1		End of Year 2
	Rp. 50.0 b.		Rp. 76.2 b.	
	+ Rp. 3.8 b.		+Rp. 5.8 b.	
	Rp. 53.8 b.		Rp. 82.0 b.	

8. Life of Facilities. The experience of Sederhana I indicates that the headworks structures, particularly gabion weirs, must be replaced after several years. However, the rest of the system only needs major rehabilitation if the regular maintenance of the system is allowed to lapse for an excessive period. For the purpose of this analysis it is very conservatively assumed that all of the capital costs, including the non-construction components, must be replaced after providing 7 full years of services; that is, in the eighth year. A more realistic estimate of 50 to 100 percent longer than this is not used because it is assumed that the regular costs of operations and maintenance make up the difference.

14) This is a simplifying assumption that facilitates the computation of the internal rate of return without affecting the validity of the results. It might be noted that if the construction is delayed, it is further assumed that the weighting of costs are such that all of the costs are actually paid on average 6 months before construction is complete.

8. Calculation of Net Benefits. The stream of net benefits associated with Sederhana II is as follows:

Year	Benefits (Rp. B)	Costs (Rp.B)	Net Benefits (Rp.B)
0	-	53.8	- 53.8
1	-	82.0	- 82.0
2	33.1	-	+ 33.1
3	45.6	-	+ 45.6
4	57.9	-	+ 57.9
5	57.9	-	+ 57.9
6	57.9	-	+ 57.9
7	57.9	-	+ 57.9
8	57.9	-	+ 57.9
9	57.9	135.8	- 77.9
10	57.9	-	+ 57.9
etc			

9. Internal Rate of Return. Discounting the stream of net benefits associated with Sederhana II gives an internal rate of return to the total direct capital outlay of 29 percent. This far surpasses the 15 percent social cost of capital often applied to capital investment projects in Indonesia.

10. Benefit-Cost Ratio. Discounting the stream of benefits and costs at the 15 percent social cost of capital gives a net benefit-cost ratio of 1.69:1.00. It also gives a net present value to Sederhana II of Rp.125 billion (that is, the present value of benefits, Rp. 307 billion, less the present value of costs, Rp. 182 billion). The payback period using this discount rate is between 5 and 6 years from the date of the first construction.

C. Conclusion

With an internal rate of return of 29 percent, Sederhana II appears to provide a favorable return to invested capital. This is almost double the social cost of capital. It should be emphasized that this analysis has used relatively conservative estimates and assumptions in almost every case. Hence, it is considered that this rate of return probably understates the actual likely return associated with the increased rice production. If the secondary income, employment, and various social benefits are also included, then the full social return to capital can be expected to be substantially higher.

D. Administrative Feasibility

1. GOI Organization

Two GOI Ministries are directly involved in the implementation of the Sederhana Program: the Ministry of Public Works, and the Department (Ministry) of Agriculture. In addition, the Ministry of Interior plays an important but indirect role through the local governments involved in the program. The BIMAS organization and cooperatives also play supportive and highly complementary roles. See Annex H.4 Chart 1 for a presentation of the organization and function of Central Government agencies involved in the Program.

Within the Ministry of Public Works, the Directorate General of Water Resources Development (DGWRD) is responsible for the Sederhana Program. The DGWRD is responsible for overall planning, organization, coordination and program progress monitoring and evaluation of the Sederhana Program. The DGWRD further exercises budgetary control over the Public Works portion of the Program including the budgets of the Provincial Public Works offices. The DGWRD has been active over the past four years in developing: (1) selection criteria; (2) subproject proposals; (3) standards; (4) design criteria; (5) operation and maintenance procedures; (6) program progress monitoring procedures; and (7) a system for evaluation. The DGWRD also provides assistance in: (1) survey; (2) planning; (3) design; (4) construction; and (5) operation and maintenance assistance to Provincial Public Works Offices to deal with difficult, complex and/or unusual problems which arise during implementation of individual subprojects. The organization of the Ministry of Public Works and the DGWRD are shown on Chart 2 and 3 in Annex G.

Within the DGWRD, the Chief of the Construction II Division of the Directorate of Irrigation, Ir. Mamad Ismail, is the project manager for the Sederhana Program. He and his superior, Ir. Oesman Djojoadinoto, were designated by BAPPENAS as the authorized representatives of the GOI for the implementation of the Ministry of Public Works responsibilities under the Sederhana I Loan Agreement. It is assumed that this authority will continue. Ir. Mamad has a Jakarta-based professional staff of 18 engineers and his Division is organizationally divided into one administrative and three geographical subsections.

The Directorate of Planning and Programming within the DGWRD also plays a supportive but quite active role in the implementation of the Sederhana Program. This office has been heavily involved in: (1) establishing selection criteria; (2) selecting subprojects and providing any economic analysis required; (3) subproject program progress monitoring; and (4) evaluation.

However, the primary implementing agencies for Sederhana subprojects within the Ministry of Public Works are the 24 Provincial and Section (Kabupaten) Public Works Offices. They are responsible for: (1) survey; (2) planning; (3) design; (4) construction, including contracting and supervision; and (5) operation and maintenance of the major works (weir, primary and secondary canals, major structures, etc.). Recently, they have been given the additional responsibility by the GOI to survey, design and construct the terminal irrigation/drainage systems for all irrigation schemes including Sederhana subprojects. Within the provinces, the lowest level of irrigation administered by the central government is the Section. The Section Irrigation Chief reports to the Provincial Chief of the Water Resources Division who reports to the Chief of Provincial Public Works, and he, in turn, reports directly to both the Provincial Governor and to the Central Ministry of Public Works. A typical Provincial Public Works organization chart is shown as Annex H.4 Chart 4.

Within the Department of Agriculture, the Directorate General of Food Crops (DGFC) is responsible for the Sederhana Program. The DGFC is responsible for the overall planning, organization, coordination and program progress monitoring and evaluation for the farm-level implementation of the Sederhana Program. This includes land clearing, land leveling, paddy field formation, the formation of water-user associations and, on an interim basis for this project, the construction of some terminal irrigation/drainage systems. The DGFC further exercises budgetary control over the agricultural portion of the program including the budgets of the provincial agriculture services.

Within the DGFC, the Chief of the Sub-Directorate of Land and Water Conservation, Ir. Otje SR Bratamidjaja, is the project manager for the Sederhana Program. He has a Jakarta-based professional staff of 15.

Within the Department of Agriculture, the Agency for Agriculture Education, Training and Extension (AAETF) plays a key supporting role to the activities of the DGFC. This Agency is responsible

for all extension and training in connection with the formation of water-users associations, water management, operation and maintenance of the terminal distribution/drainage systems, and the BIMAS/INMAS programs. Within this Agency, Mr. Sukandar Witiatmadja, MA., Chief of Education, is the project manager. Both Ir. Otje and Mr. Sukandar were designated by BAPPENAS as the authorized representatives of the GOI for the implementation of the Ministry of Agriculture responsibilities under the Sederhana I Loan Agreement. It is assumed that this authority will continue.

The provincial kabupaten and kecamatan agriculture services are the primary implementing organization for the farm level activities. These activities include: (1) contracting for land clearing and land leveling (where necessary); (2) contracting for the design of paddy fields; (3) providing guidance to the farmers in the formation of paddy fields; (4) contracting for the construction of structures for the terminal distribution/drainage systems which have already been designed by the DGFC; (5) contracting for the design and construction of the terminal distribution/drainage systems for all subprojects under 200 hectares in size; (6) supervising the excavation of the tertiary canals and farm service ditches; (7) formation of water-users associations; (8) training of key farmers in on-farm water management; (9) training of key farmers in the operation and maintenance (O&M) of the terminal distribution/drainage systems; and (10) extension services related to the BIMAS/INMAS programs. Chart 6 of Annex H.4 is an organization chart for the typical Provincial Agriculture Service.

The Ministry of the Interior is responsible for several activities related to the Sederhana program through its close connection with the local governments involved. It is expected that the local government officials, i.e., Village Chiefs, Camat and Bupatis will: (1) sign off on new project proposals submitted to the DGWRD; (2) be responsible for the formation of water-users associations; (3) organize and pay, if necessary, the labor force required to undertake on-farm work such as the excavation of the tertiary canals and farm service ditches; and (4) ensure that the water-users associations are operating and maintaining the completed terminal distributional/drainage systems. Some provinces have provincial irrigation committees which are chaired by the Governor and have as members the various provincial agencies concerned with irrigation programs. Similar committees have often been established at the Kabupaten (chaired by the Bupati), Kecamatan (chaired by the Camat), and Village (chaired by the Lurah) levels. These irrigation committees provide coordination

at the level concerned. The provincial Sederhana Program organization all the way down to the farmer, including these irrigation committees, is contained in Annex H.4, Chart 7

2. GOI Institutional Capability to Implement the Project

The GOI Sederhana Program with emphasis on the construction of the major irrigation works is now in its fifth year of implementation and the GOI programs for on-farm development are about two years old. Both of these components have been the subject of a recent comprehensive evaluation, the results of which are quite positive.

While the initial program targets were perhaps overly optimistic, nevertheless, substantial achievement was attained as described in Part II A above. It is important to emphasize that the progress of Sederhana I should be measured in terms of project purpose achievement, and not in terms of AID reimbursements. Sederhana I underwent the usual start-up difficulties and a number of administrative adjustments had to be made to facilitate the achievement of its stated objectives. The various GOI agencies involved have benefited from the experiences gained during Sederhana I. This includes among other things: (1) procurement; (2) awarding of contracts; (3) review of surveys and designs; (4) construction supervision; (5) working with farmers and consultants; and (6) the AID reimbursement procedures.

The evaluation team's general impression was that both the provincial and central government staffs assigned to the Sederhana Program are on top of the situation and that the lines of responsibility and administration as outlined above are fairly clear and are functioning smoothly. In their oral presentation to USAID, they indicated in particular their favorable impression of the secondary echelon staffs involved when compared with other LDCs. The technical assistance consulting team has also reported significant administrative and management improvements over the past two years.

During Sederhana I, considerable staff training has been carried out by both DGFC and DGNRD provincial and Jakarta-based staffs. This training can be summarized as follows:

<u>Type of Training</u>	<u>No. from DGWRD</u>	<u>No. from DGFC</u>	<u>Total</u>
US-Third Country	10	11	21
Third Country	52	50	102
In-Country	236	650	886

In addition, 950 farm leaders have been trained in-country by the Department of Agriculture in the organization of P3As and the operation and maintenance of terminal distribution systems. The training programs will be continued and expanded under Sederhana II as described in Part III A.10 above.

The technical assistance under the proposed project will also be expanded, and in the case of the DGWRD, the Consultants will be assigned to provinces on a decentralized basis more consistent with DGWRD's administrative demarcations. They will be expected to become more directly involved in all phases of project implementation, thus increasing the pool of available skills and enhancing the transfer of working know-how. In addition, the Consultants to both Departments will be required to undertake intensive Indonesian language courses to increase their effectiveness in working at the local level. The proposed technical assistance is described in Part III A.9 above.

For both the DGWRD and the DGFC, the Sederhana Program is just a small component of their respective overall programs for irrigation and agricultural development. The DGWRD has a total staff of 320 in Jakarta and 3423 in the provinces and an annual budget of Rp. 250 billion. The DGWRD staff assigned to the Sederhana program is 36 in Jakarta and 350 in the provinces and the annual budget for design and construction of major works and terminal irrigation systems for the Sederhana program is approximately Rp 25 billion.

The proposed project has a major role for the Department of Agriculture, particularly as it relates to: (1) the construction of on-farm delivery systems for approximately 110,000 hectares from Sederhana I as part of the Complementary Tertiary Program; (2) the formation, training and on-going guidance of P3A's; (3) in landclearing, landlevelling and guidance to the farmers in paddy field formation; and (4) the BIMAS/INMAS programs. As the Department of Agriculture extension agents often have the closest ties to the peasantry and the best understanding of the agricultural and irrigation dynamics of village economies, they have exercised a useful intermediatory function between target communities and the governmental bureaucracy. Its approach to forming water users associations, which encourages flexibility and water-user initiative and participation, can be contrasted to the top-down, heavy-handed approach used by other government departments in forming rural cooperatives. Recently it convened a national meeting of local leaders of P3A's from 14 provinces designed to elicit views for future politics. A sociological component will be added to Sederhana II to assist in the further development of P3A's for the explicit purpose of building-in flexibility to adjust to diverse local conditions.

In the future, as mandated by central decrees, the DGWRD will be more directly involved in completing systems started in the past and in constructing tertiary works. This expanded role has both potential gains and shortcomings. The benefits should come from the greater responsibility demanded of both the DGWRD and its contractors in future construction activities to ensure that water does in fact reach the cultivators. By being responsible for design and construction of complete systems, past problems of coordination and inattention should be reduced. Potential difficulties emerge from the fact that neither the field level personnel of the DGWRD nor the contractors for the most part have demonstrated knowledge of and sensitivity to social, cultural and agricultural parameters, of local irrigation systems.

It is significant, however, that these potential difficulties have already been identified by the DGWRD central leadership. Deliberate administrative steps are already being introduced to ensure that construction work will be better designed and implemented, and there is more cognizance of the interests and needs of the intended beneficiaries. These steps include: (1) increased technical assistance and training extended not only to the GOI, but even to the private sector survey and design firms; (2) increasing the funds available for preliminary analysis and design; (3) adding an extra year of planning prior to project implementation; (4) requiring that specific persons in the executing groups be held responsible for the work undertaken; (5) requiring that all contractors set up offices in the

provinces where they work; and (6) improving the subproject proposal and selection process. The revisions being made in the subproject selection process will better ensure that subprojects implemented are actually desired by the local populace; are technically, economically and socially feasible and that environmental concerns are considered. Finally, future priorities are being shifted to locations where rain-fed rice fields or rudimentary communal irrigation systems already exist. Such systems will be easier to design and construct and generally the cultivators in these areas tend to be better motivated and more capable of taking the initiative to bring land into more productive use. Therefore, these subprojects will have a quicker beneficial impact and, at the same time, there will be fewer administrative-supervisory demands placed on the executing agencies.

In sum, while there are risks and difficulties because of the size and dispersed character of the Sederhana Program, the demonstrated capacity of the executing agencies and the flexibility of their policies has encouraged the evaluation team and USAID to conclude that the proposed project is administratively feasible.

D. Social Institutional Analysis of the Sederhana Irrigation Program: Phase II

1. Introduction

With the launching of the Sederhana Irrigation Program (IRS) in 1974, the Indonesian government broadened the focus of its irrigation development strategies. Whereas previously capital intensive investment in and rehabilitation of major state operated lowland systems in Java had held center stage, IRS signalled the beginning of a shift to a more decentralized, geographically dispersed pattern of development. The government, in effect, began to give explicit recognition to the important existing and potential role that community irrigation systems have played, and will continue to play throughout its archipelago.

The government strategy is to provide selective inputs, such as improved technologies and technical and organizational training to the communities involved, and where existing systems are non-existent, initiate the construction of major works for the first time. The government does not, however, take responsibility for managing and operating these systems. The inputs are designed, accordingly, to enhance the capacity of the villages involved to extend, maintain and operate their own systems with a minimum of reliance on outside agencies. In contrast to the larger state operated irrigation networks which tend to foster dependency and which are frequently beset by local maintenance and water distribution problems, IRS attempts to encourage village participation in and control of its own development.

Given these considerations, the three major objectives of IRS appear to be consistent with the general priorities of US development assistance. These objectives are (1) to enhance the institutional capacity of the various parties involved to implement the program, (2) to improve the well being of the rural populace, the majority of whom have low incomes, and (3) to increase agricultural and rice production in Indonesia. In this analysis, a specific effort will be made to indicate the basic links between local institutional capacities to manage irrigation and the achievement of welfare and productivity objectives for the rural populace over time. Since the program being proposed represents the second phase of an on-going effort, the current analysis is derived from a fairly detailed review and study of past activities and proposed modifications.

2. Socio-Economic Landscape -- Socio-Cultural Feasibility

The Sederhana projects will in the future, as in the past, be scattered primarily throughout the less-developed portions of the far-flung Indonesian archipelago. In the past, 80% of the projects were located outside of the island of Java, and within the individual provinces involved (encompassing 24 of 27), they are also geographically dispersed.

The primary beneficiaries of the projects will be the rural agricultural communities (or groups of communities) involved in the rudimentary existing or prospective irrigation systems to be technically/organizationally upgraded or else constructed under the auspices of IRS. For the most part, these are communities that fall in the Government of Indonesia target group for future development activities. If we use the measurement criteria established by the Ministry of Interior to classify villages in terms of their stage of development, 41% of IRS locations fell in the least developed category, 55% in the beginning to develop category, and only 4% in the comparatively well developed category.

From the standpoint of social and economic amenities, educational facilities and accessibility, these IRS communities are also worthy targets of government development activities. Average rice land holdings while larger than in some of the very densely populated regions of Java, are still comparatively low at 0.3 to 1.0 hectare per cultivating household. While precise estimates are not available, it is reasonable to assume that 80% to 90% of the benefitting households fall below the \$150 annual per capita income figures that USAID uses to classify recipients as economically weak. From sample surveys of past project locations, less than 2% of households had electricity, and less than 5% owned motorized vehicles of any type.

The geographical dispersion of project locations, means that IRS encompasses a diversity of cultures, local languages and ethnic groups. It is not possible to treat such diversity in detail here. It is important, however, to address the question of what USAID terms the 'socio-cultural feasibility' of the project, particularly as it relates to the motivation of the households who are expected to participate. Specifically, how compatible are project activities (construction of irrigation structures, development of tertiary delivery

systems, formation of water users associations) likely to be with existing agricultural patterns and the social organization of production?

The importance of raising domestic levels of rice production within Indonesia has meant that both Sederhana I and II emphasize (although not exclusively) the development of irrigated rice cultivation. Delays in achieving these objectives under Sederhana I, in significant measure, resulted from poor selection of project locations that frequently occurred in the very early stages of the program. Local populations often were not consulted prior to project implementation. Given the then prevailing agricultural production/land use patterns and accompanying socio-cultural/organizational forms, intended beneficiaries in a number of locations were uninterested in shifting to wet rice agriculture.

In Sederhana II steps are being taken to ensure that locations where projects will be undertaken are more feasible from a 'socio-cultural' standpoint. Top priority in selecting projects will go to communities/areas with existing simple irrigation systems or where rainfed paddies are present, but where existing indigenous technologies and available knowhow limit the capacity of communities to extend and more intensively irrigate sawahs (rice paddies). A lower level of priority will be assigned to locations currently under dry-land cultivation, although this may often be rice. The changes involved in shifting to irrigated rice production therefore, should be more compatible with prevailing socio-organizational modes.

As a part of the improvements being implemented in selection of projects (see the more extended discussion in the institutional-administrative section), the Irrigation Service is also taking steps to help ensure that the intended recipients do in fact want assistance. For example, in recent pilot efforts in three provinces which will be expanded under Sederhana II, representatives from the communities involved are required to sign formal statements indicating commitments to take on the future development and management of the irrigation systems being constructed. As discussed in the administration section, agricultural service personnel will play a key role in attempting to ensure that community interests are represented in the planning implementation process.

These major alterations in program direction and implementation procedures should help to better ensure that the target populations are interested, willing, and motivated to participate in the irrigation development activities being envisaged for Sederhana II.

3. Local Irrigation Institutional Capacities and Participation

There are a number of characteristics of Sederhana irrigation systems which help to ensure (1) that the local potential for organization and participation is high and (2) that benefits from improvements will be productively and widely shared. These conclusions emerge from detailed analysis of a sample of IRS systems studied as a part of the evaluation of Sederhana I, and field visits to project locations where interviews were held with local cultivators.

First, the IRS systems are small, averaging approximately 200 hectares at the present and 300 hectares when targetted expansion is reached. Second, they tend to be located in hilly or mountainous terrain, often near the upper portions of watershed, and employ hill terracing technologies. Third, they are relatively autonomous--only 30% had upstream systems and 35% downstream systems. The technologies associated with such systems are more likely to facilitate local control and adaptability as well as sensitivity to changes in ecological parameters. Given the small size, relative autonomy and close inter-dependence among the physical units of these systems, there is usually an active perpetuation of community norms which regulate behavior and help to ensure that benefits and burdens are shared in a fashion more equitable than that found in larger systems. In short, since IRS systems are small and largely built around communities, the feedback linkages between inputs and outputs are direct. They facilitate capacity to adjust to changing conditions and needs, and responsiveness to organizational requirements and cultivator interests.

There are, however, a number of needs in the existing or potential systems to be upgraded/constructed under Sederhana II, which if addressed, could lead to higher productivity, a more equitable sharing of irrigation benefits and more effective organizational performance. The perishable nature of the indigenous diversion technologies (earth, stone, bamboo structures) leaves communities vulnerable to sudden flash floods

(banjirs) during monsoon downpours. Eighty percent of the IRS communities (where existing systems were present) had to undertake major repair work at least once during the rainy season. Second, the relatively impermanent character of many of these diversion weirs not only demands considerable labor for maintenance, but also frequently limits the amount and control ability of water than can reach lower lying sections during dry seasons. Third, there is a frequently expressed need to upgrade technologies and knowledge/skills associated with improved water management and distribution. Fourth, while organizational capacity to carry out emergency repair and major seasonal maintenance is high and usually effectively instituted, more ongoing routine upkeep in many locations leaves much to be desired. This often is a consequence of organized procedures that tend to be informal and to leave routine maintenance activities to the discretion of cultivators, particularly at the lower (tertiary and sub-tertiary) levels of the physical system.

The local technological and institutional components of Sederhana II are designed to address these specific needs.

The construction of more permanent works (including masonry weirs, lining of canals, emplacement of concrete division boxes) improves the technological capacity of the systems to deliver water in greater and more controllable amounts. Likewise, the elaboration of tertiary delivery systems facilitates improved water control and water management. The benefits of these changes, in sample Sederhana I locations studied in detail, went primarily to the lower-lying, more disadvantaged portions of local canal networks. In newly created systems, they help to ensure that benefits are more broadly shared from the start.

Second, the formation of water-user's associations and modifications of existing organizational arrangements (where appropriate), are designed to make systems even more responsible to water-users interests, and more efficient in carrying out water distribution and maintenance functions. These organizational activities often occur in the context of more elaborate development of delivery channels. Subvillage groups are formed around distinct physical components of the local irrigation canal network, thereby permitting improved water management and water-user responsiveness.

Finally, training of P3A leaders and contact farmers in improved water management and cultivation techniques has facilitated the switch to more productive and diversified uses of existing water supplies.

In short, if we use detailed evaluation of sample Sederhana I locations as a guide, it appears that the local organizational and technological components of Sederhana II should contribute to achieving overall program objectives. These include increasing agricultural (rice) production and raising cultivator incomes on the one hand, and benefitting the economically disadvantaged portions of systems on the other. Possibly more important, the capacity of the communities involved to participate in and manage the future ongoing development of their own systems, without heavy reliance on outside inputs, is likely to be strengthened.

The previous conclusions, regarding community irrigation institutional capacities however, must also be considered in the context of linkages to external sectors, chief of which is the bureaucracy. (This has been done in the section on administrative feasibility). Future plans call for a much greater involvement by contractors at the terminal farm levels of irrigation systems. It is important that such involvement does not undermine existing and potential capacities of communities to undertake irrigation management tasks. The risk is always that too extensive involvement in the present may generate dependency in the future.

In concluding that future benefits from such involvement are likely to substantially outweigh the risks, therefore, two assumptions are being made; (1) The Department of Agriculture will continue to be active in working with and providing extension assistance to the fledgling water users associations, and (2) The DGWRD field staff in the future will take a more active role in supervising contractors, so as to take better cognizance of the interests of and need for participation by the intended beneficiaries.

4. Beneficiaries

Sederhana II projects will continue to be geographically dispersed throughout the archipelago, and will primarily consist of communities that are on the lesser 'developed' ends of GOI village classification criteria. (See sub-section on Socio-Economic Landscape). These include 375 locations (150,000 hectares) where new projects will be launched, and

754 locations (470,000 hectares) where further work on existing systems will be carried out (either completion or repair and tertiary development). Total direct beneficiaries will be in excess of two million people who live on the more than 4 million rice farms in the subproject areas throughout 24 of 27 provinces and special zones in Indonesia. The multiplier effect on income and employment throughout Indonesia increases the number of beneficiaries substantially.

The question of how benefits are distributed within the local community (or within the irrigation system) is an important one. In many of the major government operated lowland systems rehabilitated under World Bank funding, beneficiaries tend to come from the rural elite, both at the village and subdistrict level. In the Sederhana projects studied in detail, it was noted earlier, those most directly benefitting tended to come from the lower portions of systems which were previously more difficult to irrigate. This observation is not to suggest that improvements initiated under IRS eliminated locational inequalities within systems, but that they tended to narrow gaps. In locations receiving irrigation for the first time, the provision of outside technologies sometimes permits the delivery of water to more distant holdings that indigenous construction cannot reach.

A second consideration of importance is the fact that the percentage of landless households in the more isolated villages which characterize IRS is considerably less than in some of the heavily populated lowland regions of Java. Eighty percent of the IRS communities reported having no or few landless laborers. In only 15% of the villages did landless households equal or exceed the number of cultivating families.

Given comparatively low levels of landlessness, one can assume that the provision of benefits to cultivating households, for the most part, did not exclude any major sectors of the village populace. Moreover, in the 15% of locations where a substantial number of landless households were present, they undoubtedly benefited from (1) direct employment in the construction activities initiated through IRS and (2) increased employment in land preparation, transplanting and harvesting activities -- all group activities, in which landless laborers tend to participate.

Estimates of the economic benefits from Sederhana II -- derived from new land brought under irrigated cultivation and existing land where cropping intensities are being increased, are presented elsewhere. These include (pending completion of Sederhana I projects) an estimated 90,000 man years of direct labor per year from construction activities which generally use labor-intensive methods. They also include employment opportunities generated from the increased production of rice.

In general, since no specific sectors of the local populations appear to be excluded from benefits arising from improved water availability and control, there are no major groups who perceive themselves as negatively affected by project activities. There are, however, situations where specific individuals are required to give up land to be used for the construction of canals and ditches. Also, where villages with existing systems and prior water rights are forced to share their water sources with lower lying villages, inter-village resentments may arise. These, for the most part, can be overcome through processes of local accommodation.

Women have been and will continue to be major beneficiaries of IRS projects, both through additional employment opportunities created in rice production as well as by their role as managers of the domestic household economy. Allowances must of course be made for the differences which arise out of the diversity of cultural regions represented by Sederhana locations, including parts of Sumatra where matriarchal social forms are present.

In general, social relations of production in rice specify major roles for women in the most labor intensive activities -- namely transplanting and harvesting -- for which wages in cash or kind are usually forthcoming. There is a tendency for women to manage food crop production and for men to manage cash crops according to informants. Data from the IRS projects, however, indicate fairly substantial participation by women in non-rice production/income earning activities participated in by men. These include upland cash crops, tree crops and fishing. More exact estimates on the breakdown of employment activities for both men and women are not available from current data. Women do not exercise a major role in irrigation and cultivation decision making processes, although they do hold considerable influence in determining how benefits will be used.

In sum, for the most part, the socio-economic and cultural characteristics of communities involved in the Sederhana program are such to ensure that benefits will be broadly shared, or at least not structurally excluded from specific sectors of the local populace. This is in part a result of the technological and organizational characteristics of the community irrigation systems. The improvements introduced by IRS construction and organizational activities in a number of IRS systems tended to benefit the relatively disadvantaged, when viewed from the standpoint of location within the canal network. Since (1) most of the beneficiaries have per capita incomes that place them in the priority target group as outlined by congressional mandates, and (2) assuming that future IRS activities will strengthen the technological and organizational capacity of communities to develop and operate their own irrigation systems, it would appear that the IRS program is socially sound.

E. Environmental Findings

The IEE for Sederhana II (approved 11/23/76) recommends that the EA be made during the early stages of the project rather than prior to project approval. Therefore the following comments refer to a proposed outline for the EA.

The typical Sederhana II project will have a wide range of environmental impacts. In most cases these impacts will be confined to a relatively small area. In the past the limited area extent of each individual project has been used as an argument against the necessity of doing full EA's for each subproject. Similarly the administrative difficulties of managing over 800 EA's raise questions as to the ultimate utility of the traditional FA procedure. Confronted with these difficulties it seems that the intent of Regulation 16 might be better served by an EA designed to fit the peculiarities of Sederhana II. It is proposed that the following work outline be used in lieu of the traditional FA:

1. A study of the selection criteria to find ways of integrating environmental concerns.
2. A review of training to identify opportunities for incorporation of environmental subjects.
3. A proposal for design of regulations appropriate for the monitoring of small scale development activity.

Such a study, as described above, besides satisfying the intent of Regulation 16 could also become a model that would be useful to the new Indonesian Ministry for Development Control and the Environment which is trying to adapt the EA process to the Indonesian situation.

It is hoped that the new climate of increasing environmental awareness will allow environmental concerns to have more effect on project selection and design in Sederhana II than in Sederhana I, in which environmental concerns were limited to the likelihood of schistosomiasis outbreaks.

PART IV - FINANCIAL PLANA. Cost Estimate

The summary Cost Estimate and Financial Plan (Table I) shows the sources and uses of funds for this project. The total cost of this project as shown is US\$ 364.3 million of which AID has been requested to provide approximately 36% or \$ 129.4 million including \$116.2 million in loan funds and \$13.2 in grant funds. This assistance will be made in installments over the next four years as follows:

<u>FY</u>	<u>Loan</u>	<u>Grant</u>	<u>total</u>
78	25.0	4.5	29.5
79*		3.8	3.8
80*	40.0	4.9	44.9
81*	51.2		51.2
Total	116.2	13.2	129.4

AID's contribution will finance both foreign exchange costs (\$10.0 million) and local currency costs (\$119.4 million). The summary table also includes an allowance for inflation and a separate allowance for contingencies for each project input line item.

Project expenditures by Fiscal Year and funding source over the life of the project are shown on Table II and described below. The estimated disbursements of the grant and loan are shown separately.

1. Major Works

The OI is financing the costs of improving the major works on some 275 existing subprojects. Cost estimates per subproject will vary widely. The general range is from US\$ 5,000 to US\$ 50,000 per subproject. AID will provide only technical assistance to this effort. The new subprojects constructed by the IXWRD will cost an average of \$ 480/ha for the major works and \$ 675/ha if the terminal distribution system is included as one design and construction package. If a short access road is required the average cost should be raised to about \$ 750/ha and if land clearing/land leveling is further required the average costs may increase to between \$1200 - \$1600/ha. AID will reimburse 50% of the contract costs for acceptable, completed subprojects as long as the costs do not exceed the agreed upon flat rate per hectare amount.

2. The Terminal Distribution/Drainage Systems

The cost estimates are based upon an engineering analysis of average costs for design, construction of structures and the excavation of tertiary canals and farm service ditches for a typical 400 ha system. The conclusions

*Only FY 78 funds are to be approved on the basis of this PP. However, further authorizations are projected after FY 78 on basis of a subsequent PP.

reached were that it would require on the average US\$ 24/ha (Rp. 10,000) for design; US\$ 95/ha (Rp. 39,000) for construction of structures and US\$ 120/ha (Rp. 50,000) for excavation of the canals. Based upon a series of discussions with the GOI, USAID has agreed to finance a greater percentage (75%) of the work done on the systems undertaken thru the Complementary Tertiary Program (CTP). This is because the GOI already had funds sufficient to cover the costs of the Special Tertiary Program (STP) and secondly because the bulk of the Sederhana Projects for which USAID has a financial commitment for the major works are included in the CTP. AID will also provide technical assistance and training for both programs.

3. Water Users Associations (P3As)

The costs estimates used in the financial plan are based on the current DepAgr proposal of US\$ 12/ha (Rp. 5,000). However, the recent evaluation pointed out some difficulties that AID will have in reimbursing for this type of activity. USAID and the GOI will thus undertake a further analysis of the costs associated with the establishment of viable P3As. This analysis will serve as the basis for mutual agreement with the GOI on USAID's participation in this activity.

4. Land Preparation

The estimates for the amount and type of land preparation as well as the basis for cost estimates for the three classifications of land clearing i.e. (1) for primary and secondary forests, (2) for grassland and bushes and (3) for upland areas are explained in annex H.2 Table 5.

There are an estimated 30,000 hectares of primary and secondary forests to be prepared to the point where the farmers can make rice fields. The cost will be an estimated US\$ 800/ha (Rp. 336,000). There are an estimated 35,000 hectares of grassland and bushes which will cost an estimated \$330/ha (Rp. 136,000) to bring up to the same level of development. Finally there are approximately 35,000 hectares of upland dry farm areas which will require an estimated US\$ 170/ha to convert to rice field cultivation.

5. Technical Assistance (Grant)

These costs are based on other similar recent AID contracts executed in Indonesia. The TA requirement will consist of 333 person months of long term expatriate advisory services plus 100 person months of short term consultants plus 237 manmonths of Indonesian technical services for a total of 670 manmonths. The total cost per month of services is estimated to be about \$ 9500, for the expatriates including all salaries, housing, overhead, etc and \$ 2300 for the Indonesia advisors. These include a 10% increase per year in costs.

6. Training

In-country training costs are based on costs incurred for similar training during 1977 with 10 percent inflation added. Funds are also included for development/reproduction of training materials including manuals. About 4,300 people will receive training of 2-20 weeks duration. USAID will loan finance 50% of mutually acceptable training. Overseas training costs are based on current USAID training allowances. About 150 people will receive overseas training. The cost estimate includes air travel, per diem and training costs. USAID will loan finance 100% of overseas training.

B. Proposed Methods of Financing/Disbursements

The costs of Sederhana have been divided into two financing categories: (i) traditional direct procurement; and (ii) a combined local-currency advance/reimbursement system.

It is proposed that traditional direct procurement be limited to AID Geographic Code 941 countries plus Indonesia. The major items to be procured in this category are foreign technical advisory services, overseas training, and commodities.

USAID and the Government of Indonesia are in the process of reaching overall agreement on an AID local-currency disbursement system which utilizes both advances and reimbursement principles. Under this system, based on the approved annual Sederhana budget, estimates will be made of projected expenditures over a six-month period and USAID will advance its contribution into a special project account in the Bank of Indonesia. This account will be replenished with additional advances as evidence is submitted that the project account has been drawn down. After subproject completion reports have been received, physical inspections will be made by USAID Sederhana Project Officers (along with DOWRD and Dep.Agr. counterparts) to ensure that the activities have been implemented according to the plans and are functioning as intended. Those subprojects which are found satisfactory will then be converted to reimbursement status. If a subproject has deficiencies noted, local officials will be advised and a subsequent inspection made at a later date. Assuming the deficiencies are then corrected, the subproject will then be converted to reimbursement status. The Government of Indonesia will either substitute a satisfactory subproject or otherwise adjust the project account to remove AID's association with a subproject which remains unacceptable.

TABLE I
 SEDERHANA IRRIGATION II
 Summary Cost Estimate and Financial Plan*
 (US \$ millions)

ACTIVITY	TOTAL	GOI	FARMERS	AID			% AID
				FX	LC	TOTAL	
I. MAJOR WORKS							
a. 95,000 ha. upgrading previous subprojects	10.6	10.6	0	0	0	0	0%
b. 30,000 ha. new sub-project complete Rep. II program	14.4	14.4	0	0	0	0	0%
c. 60,000 ha. new sub-project/yr. for 2 yrs to begin Rep. III program	86.8	43.4	0	0	43.4	43.4	50%
II. SPECIAL TERT. PROGRAM (STP) 360,000 ha.							
a. Design	7.7	7.7	0	0	0	0	0%
b. Constr. of structures	33.5	33.5	0	0	0	0	0%
c. Excavation of canals	43.5	43.5	0	0	0	0	0%
III. COMPLEMENTARY TERT. PROGRAM							
a. Design and Construct 30,000 ha. from IB above.	7.2	1.8	0	0	5.4	5.4	75%
b. Constr. of 90,000 ha. being designed by Dept. of Agriculture	19.2	4.8	0	0	14.4	14.4	75%
c. Design and Construct 20,000 ha. (subproject under 200 ha.)	5.3	1.4	0	0	3.9	3.9	75%
IV. WATER USER ASSOCIATIONS (P3As)							
Organize ^{approx.} 950 P3As on 540,000 ha & construct 100 offices	5.5	2.7	0	0	2.8	2.8	50%
V. LAND PREPARATION							
a. Land clearing and leveling (100,000 ha.)	41.8	20.9	0	0	20.9	20.9	50%
b. Farmer contribution (paddy field formation)	12.0	0	12.0	0	0	0	0

*This plan covers FY 78-81. Only FY 78 funds are to be authorized if this PP is approved. The budget for FY 78 follows on P. 75A. Another PP is projected to provide the FY 79-81 funds.

ACTIVITY	TOTAL	GOI	FARMERS	AID			% AID
				FX	LC	TOTAL	
VI. TECH. ASSISTANCE							
a. DGWRD, Major Works and STP	6.8	0	0	4.5	2.3	6.8	100%
b. DGFC, Comp. Ter. Program	2.9	0	0	1.9	1.0	2.9	100%
c. Selection Criteria and Evaluation	0.3	0	0	0.2	0.1	0.3	100%
d. DGFC/Local Govt./P3A	0.7	0	0	0.5	0.2	0.7	100%
e. DGFC Land Clearing	0.2	0	0	0.1	0.1	0.2	100%
VII. TRAINING							
a. DGWRD	0.9	0.5	0	0	0.4	0.4	50%
b. DGFC/Local Govt/P3A	0.9	0.5	0	0	0.4	0.4	50%
c. Private Sector (Engr. Consultants, surveyors, designers)	0.7	0.3	0	0.1	0.3	0.4	50%
d. Asst. to DGWRD Training Centers	1.2	0.4	0	0.4	0.4	0.8 ^{1/}	67%
e. Asst. to DGFC Training Centers	1.2	0.4	0	0.4	0.4	0.8 ^{2/}	67%
VIII. EQUIPMENT	0.4	0	0	0.4	0	0.4	100%
SUB TOTAL	303.7	186.8	12.0	8.5	96.4	104.9	35%
10% CONTINGENCIES	23.5	12.9	1.1	0.6	8.9	9.5 ^{3/}	
INFLATION	37.1	20.2	1.9	0.9	14.1	15.0 ^{4/}	
	364.3	219.9	15.0	10.0	119.4	129.4	36%

AID Loan and Grant Installments by US FY:

FY	Loan	Grant
78	25.0	4.5
79	-	3.7
80	40	5.0
81	51.2	-
Total	116.2	13.2

NOTES: *Grant Funding

1/ 0.1 is Grant Funding

2/ 0.1 is Grant Funding

3/ 0.7 is Contingency for Grant Funding

4/ 1.0 is Inflation for Grant Funding

Total of starred plus number items equal \$13.2 million.

Budget for Use of FY 78 Funds
(\$millions)

	GRANT	<u>AID</u> LOAN	TOTAL	<u>GOI</u>
I. Construction of Irrigation, major works	0	10.5	10.5	35.5
II. Special Tertiary Program	0	0	0	40.4
III. Complementary Tertiary Program	0	7.6	7.6	2.5
IV. Irrigators Associations	0	1.2	1.2	1.2
V. Land Clearing, Etc.	0	4.9	4.9	4.9
VI. Technical Assistance				
A. DGWRD	2.5	0	2.5	0
B. MOA	1.6	0	1.6	0
VII. Training				
A. DGWRD	0.1	0.2	0.3	0.2
B. MOA	0.1	0.2	0.3	0.2
C. Private Sector	0.2	0	0.2	0.2
VIII. Equipment	0	0.4	0.4	0
TOTALS	<u>4.5</u>	<u>25.0</u>	<u>29.5</u>	<u>85.1</u>

TABLE II
SEDERHANA IRRIGATION II - DISBURSEMENTS BY YEARS (IFYs & US FYs)
(US \$ millions)

May 21, 1978

IFY	78/78			79/80			80/81			81/82			81/82		
	AID	GOI	'Farmers'	AID	GOI	'Farmers'	AID	GOI	'Farmers'	AID	GOI	'Farmers'	AID	GOI	'Farmers'
L	2.6			18.4			32.8								
G	0			6.2			7.0								
	<u>2.6</u>	21.0	0.2	<u>24.6</u>	36.6	1.1	<u>39.8</u>	48.7	1.6	L 40.0	53.7	3.3	L 18.1	45.0	5.3
IFY	82/83			Totals			AID	GOI	Farmers	Project					
L	4.3	14.9	3.5				129.4	219.9	15.0	364.3					
USFY	79			80			81			82			83		
	AID	GOI	Farmers'	AID	GOI	Farmers'	AID	GOI	Farmers'	AID	GOI	Farmers'	AID	GOI	Farmers'
L	9.0			22.1			35.9								
G	1.9			9.2			2.1								
	<u>10.9</u>	35.2	0.7	<u>31.3</u>	38.2	1.2	<u>38.0</u>	49.9	2.0	34.6	48.4	4.0	14.6	48.2	7.1
Totals				AID	GOI	Farmers	Project								
				129.4	219.9	15.0	364.3								

Grant Funding Expenditure Table

USFY	78	79	80	81	Totals
Grant Provided	4.5	3.7	5.0	0	13.2
Grant Expended	0	1.9	9.2	2.1	13.2
Balance	4.5	6.3	2.1	0	---

PART V - IMPLEMENTATION PLAN

A. GOI Implementation/Monitoring

The GOI has developed a monitoring plan for Sederhana I which has been approved by USAID. This monitoring plan will continue to be used for the ongoing Sederhana Program. It will be reviewed by the GOI and USAID and revised as appropriate not later than April 1979.

The responsibility for monitoring the execution of the DGWRD and Provincial Public Works office activities associated with subprojects and implementation events has been given to the Construction II Division under the Directorate of Irrigation within DGWRD. The DGWRD monitoring tasks include: (1) planning and budget preparation, (2) detecting problems and providing needed assistance, (3) assuring that the selection criteria for new subprojects are adhered to, (4) approving plans, specifications and construction cost estimates, (5) assuring that construction is completed according to standards and (6) preparing requests for AID advances and reimbursements. The Directorate of Planning and Programming within the DGWRD will also continue to play an active role in this process as this office has the responsibility for subproject selection and evaluation. The Directorate of Planning and Programming is to explore the possibility for using computer data processing as an integral part of its program progress control system. Advice and assistance in program progress control procedures will be provided by the consultants.

The responsibility for monitoring the execution of the DGFC and Provincial Agriculture Service subproject activities and implementation events has been given to the Sub-Directorate of Land and Water Conservation (SLWC) and the Agency for Agriculture Education, Training and Extension (AAETE). The DGFC monitoring tasks include: (1) planning and budget preparation, (2) detecting problems and providing needed assistance, (3) approving plans, specifications and cost estimates for landclearing, leveling, paddy field formation and the construction of terminal distribution/drainage systems, (4) assuring that all activities including the formation of water user associations are completed in a timely manner according to standards, and (5) preparing requests for AID advances and reimbursements. The consulting team will provide assistance and advice on how to improve the DGFC monitoring system.

B. USAID Monitoring

The principal objective of AID monitoring would be to verify the required documentation for reimbursement, but it would also include normal problem identification and subproject and overall program progress monitoring. Assistance would also be provided upon request to help improve

the GOI program progress control system. Verification will be required to determine to AID's satisfaction that (1) the agreed upon subproject identification and selection criteria are being applied and enforced, (2) that the consultants are providing the necessary technical assistance, (3) that the training programs are sufficient and that they are being carried out effectively and the trainees properly utilized, (4) that the subprojects are built in reasonable compliance with the plans and contract costs submitted to AID for reimbursement, (5) that the subprojects are being utilized to increase rice and other production, and (6) that there is an effective program including sufficient funding for sustained operation and maintenance of the completed subprojects. Sources of information for AID monitoring would include: (1) required AID documentation, (2) regular GOI and consultants reports, (3) site inspections, and (4) close working relationships with the DGWRD, DGFC and local government personnel.

USAID's monitoring staff would consist of two US direct-hire irrigation engineers (on board), one part-time US direct-hire agriculturalist (on board), one full-time irrigation O&M and organizational advisor, assisted by three local hire Indonesian engineers (two on board). This level of staffing is required to adequately manage/monitor a program of this magnitude.

C. Technical Assistance

The expanded technical assistance proposed under Sederhana II is described in Part III A. Experience clearly indicates the need for more technical assistance than was provided under Sederhana I, where a larger TA effort would have probably eliminated many of the problems discussed throughout this paper. The increase in technical assistance for Sederhana II is justified because of the increase in magnitude of the project due to (1) the decision by the GOI to undertake the construction of the terminal distribution/drainage systems, (2) the decision by the GOI to undertake landclearing, land leveling and paddy field design and (3) the provision of technical assistance to the private sector Indonesian survey and design firms.

The technical assistance provided by AID in the Sederhana I Program consists of a loan-funded, host-country contract for 433 man months of services over 33 months with a US-Taiwan-Indonesian joint venture. The GOI is in process of extending this contract for one year to provide an additional 180 man months of services up to July 1979. Depending upon how the current round of negotiations turns out, the GOI will decide by January 1979 whether they will elect to further extend this contract under Sederhana II or opt for competitive selection of another firm.

The GOI has expressed satisfaction with the technical assistance they have received from the present consultant. However, there has been

some friction over the local logistical and administrative support provided. AID hopes to eliminate such friction by using grant funding for technical assistance. The grant-financed contract will cover all foreign exchange costs and local currency costs for housing, utilities and in-country, job related personal expenses of the consultants on a reimbursable basis with amenities and local support provided at a level comparable to USAID direct-hire personnel. However, even with grant-funding, the GOI will continue to provide office space, office equipment, office supplies, local office personnel, operation and maintenance costs for vehicles. The GOI will also procure the consultant's vehicles with loan funds.

The GOI prefers the host-country contract arrangement because it wants the consultants to work directly for and with them, and, in effect, be an integrated extension of its own Sederhana Jakarta and field office staffs. However, it has expressed a desire to split the contract and to procure the evaluation and the water users association development and training advisory services from a non-engineering firm or through PCSs.

D. Training

The proposed training program is described in Part III.A.10. The emphasis will be placed on improving the GOI's in-country training programs and training for (1) irrigation engineers working in provincial or central government public works offices, (2) agriculturalists working in provincial or central government agriculture services, (3) key-farmer leaders of water-users associations and (4) the private sector staffs of Indonesian engineering consulting firms. In addition to this heavy in-country training, there will be a series of training/observation tours of Sederhana agriculturalists and irrigation engineers to nearby Asian countries. There are however, no present plans for long-term or U. S. training. If the training advisors later recommend such training it may be proposed for the second or third installments under the project. The training advisors will be tasked with reviewing and updating the existing GOI training plan approved by USAID.

E. Reimbursement Procedures for Local Currency Costs

When a contract is completed for each discrete activity for each subproject approved for reimbursement under the loan, the GOI may at its convenience submit to USAID a request for reimbursement of the agreed upon percentage of the prior agreed cost. It is planned that by June 15 of each year, the GOI will have submitted to USAID for reimbursement for all work contracted for in the previous fiscal year and USAID would endeavor to respond positively to these requests within 30 days of receipt but in no case would the delayed response exceed 90 days.

The request for reimbursement for the physical infrastructure activities including land preparation and water users association offices would include; (1) a certification that the described work has been completed on a Sederhana subproject, selected in conformity with the agreed upon Selection Criteria, in accordance with the plans and specifications attached, (2) a cost estimate based on the plans and specifications, (3) the Consultants certification of satisfactory completion and (4) and O&M plan for the entire system. Requests for reimbursement of the design and/or the construction of terminal distribution/drainage systems will also include certification that the systems were necessary, either to extend the limits of the area irrigable or because the water from the major works could not be effectively distributed by using paddy to paddy flow.

The requests for reimbursement for the formation of water user associations (P3A) would include for each P3A; (1) certification signed by the village chief that a P3A has been formed, is functioning and will operate and maintain the terminal distribution/drainage systems of the Sederhana subproject, (2) evidence that at least two meetings of the general membership have been held since the organization of the P3A and (3) a copy of its by-laws.

The request for reimbursement for training would include for each training course; (1) certification that the course was conducted in support of the Sederhana Project, (2) a course outline, (3) location and duration of the course with the number of trainees who participated, (4) a breakdown of the costs of the course by major line items, and (5) a list of participants including their positions.

For the physical infrastructure activities USAID would make reimbursements on the basis of the actual contract costs providing this cost does not exceed the maximum set forth in the USAID-approved Selection Criteria. An agreement on the flat rate per hectare for all construction costs will be a condition precedent to the first advance under the loan. For the terminal distribution/drainage system, reimbursement shall be made only for that portion of the subproject being served directly by the constructed system, excluding areas served by paddy to paddy flow. For the P3As, reimbursement will be made on the basis of an agreed upon flat rate per hectare. For in-country training USAID will reimburse on an approved per trainee cost basis.

F. Project Schedule

The following is a list of the more important implementation actions to be accomplished during the life of the project, the agency responsible and the estimated critical date for completion:

<u>Implementation Action</u>	<u>Responsible Agency</u>	<u>Date</u>	
1. First Grant/Loan Authorized	AID/Washington	July	1978
2. IFY 78/79 Subproject Construction started	GOI	July	1978
3. Sign First Grant Agreement	USAID/GOI	Aug.	1978
4. Sign First Loan Agreement	USAID/GOI	Aug.	1978
5. Initial CPs satisfied	GOI/USAID	Nov.	1978
6. Issue IFBs for Equipment	GOI	Dec.	1978
7. Decision on TA	GOI	Jan.	1979
8. Request for Grant Installment *	USAID/GOI	May	1979
9. Second Grant Authorized *	AID/Washington	June	1979
10. Sign Second Grant Agreement *	USAID/GOI	July	1979
11. TA Contracts Extended/Awarded	GOI/Consultants	Sept.	1979
12. Request 2nd Loan Installment *	USAID/GOI	Nov.	1979
13. Second Loan Authorized *	AID/Washington	Jan.	1980
14. Sign Second Loan Agreement *	USAID/GOI	Mar.	1980
15. Request for Reimbursement 78/79	GOI	June	1980
16. Begin 1st Comprehensive Evaluation	GOI/USAID	July	1980
17. Approve Reimbursement 78/79	USAID	Sept.	1980
18. Third Grant/Loan Installment * Requested	GOI/USAID	May	1981
19. Request for Reimbursement 79/80 Subprojects	GOI	June	1981
20. Third Grant/Loan Authorized*	AID/Washington	June	1981
21. Sign third Grant Agreement *	USAID/GOI	Aug.	1981

*Future grant and loan installments will depend upon submission and approval of a separate PP for the Sederhana Program.

<u>Implementation Action</u>	<u>Responsible Agency</u>	<u>Date</u>	
22. Sign third Loan Agreement *	USAID/GOI	Aug.	1981
23. Approve Reimbursement 79/80	USAID	Sept.	1981
24. Request for 80/81 Reimbursements	GOI	June	1982
25. Begin 2nd Comprehensive Evaluation	GOI/USAID	July	1982
26. Approve Reimbursement 80/81 Subprojects	USAID	Sept.	1981

* Future grant and loan installments will depend upon submission and approval of a separate PP for the Sederhana Program.

Part VI - Evaluation Plan

A. Background

Neither a plan by funds for an evaluation of the Sederhana Program was foreseen or provided for in the Sederhana I loan agreement. However, within the past year all of the concerned agencies reached the conclusion that a comprehensive evaluation was necessary. This evaluation conducted jointly by the DGWRD and DGFC, with the assistance of four consultants supplied by a grant from AID has just been completed. The framework for this task was outlined in a "scope of work" by Dr. Allen Thodey, IECO Economist, in August of 1977 and revised by him on January 16, 1978. The USAID evaluation consultants upon their arrival, further elaborated upon this document and wrote both a "Terms of Reference" and a proposal for conducting the evaluation. These documents were submitted together on April 20, 1978.

To establish a data bank of information for this evaluation both the the DGWRD and the DGFC developed extensive, quite independent questionnaire forms, each focussed on their respective sphere of interest. After some introductory training sessions, these forms were filled out at the sub-project site by the field representatives of each agency, for each sub-project initiated by the GOI during the first three years of the program (IFY 74/75-76/77). In all, 517 sub-projects were surveyed by the DepAgr and 543 by the DGWRD. The questionnaire forms from these surveys were returned to Jakarta after a further series of regional workshops where they were checked for completeness, accurateness and uniformity of approach. Then both the DGWRD and the DGFC hired Indonesian computer programmers. These experts through an elaborate process were able to collate all the data collected and enter it on the Ministry of Public Works computer. This process took about three months and involved many steps including transferring the data onto coding sheets, key punching in onto cards and finally recording the data onto tape for further manipulation by the computer. Each step required time consuming, editing and manual checking for errors. The Public Works Computer Center has a very modern IBM 370/147 machine and is equipped with special software called "Statistical Package for the Social Science" (SPSS) which is specifically designed to manipulate social survey type data. The USAID consultants were able to analyze this data from a series of computer runs and considered it to be invaluable to their task. The results of this evaluation are discussed in Part IIA and copies of the final report have been furnished to the DGFC, DepAgr, BAPPENAS and USAID.

Subsequently both the DGWRD and the DGFC have expressed an interest in conducting an annual evaluation of the project using the questionnaires and computer tools developed during the most recent evaluation exercise. USAID is impressed by their efforts and accomplishment over the past several months and hopes to continue its supportive role.

B. Focus

The evaluation of Sederhana II will continue to focus primarily on the goal and purpose level impact. This approach will attempt to:

1. Identify the factors making the greatest contribution to the success of the project and those that prevent or inhibit full achievement of project goals.

2. Furnish a basis for making any needed modifications in existing implementation plans; for planning and improving future Sederhana Projects; and for selecting proper corrective measures for any weakness or problems in projects.

3. Improve the assembly, analysis and distribution of basic information needed by the GOI and USAID to make sound development plans and policy decisions.

4. Identify activities where performance is lagging and suggest possible improvement.

5. Provide direction and guidance for future policy, administrative, training, and implementation activities by the GOI and USAID.

C. Timing/Methodology

As stated above the DGWRD and DGFC plan to conduct annual evaluations using the tools and skills acquired during the last several months. The DGWRD presently has a contract with a quasi government firm, Survey Agro Ekonomi (SAE) to conduct annual surveys of selected projects. The Director of SAE is concurrently the Director of Planning for the Department of Agriculture and the staff are drawn from DepAgr and a prominent local Agriculture University (IPB). This arrangement will improve coordination, cooperation and a flow of information between the two agencies which will be further facilitated by the use of the Public Works computer. The consultants, especially those assigned to the Provinces will also be given a role in future evaluations.

USAID will assist this effort upon request with project grant funds and will use the the information provided by both GOI agencies to determine the amount of future grant/loan installments to be made in support of the Project. This information will also be sufficient to enable USAID to prepare for AID/W the required Project Evaluation Summary.

In addition, two comprehensive evaluations are planned on the same scale as the recent exercise, for the winter and spring of 1980 and

1982. These evaluation will be used to develop new project initiatives such as a Title III program or follow-on projects.

PART VII. CONDITIONS AND COVENANTS AND NEGOTIATING STATUS**1. Conditions Precedent for First Disbursement:**

a. Loan - In addition to the usual legal opinion and authorized representatives, the project loan agreement will contain a condition which assures that the required rupiah financing will be provided on a timely basis.

b. Grant - The project grant agreement will contain a condition requiring that a draft contract for consulting services be approved by A.I.D. prior to execution thereof.

2. Conditions Precedent for First Disbursement for Construction Activities:

a. Detailed criteria for selection of irrigation subprojects acceptable to AID which includes economic, environmental and social factors.

b. A mutually agreed technical basis for approving subprojects.

c. Mutual agreement between AID and the implementing agency concerned on the disbursement procedures to be used, including a flat rate per hectare where applicable, for the following cost items; (i) survey and design of land preparation (clearing, shaping and paddy formation), (ii) survey and design of major works including tertiary canals and on-farm water distribution systems, and (iii) construction of major works, including construction of terminal irrigation systems.

d. An implementation plan which will include a time phased schedule of events necessary to complete the systems and evidence that adequate staff will be assigned to such activity.

3. Condition Precedent to Disbursement for Land Preparation:

Mutual agreement between AID and the implementing agency(ies) concerned on the implementation plan and disbursement procedures to be used for land preparation (clearing and levelling).

4. Condition Precedent to Disbursement for the Establishment of P3As (water-user associations)

Mutual agreement between AID and the implementing agency(ies) concerned on the implementation plan and disbursement procedures to be used for the establishment of P3As.

5. Condition Precedent for First Disbursement for Training Beyond January 1980:

A training plan for the project (separate training plans from different ministries may be submitted including on-the-job in-country and overseas training).

6. Special Covenants:

a. Irrigation subprojects will be selected in accordance with the approved selection criteria and constructed according to the approved design and construction criteria;

b. Training will be carried out in accordance with the approved training plan;

c. An effective program of operation, maintenance and repair, including necessary funding will be provided for all completed subprojects.

Negotiating Status:

Over the last five months, USAID has been engaged in extensive discussions and negotiations with BAPPENAS and the two principal implementing agencies for the Sederhana Irrigation Program. From this collaborative effort has come the program described in this project paper. Substantive consensus has been reached on the elements to be included in order to assure success of the program; as well as the approaches to be taken in providing or implementing these elements. There are no known impediments which will delay the final negotiation and signing of a loan/grant agreement(s) for the proposed program.

PART VIII - ANNEX

- A. Log Framework
- B. (1) PRP Cable
(2) Resolution of Issues
- C. GOI Application
- D. Statutory Checklist
- E. 611(e) Determination
- F. Draft Authorization
- G. PL 480 Title III Proposal
- H. Technical Annexes
 - H.1. Tables - Before and During Sederhana I
 - Table 1 - Sederhana Program Achievements by Year/Province
 - 2 - Sederhana I Subproject Status (Major Works)
 - 3 - Sederhana I Status
 - (a) - Statistical Data and Consultant Services
 - (b) - Budget Analysis
 - (c) - Sederhana Outputs
 - (d) - Sederhana Training 1976/77 and 1977/78
 - 4 - Size Distribution of Projects
 - 5 - Previous Land Status of First Three Year's Subprojects

H.2. Tables - Sederhana II

- Table 1** - Sederhana II Implementation Schedule
- 2 - Sederhana II Disbursement Schedule
- 3 - Financial Projections by GOI Fiscal Year
- 4 - Additional Area Under New or Improved Irrigation Due to Sederhana I and II
- 5 - Land Clearing, Leveling, and Paddy Field Formation Data
- 6 - Employment Effects of Sederhana Project

H.3. Tables - GOI Information

- Table 1** - DGWRD Budget Expenditures for All Irrigation Projects
- 2 - DGWRD Approved Budget IFY 78/79 (Sederhana Only)
- 3 - DepAg Approved Budget IFY 78/79 (Sederhana Only)
- 4 - Existing Personnel of Provincial Public Works Offices
- 5 - Existing and Required Personnel of Provincial Agriculture Service
- 6 - Designated Survey and Design Contractors with Irrigation Prequalification Classification.

H.4. Charts

- Chart 1** - GOI Organization Chart for Sederhana Program
- 2 - Ministry of Public Works Organization
- 3 - DGWRD Organization

- 4 - Typical Provincial Public Works Organization
 - (a) - With Wilayahs (Regions)
 - (b) - Without Wilayahs
 - 5 - Ministry of Agriculture Organization
 - 6 - Typical Provincial Agricultural Service
 - 7 - Organization for Sederhana
 - 8 - Monitoring Organization
 - (a) - DGWRD for Major Works
 - (b) - DGFC for On-Farm Works
- H.5. Map - Sederhana Program Concentration

ANNEX A

SEDERHANA (SIMPLE) IRRIGATION AND LAND DEVELOPMENT PROJECT
LOGICAL FRAMEWORK MATRIX

- | | | | |
|---|---|---|---|
| <p>A. 1. Program or Sector Goal
Increase Indonesia's domestic food production, particularly rice, needed to feed growing population and increase the well-being of the country's poor majority.</p> | <p>2. Measures of Goal Achievement
a. Volume of food imports per year.
b. Tons of rice imported per year.</p> | <p>3. Means of Verification
GOI trade statistics</p> | <p>4. Assumption for Achieving Goal (Targets)
a. Present conditions of political stability continue to prevail.
b. GOI's Family Planning Program meets its targets.
c. Transportation and marketing system capable of moving rice from producers in surplus areas to consumers in deficit areas both intra and inter-island.
d. Other GOI food production programs meet their targets.</p> |
| <p>B. 1. Project Purpose</p> | <p>2. Conditions that Will Indicate Purpose Has been Achieved - End of Project Status</p> | <p>3. Means of Verification</p> | <p>4. Assumption for Achieving</p> |
| <p>1. Institution Building (Primary Focus)
Increase the institutional capability of GOI implementing agencies; particularly the: (a) BOWED; (b) Provincial Public Works offices; (c) Agency for Agriculture Education Training and Extension; (d) DepAg, Land & Water Conservation; and (e) Provincial Agriculture Services; to implement GOI's Sederhana (Simple) Irrigation Program the amount necessary to achieve a Program level of about 60,000 hectares per year.</p> | <p>1. Institution Building
Successful implementation Sederhana Program at level about 60,000 ha. per year beginning in IPT 1979-80 of physical infrastructure including terminal distribution/drainage systems, land clearing, land leveling and paddy field formation plus the social infrastructure necessary at the local level for operation and maintenance of the completed systems.</p> | <p>1. Institution Building
a. GOI program progress control system.
b. AID monitoring of this system.
c. Steady flow of reimbursement for completed projects.</p> | <p>1. Institution Building
a. Adequate number of technical personnel recruited and assigned to implement Program at target levels.
b. Momentum generated during implementation of present project maintained in subsequent years.
c. The GOI closely adhere to the agreed upon project monitoring plan and its selection criteria, for new projects.</p> |

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2. Rice Production

Increase rice production from subproject areas.
Note: Secondary crop production may also be increased.

2. Rice Production

- a. Increased rice production from subproject areas of about 500,000 tons in IFT 1980/81, and ultimately by about 1,140,000 tons in IFT 1984-85.
- b. All major works serving each subproject area in place and operational.
- c. All the necessary land clearing, levelling and paddy field formation is completed on the total planned area for each site.
- d. The terminal distribution and drainage systems planned for each site are in place and operational.
- e. The completed systems are being operated and maintained by the P3As with guidance from Provincial Public Works.

2. Rice Production

- a. Department (Ministry) of Agriculture rice crop statistics.
- b. GOI program progress control system and AID monitoring of this system.

2. Rice Production

- a. End-of-project and ultimate purpose.
 - 1). Rice and input prices kept at level adequate to maintain farmer incentives.
 - 2). BIMAS production input package is provided to the farmers after completion of the systems.

3. Well-being of Rural Poor

- a. Increase income of farmers in subproject areas.
- b. Increase employment opportunities in subproject areas.

3. Well-being of Rural Poor

- a. Increased income of farmers in subproject areas of about \$170 per hectare in IFT 1980/81 and ultimately by about \$341 per hectare in IFT 1984-85.
- b. Increased employment opportunities as follows:
 - 1). Construction by about 90,000 person years per year.
 - 2). Tilling land in:
 - a) Wet season by about 18 million person-days per year.
 - b) Dry season by about 69 million person-days per year.
 - 3). Operation and maintenance by 4,400 man-years per year.

3. Well-being of Rural Poor

GOI program progress control system and AID monitoring.

3. Well-being of Rural Poor

- a. End-of-project and ultimate purpose.
 - 1). Rice and input prices maintained at level adequate to generate increases in farmer income indicated under project purpose
 - 2). Present average size of land-holding in subproject areas of one hectare or less of paddy maintained.
 - 3). Implementation of subprojects carried out in labor-intensive manner.

C. 1. Outputs**1. Institution Building**

- a. Managerial and technical personnel assigned on project assisted and trained by consultants including GOI staff, private sector survey design and construction personnel plus key local officials and farmers.
- b. Establishment or improvement of internal training programs in GOI implementing agencies.
- c. GOI implementing agency personnel training programs both in-country and overseas.

2. Rice Production

- a. Major works (weir, primary and secondary canals, major structures, etc.)
- b. Terminal distribution/Drainage systems.
- c. Finished rice paddies ready for planting.
- d. Effective water management thru actively functioning FIAs.
- e. Adequate operation and maintenance (O and M) of:
 1. Major works by public works.
 2. Tertiary canals and farm service ditches by FIAs
- f. Evaluation.

2. Magnitude of Outputs**1. Institution Building**

- a. Number of GOI implementing agency counterpart personnel assisted and trained by consultants.
- b. Internal training programs established in GOI implementing agencies.
- c. Number of GOI implementing agency personnel completing training programs:
 1. In-country
 2. Overseas.

2. Rice Production

- An estimated 1325 sub-projects on 660,000 ha as follows:
About 350 Soderhamm sub-projects financed in part by AID on an estimated 410,000 ha as follows: about 200,000 ha where major works and farm level systems will be constructed plus about 210,000 ha where farm level systems will be constructed in areas presently having major works.

3. Means of Verification**1. Institution Building
AID monitoring.****2. Rice Production**

- GOI program progress control system and AID monitoring of this system.

4. Assumption for Achieving Outputs**1. Institution Building
None.****2. Rice Production**

- a. GOI implementing agencies given all the required inputs can produce the desired outputs
- b. Adequate financing is provided for O and M.

D. 1. Inputs**1. Institution Building**

- a. Long-term consultants.
- b. Short-term consultants.
- c. Training:
 - 1) In-country
 - 2) Overseas
- d. Funds

2. Implementing Target (Type and Quantity)

- See Financial Plan for detailed breakdown of inputs by quantity, cost, implementing agency, AID financing category, source of financing and time phasing.

3. Means of Verification

- a. Traditional Direct Procurement.
- b. Fixed Amount Reimbursement, GOI Contribution, and Farmer Contribution.
- c. GOI program progress control system and AID monitoring of this system.

4. Assumptions for Providing Inputs

1. GOI makes budget provision for and provides its inputs on timely basis.
2. Farmers make basic commitment to project and provide inputs on a timely basis.

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E.O. 11652: N/A
TAGS:

SUBJECT: SEDERHANA IRRIGATION II:PRP

BHS

REFS: (A) JAKARTA 15740 (B) STATE 293459 (C) STATE 289176

1. PRP APPROVED AS SUPPLEMENTED AND USAID AUTHORIZED PRE-PARE PP FOR FY 78 LOAN. APAC IDENTIFIED FOLLOWING ISSUES TO BE FULLY ADDRESSED IN PP.

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5. ECONOMIC FEASIBILITY: COMMITTEE VIEW IS THAT FOR ALL PROPOSED SUBPROJECTS WHERE AID FINANCING EXPECTED TO EXCEED DOLS 100,000, DGWRD SHOULD MAKE REASONABLY SOPHISTICATED ECONOMIC ANALYSIS PER PRP, PAGE 8. PP SHOULD CLARIFY PROCEDURES TO BE USED FOR SUBPROJECTS IN THIS CATEGORY.

6. ORGANIZATION OF BENEFICIARIES: PP SHOULD ANALYZE EXPERIENCE UNDER SEDERHANA I PROJECT REGARDING FORMATION OF VIABLE WATER USER ASSOCIATIONS. WHAT, IF ANYTHING, IS DONE IN SUBPROJECT AREAS WHERE SOCIAL ORGANIZATION FOR MANAGEMENT OF WATER ALREADY EXISTS? IS WATER USER ORGANIZATION NORMALLY ESTABLISHED ON SINGLE-VILLAGE OR MULTI-VILLAGE BASIS? HAVE THERE BEEN ANY PROBLEMS OF COOPERATION BETWEEN DIFFERENT VILLAGES/ASSOCIATIONS BEING SERVED BY SAME SEDERHANA SYSTEM? COMMITTEE VIEW WAS THAT WHENEVER POSSIBLE, SYSTEMS SHOULD BE DESIGNED TO MEET THE NEEDS OF INDIVIDUAL VILLAGES IN ORDER TO MINIMIZE COOPERATION PROBLEMS AMONG VILLAGES.

and 7. EVALUATION - THE PP SHOULD DISCUSS THE RESULTS OF SEDERHANA I EVALUATION SCHEDULED FOR LATE 1977 AND HOW RECOMMENDATIONS FOR PROGRAM IMPROVEMENT HAVE BEEN INCORPORATED IN THE DESIGN OF SEDERHANA II. WOULD APPRECIATE RECEIVING COPY OF EVALUATION DESIGN AND CONTR

CTOR REPORT

PREPARED BY SORENSON/THOMPSON.

UNCLASSIFIED

8. AID MONITORING - THE PP SHOULD DESCRIBE THE MISSION'S STRATEGY FOR MONITORING THE SEDERHANA II PROGRAM, WITH ATTENTION TO THE FOLLOWING:

- (A) EFFECTIVENESS OF AID MONITORING ON SEDERHANA I
- (B) PROPOSED PROCEDURES FOR MONITORING SEDERHANA II
- (C) STAFFING CONSIDERATIONS IN TERMS OF HOW MANY AND WHAT KIND OF STAFF ARE REQUIRED FOR MONITORING PURPOSES

9. ENVIRONMENTAL ANALYSIS - APPROACH TO ENVIRONMENTAL ANALYSIS FOR SEDERHANA I DEVELOPED THROUGH SERIES OF CABLES CULMINATING IN JAKARTA 1471A. PP SHOULD DISCUSS EXPERIENCE IN APPLYING AGREED PROCEDURES TO SUBPROJECTS UNDER SEDERHANA I. PER REF (COGLN AID/W- PREPARED IEE FOR SEDERHANA II RECOMMENDED THAT AREA ENVIRONMENTAL ASSESSMENT BE PREPARED FOR EACH SUBPROJECT DURING SUBPROJECT DESIGN PHASE. AID/W WILL PROVIDE FURTHER GUIDANCE ON HOW TO ADDRESS ENVIRONMENTAL MATTERS IN PP.

10. GRANT FUNDING OF TECHNICAL ASSISTANCE - REF (A), PARAGON PROVIDES GENERAL RATIONALE FOR GRANT-FUNDING OF TA ASSOCIATED WITH LOAN PROJECT. THIS WOULD NOT SEEM TO APPLY TO SEDERHANA PROJECT WHERE HEAVY TA INPUTS ALREADY BEING PROVIDED ON LOAN-FINANCED BASIS AND EFFECTIVE QUOTE WORKING RELATIONSHIP OF AUTHORITY/RESPONSIBILITY UNQUOTE ALREADY ESTABLISHED. SINCE PRP AND SUPPLEMENT DID NOT DISCUSS GRANT-FUNDING, REQUEST USAID SEND ASAP FURTHER JUSTIFICATION FOR GR

NT-FUNDING OF TECHNICAL ASSISTANCE UNDER SEDERHANA

11.

KISSINGER

BJ

Resolution of Issues Identified
by AID/W in PRP Approval Cable
(State 306271 of December 18, 1976)

1. Sederhana I Pipeline

The commitment and disbursement record of Sederhana I is discussed in detail in Part II.A.1. The present pipeline is due to start-up difficulties and other procedural problems. Basically, Sederhana I is fully committed and funds are required now to support the program.

2. Long-term Strategy

This issue is discussed in Part II.A.5. Basically USAID involvement in small scale irrigation in Indonesia matches both the GOI's developmental priorities and AID's new directions. As long as increased rice production and assistance to the rural poor are priority goals for both Governments there will be a role for USAID. As the program matures this role will change, the need for technical assistance after Sederhana II will no doubt be less and the financial requirements will grow to the point where the World Bank or some other donor may have to step in. USAID is considering further assistance in this area thru a Title III program.

3. Institution Building/Capabilities

This issue is discussed several places in the PP. In Part II.B., the End of Project Status (EOPS) was described as having the institutions involved developed to the point where 60,000 ha/year of additional irrigated land could be brought under rice cultivation. The technical assistance and training required to achieve this EOPS is described in Part III.9, 10 and the institutional capacity to implement the project is discussed in Part III.C.

4. On-farm Development and Agricultural Potential

The problems of bringing about effective coordination between Public Works offices and local agriculture extension offices is discussed in detail in Part III.C.D. Basically, the top leadership of the DGWRD is aware of the problem and is taking steps to deal with it including better coordination with all levels of the local governments concerned.

USAID and the GOI are also aware that the project will only be successful to the extent that the on-farm aspects of the project are successful. Both governments are also working to improve other complementary agricultural programs. See Part II.A.6.

5. Economic Feasibility

The DGWRD has continued to improve its selection criteria for new subprojects. During the summer of 1977 an economist from Fresno State University, Dr. Allen Thodey, worked with the Chief Economist of the Planning Directorate of DGWRD to improve the economic analysis. He returned in late May 1978 to spend three months continuing this efforts. See Part III.A.2. Secondly, the DGWRD plans to keep future projects within the special criteria which define a Sederhana subproject as being "simple". Since the cost/ha should average about \$750 for both major works and terminal distribution systems, an average project of 300-400 ha should cost US \$ 300,000. As long as the subprojects approved are under 2,000 ha in size and meet the other criteria, USAID does not feel that any special economic analysis is necessary.

6. Water User Associations (P3As)

This subject is discussed in Part III A.6 and the social ramifications in Part III.B. To answer the specific questions raised in the PRP approval cable: (1) In areas where social organizations for management of water already exist, the Department of Agriculture extension agents are working to strengthen and improve their operation and maintenance practices. This is now a common effort; (2) USAID agrees with the committee view that wherever possible, systems should be designed and P3As organized so as to meet the needs of individual villages and minimize friction between villages. This is also being done in the field. The size and area coverage for a P3A varies. But P3As are generally formed on a per project basis with some variation based upon local traditions.

7. Evaluation

The executive summary of the evaluation is found in Part II.A.2 and a copy of the final report is available in AID/W.

8. AID Monitoring

The staffing requirements are discussed in Part V.A.

9. Environmental Analysis

This issue is fully covered in Part III.E. Basically, USAID and the GOI will conduct a joint study of the environmental impact of the Sederhana Program during project implementation.

10. Grant Funding

Grant funding should permit a more adequate and positive response to the technical assistance needs of the program as well as to meet the basic needs of the consultant staff. It should eliminate the friction

between the GOI and the Consultant which have resulted from the consultant's complaints about inadequate local support (e.g., housing, vehicles, education allowances, etc.) and the GOI's view that the Consultant's demands are excessive. USAID's view is that technical advisors who are reasonably content with their logistic and administrative support and amenities will function more effectively in performing their technical duties. Further, the turnover of expatriate personnel should also be reduced and their overall continuity and general technical assistance effectiveness enhanced.



WORKING COPY

REPUBLIC OF INDONESIA
NATIONAL DEVELOPMENT PLANNING AGENCY
JAKARTA, INDONESIA

Annex C
Page 1 of 2

No. : 1264 /WK/5/1978.-

Jakarta, May 31, 1978.-

Mr. Thomas C. Niblock
Director
US-AID Mission of Indonesia
c/o American Embassy
Jakarta, Indonesia.

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Dear Mr. Niblock,

Subject : Sederhana (Simple) Irrigation and Land Development II Project.-

With reference to our recent discussions concerning the above subject project, the Government of Indonesia requests from the Government of the United States a loan of up to one hundred sixteen million two hundred thousand dollars (\$ 116,200,000) and a grant of up to thirteen million two hundred thousand dollars (\$ 13,200,000) to finance the foreign exchange and part of the local currency costs of the second phase of the project.

We understand that this loan/grant will be make in three installments beginning in your U.S. FY 1978. The first installment would be approximately twenty nine million five hundred thousand dollars (\$ 29,500,000) including a loan of twenty five million dollars (\$ 25,000,000) and a grant of four million five hundred thousand dollars (\$ 4,500,000). An annual evaluation of program progress and financial requirements will be made also that the following two installments will be adjusted accordingly and outlined in separate agreements.

The Government gives very high priority to the objectives of decreasing Indonesia's dependence on imports and eventually becoming self-sufficient in rice production. The Sederhana Irrigation Program is one of the most important means available to achieve this objective. In addition, the Program is expected to make a significant contribution to achievement of the Government's overall objectives: (a) income growth, (b) employment creation and (c) income redistribution as a result of the small average size of land-holding within the labor-intensive nature of the included subprojects.

The Government is committed to the expeditious completion of approximately 1100 subprojects covering an area of 660,000 hectares in 24 of Indonesia's 27 provinces and special areas over the next three years. Although Sederhana subproject are conceptually simple when taken individually, the large number of subprojects, their scattered and isolated locations and the rate of increase of the size of the Program will require a rapid expansion of the capability of the Government's implementing agencies, particularly the Directorate General Water Resource Development, the provincial public works offices, the Department of Agriculture and provincial agriculture services. AID support is being sought primarily to assist in this institution-building effort.

The estimated total cost of this second phase effort covering Sederhana subprojects to be completed in Indonesia fiscal years 1978/79, 1979/80, and 1980/81 is US \$ 378.7 million. Of this amount about US \$ 13.8 million represents foreign exchange cost to be financed by AID. Another \$ 155.7 million is local currency cost which will be funded by the Government of Indonesia with AID reimbursing the Government a mutually agreed percentage of the predetermined cost of items included in this category. In addition, the Government will budget and finance approximately \$ 130.2 million in local currency cost for activities for which there will be no AID reimbursement. The GOI budget for this year (IFY 1978/79) in support of the project amounts to the equivalent of US \$ 62.8 million and includes the Rp. 2.7 billion additional that you requested in your letter of May 3, 1978. The remaining \$ 79 million of Project costs will be labor services contributed by individual farmers.

Other sources of financing for this project are not available to the Government of Indonesia at present.

We hope that this information will be useful and sufficient for you to proceed with the consideration of this loan application as soon as possible.

Sincerely yours,



J.B. Sumarlin
J.B. Sumarlin
Vice Chairman

INDONESIA - SEDERHANA (SIMPLE) IRRIGATION AND LAND DEVELOPMENT PROJECT II

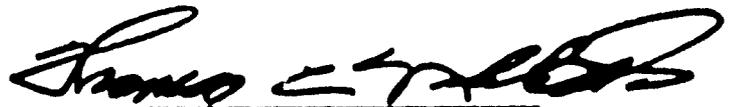
CERTIFICATION PURSUANT TO SECTION 611 (e) OF
THE FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED

I, Thomas C. Niblock, the principal officer of the Agency for International Development in Indonesia, having taken into account among other things:

the experience of the Government of Indonesia in association with multilateral and bilateral donors, including AID, in implementing programs directed to irrigation system rehabilitation, construction and maintenance; and especially with Sederhana (Simple) Irrigation I loan; and

the commitment of the Government of Indonesia to carry out this Project effectively as evidenced by the scale of effort included for the Second Five-Year Plan (1974-79),

do hereby certify that in my judgment Indonesia has the financial and human resources capability to implement, maintain and utilize effectively the facilities of the Sederhana (Simple) Irrigation II Project.



Thomas C. Niblock
Director, USAID Indonesia

Date

Project Authorization and Request for Allotment of Funds

Part II

Indonesia

Sederhana (Simple) Irrigation
and Land Development II
AID Project No. 497-0252

Pursuant to Part I, Chapter 1, Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize a Loan and a Grant to Indonesia (the "Cooperating Country") of not to exceed Twenty Nine Million Five Hundred Thousand United States Dollars (\$29,500,000) (the "Authorized amount") to help in financing certain foreign exchange and local currency costs of goods and services required for the project as described below.

The Project (hereinafter referred to as the "Project") consists of assistance to the Cooperating Country to enable the central and local governmental agencies involved, with participation from the farmers, to construct, operate and maintain small scale irrigation systems. This includes training, technical assistance and reimbursement for an agreed upon portion of the costs of construction.

Of the Authorized Amount, Twenty Five Million Dollars ("Loan") will be loaned, and Four Million Five Hundred Thousand Dollars granted, to the Cooperating Country to assist in financing certain foreign exchange and local currency costs of goods and services required for the Project.

I hereby authorize the initiation of negotiation and execution of the Project Agreement or Agreements by the officer to whom such authority has been delegated in accordance with AID regulations and delegations of authority subject to the following essential terms and covenants and major conditions; together with such other terms and conditions as AID may deem appropriate:

a. Interest Rate and Terms of Repayment

The Cooperating Country shall repay the Loan to AID in United States Dollars within thirty (30) years from the date of the first disbursement of the Loan, including a grace period of not to exceed ten (10) years. The Cooperating Country shall pay to AID in United States Dollars interest from the date of first disbursement of the Loan at the rate of (a) two percent (2%) per annum during the first ten (10) years, and (b) three percent (3%) per annum thereafter, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

b. Source and Origin of Goods and Services

Except for ocean shipping, goods and services financed by AID under the Project shall have their source and origin in the Cooperating Country or in the United States (in the case of Grant) or in the Cooperating Country or in Countries included in A.I.D. Geographic Code 941 (in the case of Loan) except as A.I.D. may otherwise agree in writing. Ocean shipping financed under the Project shall be procured in any eligible source country under the Loan or Grant, respectively, except the Cooperating Country.

Sederhana (Simple) Irrigation and Land Development Project I
PROGRAM ACHIEVEMENTS BY YEAR/PROVINCE

	197 1976 - 78 (achieved)						197 1978 - 78 (achieved)					
	Irrigation		Reclamation		Total		Irrigation		Reclamation		Total	
	No	Ha	No	Ha	No	Ha	No	Ha	No	Ha	No	Ha
Ach	6	3,921	-	-	6	3,921	0	4,000	-	-	0	4,000
S. Sumatra	7	3,100	-	-	7	3,100	12	6,740	-	-	12	6,740
W. Sumatra	12	4,344	-	-	12	4,344	9	4,170	-	-	9	4,170
Riau	4	372	-	-	4	372	8	3,183	-	-	8	3,183
S. Sumatra	-	-	2	1,300	2	1,300	6	1,813	1	900	7	2,713
Jambi	20	3,700	-	-	20	3,700	31	8,497	-	-	31	8,497
Bangka	8	1,214	-	-	8	1,214	10	2,746	-	-	10	2,746
Lampung	8	1,313	-	-	8	1,313	12	3,008	-	-	12	3,008
Tot. Sumatra	75	19,334	2	1,300	75	19,334	97	29,418	1	900	98	29,918
E. Kalimantan	-	-	-	-	-	-	1	217	-	-	1	217
W. Kalimantan	-	-	-	-	-	-	1	100	-	-	1	100
S. Kalimantan	7	1,307	-	-	7	1,307	8	1,232	2	900	10	2,132
E. Kalimantan	-	-	-	-	-	-	1	100	-	-	1	100
Tot. Kalimantan	7	1,307	-	-	7	1,307	7	1,649	2	900	9	2,549
S. Java	27	8,336	-	-	27	8,336	17	3,996	-	-	17	3,996
E. Java	20	4,833	-	-	20	4,833	6	813	-	-	6	813
D.I. Yogyakarta	2	73	-	-	2	73	2	134	-	-	2	134
E. Java	3	2,193	-	-	3	2,193	3	632	-	-	3	632
Tot. Java	52	11,635	-	-	52	11,635	26	5,575	-	-	26	5,575
Sul	-	-	-	-	-	-	4	600	-	-	4	600
S. Sulawesi	8	2,960	-	8	8	2,960	22	9,810	-	-	22	9,810
W. Sulawesi	2	2,631	-	-	2	2,631	3	2,633	-	-	3	2,633
S. Sulawesi	7	1,881	-	-	7	1,881	4	1,928	-	-	4	1,928
E. Sulawesi	4	968	-	-	4	968	8	4,988	-	-	8	4,988
Tot. Sulawesi	21	8,440	-	-	21	8,440	44	18,423	-	-	44	18,423
S. Sumatenggara	-	-	-	-	-	-	4	1,408	-	-	4	1,408
E. Sumatenggara	-	-	-	-	-	-	4	200	-	-	4	200
Total Sumatenggara	-	-	-	-	-	-	8	1,608	-	-	8	1,608
Maluku	-	-	-	-	-	-	1	0	-	-	1	0
Grand Total	163	39,872	2	1,300	165	41,222	187	87,408	3	1,400	190	89,008
Percent Grand Total					21,10	17,37				21,40	24,75	

Sederhana (Simple) Irrigation and Land Development Project I
PROGRAM ACHIEVEMENT BY YEAR/PROVINCE

	BY 1976 - 77 (achieved)						BY 1977 - 78 (targets)					
	Irrigation		Reclamation		Total		Irrigation		Reclamation		Total	
	No	Ha	No	Ha	No	Ha	No	Ha	No	Ha	No	Ha
Sum	8	2,368	-	-	8	2,368	2	868	-	-	2	868
D. Sumatra	11	2,828	-	-	11	2,828	8	4,787	-	-	8	4,787
Riau	14	4,700	-	-	14	4,700	8	8,388	-	-	8	8,388
S. Sumatra	20	4,278	3	1,388	23	5,728	12	4,178	2	2,171	14	6,388
Jambi	18	4,842	3	1,788	21	6,742	18	2,928	1	888	19	4,828
Sungai	28	8,888	-	-	28	8,888	14	4,788	-	-	14	4,788
Lampung	19	2,812	-	-	19	4,812	14	4,812	-	-	14	4,812
Tpt. Sumatra	11	2,812	-	-	11	2,812	7	2,812	2	2,771	9	2,771
E. Kalimantan	7	2,488	-	-	7	2,488	-	-	2	2,888	2	2,888
D. Kalimantan	-	-	2	788	2	788	2	272	1	888	3	872
S. Kalimantan	8	1,828	-	-	8	4,842	2	188	4	4,888	6	4,828
E. Kalimantan	8	1,378	-	-	8	1,378	8	1,118	-	-	8	1,118
Tpt. Kalimantan	21	5,784	2	2,818	23	8,622	8	1,848	7	7,788	15	9,328
W. Java	21	2,222	-	-	21	2,222	14	2,848	-	-	14	2,848
E. Java	8	1,788	-	-	8	1,788	18	2,844	-	-	18	2,844
D.I. Yogyakarta	4	388	-	-	4	388	4	388	-	-	4	388
E. Java	1	188	-	-	1	188	3	487	-	-	3	487
Tpt. Java	28	6,472	-	-	28	6,472	48	6,922	-	-	48	6,922
Sul	2	8	8	-	2	8	4	1,372	-	-	4	1,372
S. Sulawesi	28	8,922	-	-	28	8,922	8	1,842	-	-	8	1,842
W. Sulawesi	8	8	-	-	8	8	7	2,828	-	-	7	2,828
S. Sulawesi	7	2,888	-	-	7	2,888	12	4,182	-	-	12	4,182
E. Sulawesi	8	4,888	-	-	8	4,788	18	2,788	-	-	18	2,788
Tpt. Sulawesi	28	18,888	-	-	28	18,888	28	11,784	-	-	28	11,784
D. Sumatrapura	7	1,812	-	-	7	1,812	7	2,428	-	-	7	2,428
E. Sumatrapura	18	1,212	-	-	18	1,212	8	1,488	-	-	8	1,488
Total Sumatrapura	17	2,382	-	-	17	2,382	12	4,878	-	-	17	4,878
Sulabu	2	188	-	-	2	188	2	222	-	-	2	222
Grand Total	228	68,772	11	8,718	239	77,492	178	88,421	18	18,881	198	88,982
Percent Grand Total					28,86	28,13				24,84	28,23	

**Sederhana (Simple) Irrigation and Land Development Project I
PROGRAM ACHIEVEMENT BY YEAR/PROVINCE**

	TOTAL IRY's 1974 - 75 up to 1977 - 78					
	Irrigation		Reclamation		Total	
	No	Ha	No	Ha	No	Ha
Sum	22	12,164	-	-	22	12,164
S. Sumatra	20	10,282	-	-	20	10,282
S. Sumatra	2	18,878	-	-	2	18,878
Riau	48	22,729	8	3,371	48	14,608
S. Sumatra	26	9,988	7	4,788	23	14,138
Jambi	99	28,862	9	-	99	28,862
Sungai	81	11,316	-	-	81	11,316
Lampung	27	10,089	-	-	27	10,089
Tot. Sumatra	211	111,171	12	7,827	272	118,822
E. Kalimantan	8	2,897	2	2,808	10	8,197
S. Kalimantan	3	372	2	1,388	6	1,672
S. Kalimantan	18	4,688	9	7,688	27	12,368
E. Kalimantan	18	2,893	-	-	18	2,893
Tot. Kalimantan	46	10,338	14	11,488	60	21,828
S. Java	79	18,112	-	-	79	18,112
E. Java	88	9,388	-	-	82	8,388
S.I. Yogyakarta	12	811	-	-	12	811
E. Java	18	2,462	-	-	18	2,462
Tot. Java	183	29,886	-	-	183	29,886
Solo	18	2,831	-	-	18	2,831
S. Sulawesi	66	23,343	-	-	66	23,343
SE. Sulawesi	17	8,084	-	-	17	8,084
S. Sulawesi	38	18,788	-	-	38	18,788
E. Sulawesi	28	13,678	-	-	28	13,678
Tot. Sulawesi	138	68,891	-	-	138	68,891
S. Sumbawa	18	8,843	-	-	18	8,843
E. Sumbawa	19	3,111	-	-	19	3,111
Total Sumbawa	37	9,984	-	-	37	9,984
Maluku	3	222	-	-	3	222
Grand Total	788	218,288	26	19,819	782	237,304
Percent Grand Total			3,32	8,81	188	100

SEDERHANA IRRIGATION PROJECT I

Status of Major Works
(as of April 30, 1978)

	<u>1976-1977</u>	<u>1977-1978</u>	<u>TOTAL</u>
Total new subprojects	215	137	352
Designs received by USAID	207	117	324
Cost estimates received by USAID	204	110	314
Designs reviewed by USAID	158	35	193
Cost Estimates reviewed by USAID	130	34	164
Construction Reported Complete	161	59	220
Carried over to next year's program	49	39	88
Completion certified by IECO	103	0	103
Inspected by USAID	95	18	113
Approved for reimbursement			

Note: Data from Quarterly Report No. 7, January 1, 1978 to March 31, 1978;
Sederhana Irrigation, Reclamation and Land Development Project,
Republic of Indonesia; International Engineering Co., Inc.

STATISTICAL DATA AND CONSULTANT SERVICES
SEDERHANA IRRIGATION, RECLAMATION AND LAND DEVELOPMENT PROJECT (1975)

The Sederhana Program started at the beginning of Indonesia's second five year program, April 1, 1974.

An AID loan for \$20 million was signed on June 25, 1975. An amendment raising the loan amount to \$23.7 million was signed on October 28, 1976.

A 33 months contract for technical services was signed on March 24, 1976. Negotiations to extend the contract through June, 1979 are currently underway.

Man Months Services
Provided in 33 Months Contract

	<u>Long Term</u>	<u>Short Term</u>	<u>Home Office</u>	<u>Total</u>
International Engineering Co., Inc., USA	153	48	6	207
SINOTECH, Engineering Consultant, Inc., Taiwan	<u>180</u>	<u>44</u>	<u>2</u>	<u>226</u>
Total Expatriate Staff	333	92	8	443
Sangkuriang Ltd., Architects and Engineers, Jakarta	<u>237</u>	-	-	<u>237</u>
	570	92	8	670

BUDGET ANALYSIS
SEDERHANA IRRIGATION I

(\$ In Thousands)

ITEM	Budget in Sederhana I P.Paper	Item dropped From AID Funding	FAR comm. + oblig.*	Ex- pendi- tures	Anticipated Future Expenditures	Anticipated Total AID Obligation
I	Consultants					
a.	1,992.9		3214.6	2180.5	1900.0	5114.6
b.	103.6		285.4	285.4	100	
II	DGWRD					
a.	16,401.9		15657.8	Ø	(2231.8)	13426.0
b.	456.0		770.1	Ø	(77.0)	693.1
e.	Light Equipment					
1.	234.8		Ø	Ø		Ø
2.	177.0		166.9	Ø		166.9
	PIO/C-6470316					
3.	598.0		546.4	522.0		546.4
	PIO/C - 6437002					
4.	113.7	113.7	Ø	Ø		Ø
f.	103.5	103.5	Ø	Ø		Ø
g.	1,035.0		Ø	Ø	1035.0	1035.0
	Light Equipment, etc.					
III	IN-COUNTRY TRAINING					
a.	146.6		167.8	Ø	83.9	251.7
b.	228.6		346.1	Ø	173.1	519.2
	PIO/P					
			8.5	Ø		8.5

IV Department Agriculture

a. Light Equipment						
1. 2" Water Pumps	51.9	51.9	∅	∅		
2. One bag cement mixers	71.4	71.4	∅	∅		
3. 3/4 ton pickups (45) PIO/C-6470318	419.2		395.6	∅		395.6
4. Jeeps (31) PIO/C-6470105	231.7		223.8	∅		223.8
5. Motorbikes (110)	100.3	100.3	∅	∅		∅
b. Hand Tools	128.1		90.3	∅		90.3
c. Formation of Water User Association & Extension	208.3		77.8	∅		77.8
d. Construction of Water User Assoc. Offices	228.0	228.0	∅	∅		∅
e. Design & Construction of Farm Service Ditches	608.1		150.6	∅	307.4	458.0
T O T A L	23,638.6	668.8	22101.7	2987.9	1290.6	23006.9

SEDERHANA IRRIGATION I
BUDGET ANALYSIS

- I. Consultants Services: Contract for TA includes overseas training. Original contract was \$3.5 million.

Intend to extend present contract until July 1, 1979. Estimated cost \$1.9 million plus \$100,000 for Overseas Training.

- II. a. Original contract contemplated import of steel wire to make gabion baskets. This was not done due to logistical problems. Also contractors were able to purchase wire on the local market. Budgets for Gabion wire and Construction combined in analysis. Estimated reimbursement for subprojects is based on review of Consultants reports showing status of 76/77 and 77/78 subprojects. GOI has already funded \$36.8 million for construction of 352 subproject started in these two years of which 220 are reported as completed. If all the GOI funded works were completed and accepted by AID, \$15.7 million could be reimbursed. AID estimates that only \$13.4 million will be reimbursed for Construction.
- b. Survey and Design were made for 150,224 ha. for 76/77 and 77/78 subprojects. AID has agreed to reimburse 42½% of Rp. 5,000/ha for design of major works - Rp. 319.2 million or \$770,147.
- e. 1. The DGWRD has determined that the 4" Water Pump are "not" required. These were intended for use in both maintenance and construction.
2. PIO/C for 19 pickups has been forwarded to AID/W, and GSA is in process of purchasing vehicles.
3. 80 Jeeps have been received by DGWRD and spare parts have arrived in the Jakarta Port.
4. Motorbikes were proposed to be purchased as local procurement with AID reimbursing 42½% of the cost. This has been found to be contrary to AID procurement regulations. Motorbikes will not be purchased under this loan.

- f. DGWRD has decided not to purchase hydrological equipment under this loan. They have \$300,000 from World Bank for "Proyek Hidrologi", Eleventh Irrigation Loan from World Bank.
 - g. A proposed list of equipment to support provincial maintenance operations has been prepared by the Consultant and IFB should be out in July or August, 1978.
- III. In-Country training is anticipated to be continued during IFY 78/79 at about the same level as the past two years programs. Training already completed is capable of being reimbursed upon presentation of request for reimbursement.
- IV. a. 1. & 2. DepAgr feels that the water pumps are not necessary and BAPPENAS will not approve purchase of cement mixers on grounds World Bank extension program will take care of any needs in this area.
- 3. Same status as II. e. 2.
 - 4. 31 Jeeps have arrived in the Jakarta port. As yet, spare parts have not been shipped.
 - 5. Same status as II. e. 4.
- b. DepAgr has purchased hand tools for use in construction of tertiary systems, AID obligation to reimburse upon receipt of documentation is \$90,300.
- c. At the end of IFY 77/78 DepAgr reported 118 water user associations organized covering an area of 50,646 hectares. AID has agreed to reimburse 42½% of Rp. 1,500/ha or has an obligation of \$77,800.
- d. BAPPENAS has refused to release funds for construction of offices for Water User Associations.
- e. AID has agreed to reimburse for completed survey and designs for tertiary systems Rp.5,000/ha. DepAgr has contracted for 89,334 hectares of design and AID has a total potential reimbursement obligation of \$457,985. The tertiary designs have been completed for 61 subproject covering 29,381 ha. giving a reimbursement obligation of \$150,626.

SEDERHANA I OUTPUTS

I. TRAINING ASSISTED UNDER THE LOAN

(See Table 3(d) for courses)

<u>Type of Training</u>	<u>No. From DGWRD</u>	<u>No. from DepAgr</u>	<u>Total</u>
In-Country	236	650	886
Third Country	52	50	102
US-Third Country	10	11	21

II. MAJOR WORKS

<u>IFY</u>	<u>Subprojects</u>	<u>Area</u>
1974/1975	135	39,208 ha.
1975/1976	190	49,184 ha.
1976/1977	215	57,452 ha.
1977/1978	137 (New) 49 (Carry Over)	92,772 ha.
	<hr/> 677	<hr/> 238,616 ha.

AID assisted subprojects are those in 76/77 and 77/78, 352 subprojects covering 150,224 ha.

BEST AVAILABLE DOCUMENT

Annex H.1
Table 3(d)

SEDERHANA TRAINING 1976/77 AND 1977/78

TYPE TRAINING	NUMBER TRAINERS	DURATION OF TRAINING	LOCATION	TEACHERS
I. IN-COUNTRY TRAINING				
Short Courses				
1. DGWRD				
a. Project planning & design for Engineers & BIE.	33	9 weeks	Bandung Training Center	Teachers from Universities and DGWRD officials.
b. Construction & Supervision for High School Graduates.	40	15 weeks	Yogyakarta Training Center	Teachers from DGWRD officials.
c. Irrigation Operation Maintenance for Engineers & B.I.E.	33	6 weeks	Surabaya Training Center	Teachers from DGWRD officials.
d. Surveying & Mapping for STM	40	15 weeks	Yogyakarta Training Center	Teachers from DGWRD officials
e. Princ. & Practices of O & M for STM	44	12 weeks	Surabaya Training Center	Teachers from DGWRD officials
f. Project Management, Construction Supervision & Monitoring for Ir. & BIE	24	6 weeks	Bandung Training Center	Teachers from DGWRD officials
g. Drafting & Cost Estimating for STM.	22	14 weeks	Yogyakarta Training Center	Teachers from DGWRD officials
2. M.O.A.				
a. Prin. & Practices of Irrig. O & M of Tertiary Systems & On-Farm Irrigation for FPS	29	1 month	Surabaya Training Center	Teachers from MOA officials
b. Const. of Tertiary & On-Farm irrigation and Drainage for FPS	29	3 months	Bandung Training Center	Teachers from MOA officials
c. Irrigation Water Management for PPL	199	2 weeks	North Sumatra, South Sumatra, South Sulawesi, East Java	Teachers from - Provincial Agriculture Ext. Service - Training Management Office - B.R.I. & Others
d. Water-User Associations & Water Management for PPL	181	1 month	Central Java, Bali, South Kalimantan, South Sulawesi, West Sumatra and East Java	Teachers from: - Provincial Agriculture Service - Training Management Office - Provincial Public Works - Provincial Health Service - B.R.I. & others
e. Water Management & Land Shaping	173	1 month	South Sulawesi, South Sumatra, Bali, Aceh, South Kalimantan, Central Java, West Sumatra	Teachers from - Provincial Agriculture Ext. Service - Training Management Office - B.R.I. - Others
f. Extension Water Management	19	1 month	Ciawi Bogor, West Java)	Teachers from Universities, MOA officials and Sinotech, Consultant
g. On-Farm Irrigation Design & Land Shaping	20	1 month	Ciawi Bogor, West Java)	
3. FARM LEADERS				
a. Water Users Association Leader Training	950	7 - 10 days	In every Province, except Bengkulu, C. Kalimantan, Irian Jaya, Timor Timur and Jakarta	Teachers from MOA officials
II. THIRD COUNTRY TRAINING				
Observation/Training Tours				
1. DGWRD	52	3 weeks	Philippines & Taiwan	
2. MOA	50	3 weeks	Philippines & Taiwan	
III. U.S./THIRD COUNTRY TRAINING				
Observation/Training Tours				
1. DGWRD	10	3 weeks	USA & Taiwan	
2. MOA	11	3 weeks	USA & Taiwan	

Sederhana (Simple) Irrigation and Land Development Project I
 SIZE DISTRIBUTION OF PROJECTS, IFY 1974-75
 (achievement - Ha.)

No.	Province	Less than 100	100-199	200-299	300-399	400-499	500-599	600-799	800-999	1000-1499	1500 and More	Total
1.	Aceh	-	2	-	-	-	1	1	1	-	1	6
2.	N. Sumatera	-	4	2	1	1	1	1	1	-	-	15
3.	M. Sumatera	3	1	2	3	1	1	-	-	1	-	14
4.	Riau	3	1	-	-	-	-	-	-	-	-	4
5.	S. Sumatera	-	1	-	-	-	-	-	-	1	-	2
6.	Jambi	13	12	1	1	-	-	1	-	-	-	28
7.	Bengkulu	3	3	2	-	-	-	-	-	-	-	8
8.	Lampung	2	-	-	2	1	-	-	-	-	-	5
-	Total Sumatera	24	23	7	7	3	3	4	2	2	1	75
9.	C. Kalimantan	-	-	-	-	-	-	-	-	-	-	-
10.	M. Kalimantan	-	-	-	-	-	-	-	-	-	-	-
11.	S. Kalimantan	1	3	2	-	1	-	-	-	-	-	7
12.	E. Kalimantan	-	-	-	-	-	-	-	-	-	-	-
-	Total Kalimantan	1	3	2	-	1	-	-	-	-	-	7
13.	M. Java	6	11	5	1	2	2	-	-	-	-	27
14.	C. Java	11	12	2	1	1	1	1	1	-	-	30
15.	D.I. Yogyakarta	2	-	-	-	-	-	-	-	-	-	2
16.	E. Java	-	1	1	-	-	-	-	1	-	-	3
-	Total Java	19	24	8	2	3	3	1	2	-	-	62
17.	Bali	-	-	-	-	-	-	-	-	-	-	-
18.	S. Sulawesi	1	-	1	1	2	1	1	1	-	-	8
19.	SE. Sulawesi	-	-	-	-	-	-	-	1	-	1	2
20.	M. Sulawesi	2	2	-	2	-	-	1	-	-	-	7
21.	C. Sulawesi	-	1	1	-	-	1	1	-	1	-	4
-	Total Sulawesi	3	3	2	3	2	1	3	2	1	1	21
22.	N. Nusatenggara Barat	-	-	-	-	-	-	-	-	-	-	-
23.	E. Nusatenggara Timur	-	-	-	-	-	-	-	-	-	-	-
-	Total Nusatenggara	-	-	-	-	-	-	-	-	-	-	-
24.	Maluku	-	-	-	-	-	-	-	-	-	-	-
-	Grand Total	47	53	19	12	9	7	7	6	3	2	165
-	Percent Total	28,48	32,12	11,51	7,27	5,45	4,24	4,24	3,63	1,8	1,2	
-	Cumulative Percent		60,60	72,11	79,38	84,83	89,07	93,31	96,94	98,74	100,00	

Sederhana (Simple) Irrigation and Land Development Project I
 SIZE DISTRIBUTION OF PROJECTS, IFY 1975-76
 (achievement - Ha.)

	Less than 100	100-199	200-299	300-399	400-499	500-599	600-799	800-999	1000-1499	1500 and More	Total
Ach	1	-	3	1	-	2	3	-	-	-	9
B. Sumatra	-	2	1	1	2	-	3	1	2	-	12
M. Sumatra	-	2	2	1	-	1	1	2	-	-	9
Bia	-	3	3	-	-	1	1	-	-	-	8
S. Sumatra	2	-	3	-	-	1	1	-	-	-	7
Jambi	9	11	7	4	-	-	-	-	-	-	31
Pangkajene	9	4	2	1	1	-	-	-	-	-	10
Lampung	-	6	3	1	1	1	-	-	-	-	12
Tot. Sumatra	11	30	24	9	4	6	9	3	2	-	88
G. Kalimantan	2	-	2	-	-	-	-	-	-	-	4
M. Kalimantan	-	1	-	-	-	-	-	-	-	-	1
S. Kalimantan	-	1	1	2	-	1	1	-	-	-	6
E. Kalimantan	-	1	-	-	-	-	-	-	-	-	1
Tot. Kalimantan	-	3	2	2	-	1	1	-	-	-	9
M. Java	-	8	4	2	1	1	1	-	-	-	17
G. Java	-	-	2	1	1	-	-	-	-	-	4
D.I. Yogyakarta	1	1	-	-	-	-	-	-	-	-	2
E. Java	-	1	1	1	-	-	-	-	-	-	3
Tot. Java	1	10	7	4	2	1	1	-	-	-	26
Bali	1	2	-	1	-	-	-	-	-	-	4
S. Sulawesi	5	7	4	5	5	3	2	-	1	-	32
SE. Sulawesi	-	-	-	-	-	1	-	1	-	1	3
E. Sulawesi	-	-	2	-	-	-	1	-	-	1	4
G. Sulawesi	-	-	-	-	1	-	2	-	1	1	5
Tot. Sulawesi	5	7	6	5	6	4	5	1	2	3	44
M. Banteng area	-	-	1	1	1	1	-	-	-	-	4
E. Banteng area	1	-	2	-	1	-	-	-	-	-	4
Tot. Banteng area	1	-	3	1	2	1	-	-	-	-	8
Maluku	-	-	-	1	-	-	-	-	-	-	1
Grand Total	21	50	42	23	14	13	16	4	4	3	190
Percent Total	11.05	26.32	22.10	12.10	7.37	6.84	8.42	2.10	2.10	1.58	100
Cumulative Percent		37.37	59.47	71.57	78.94	85.78	94.20	96.30	98.40	99.98	

Sederhana (Simple) Irrigation and Land Development Project I
 SIZE DISTRIBUTION OF PROJECTS, IFY 1977-78
 (GOI TARGETS - Ha.)

	Less than 100	100-199	200-299	300-399	400-499	500-599	600-799	800-999	1000-1499	1500 and More	Total
Aceh	0	0	0	1	0	0	0	0	0	0	2
N. Sumatra	1	0	2	2	0	2	1	0	1	0	9
W. Sumatra	0	0	2	1	1	1	0	1	2	0	18
Riau	0	1	3	1	2	2	2	0	2	0	13
S. Sumatra	0	2	1	2	2	1	2	1	0	0	11
Jambi	2	2	3	3	2	0	0	2	0	0	14
Bengkulu	1	1	5	4	0	1	2	0	0	0	14
Lampung	1	3	2	2	0	2	0	0	0	0	9
Tot. Sumatra	5	9	18	16	7	9	7	4	5	0	80
C. Kalimantan	0	0	0	0	0	0	1	0	1	2	2
W. Kalimantan	0	0	1	1	0	0	0	0	0	0	3
S. Kalimantan	0	1	0	0	0	1	0	0	2	0	5
E. Kalimantan	1	0	5	0	0	0	0	0	0	0	6
Tot. Kalimantan	1	1	6	1	0	1	1	0	3	0	16
W. Java	1	5	4	4	0	0	0	0	0	0	14
C. Java	8	6	4	2	0	0	0	0	0	0	19
D.I. Yogyakarta	0	4	0	0	0	0	0	0	0	0	4
E. Java	1	1	1	0	0	0	0	0	0	0	3
Tot. Java	10	16	9	5	0	0	0	0	0	0	40
Bali	0	1	1	0	0	0	0	0	0	0	2
S. Sulawesi	2	1	3	0	0	0	0	0	0	0	6
Sr. Sulawesi	0	0	0	1	2	0	1	0	0	0	7
N. Sulawesi	0	2	3	4	2	0	1	0	0	0	12
C. Sulawesi	0	0	0	0	2	2	0	0	4	0	10
Tot. Sulawesi	2	3	6	5	5	2	2	0	4	0	35
W. Sumatenggara	0	1	1	1	0	2	1	0	2	0	7
E. Sumatenggara	0	1	0	2	1	0	0	0	0	0	5
Tot. Sumatenggara	0	2	1	3	1	2	1	0	2	0	12
Maluku	0	0	0	1	0	0	0	0	0	0	1
Grand Total	18	32	41	31	13	16	11	4	15	9	180
Percent Total	9.57	17.02	21.80	16.49	6.91	8.51	5.85	2.12	6.91	4.79	100
Cumulative Percent		26.59	48.39	64.88	71.79	80.30	86.15	88.27	95.18	99.97	

