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

CAPITAL ASSISTANCE PAPER

Proposal and Recommendations
For the Review of the
Development Loan Committee

INDONESIA - Sederhana (Simple) Irrigation and Land Development
Project

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AID-DLC/P-2071

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

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February 20, 1975

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: Indonesia - Sederhana(Simple) Irrigation and Land
Development Project

Attached for your review are the recommendations for authorization of a loan to the Government of the Republic of Indonesia("Borrower") of not to exceed Twenty-three million Seven Hundred Thousand United States dollars (\$23,700,000) to assist in financing the United States dollar and local currency costs of a small-and medium-scale irrigation project in Indonesia.

This loan is scheduled for consideration by the Development Loan Staff Committee on Wednesday, February 26, 1975. Also, please note your concurrence or objection is due at the close of the meeting. Your poll sheet has been enclosed.

Development Loan Committee
Office of Development
Program Review

Attachments:

Summary and Recommendations
Project Analysis
ANNEX - F
(All other annexes will be
printed at a later date)

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SEDERHANA (SIMPLE) IRRIGATION AND
LAND DEVELOPMENT PROJECT - INDONESIA

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SEDERHANA (SIMPLE) IRRIGATION AND
LAND DEVELOPMENT PROJECT - INDONESIA

ABBREVIATIONS/ACRONYMS USED:

1. BUREC - Bureau of Reclamation.
2. SCS - Soil Conservation Service.
3. GOI - Government of Indonesia.
4. DGWRD - Directorate General Water Resource Development.
5. AAETE - Agency for Agriculture Education, Training and Extension.
6. RIS - Rural Irrigation Service.
7. BRI - Bank Rakyat Indonesia.
8. BI - Bank Indonesia.
9. BAPPENAS - National Development Planning Board.
10. IGGI - Inter-Governmental Group on Indonesia.
11. IBRD - International Bank for Reconstruction and Development.
12. IDA - International Development Association.
13. ADB - Asian Development Bank.
14. UNDP - United Nations Development Program.
15. FAR - Fixed Amount Reimbursement.
16. DRA - Direct Reimbursement Authority.
17. IFY - Indonesian fiscal year - 1 April to 31 March.
18. BIMAS - Crop intensification program - production inputs supplied on credit basis.
19. INMAS - Crop intensification program - production inputs supplied on cash basis.
20. IPEDA - Regional development contribution - a type of land tax.
21. Repelita - Five-year plan.
22. Repelita I - IFY 1970 to IFY 1974.
23. Repelita II - IFY 1975 to IFY 1979.
24. Ir. - University graduate engineer.
25. BE/BIE - Academy graduate with a bachelor of engineering degree.
26. STM - Technical high school graduate.
27. O and M - Operation and maintenance.
28. IRR - Internal rate of economic return.

LOCAL GOVERNMENT ORGANIZATION:

1. Province - Headed by Governor.
2. Kabupaten - District - Headed by Bupati.
3. Kecamatan - Subdistrict - Headed by Camat.
4. Village - Headed by Lurah (village chief).

SEDERHANA (SIMPLE) IRRIGATION AND LAND DEVELOPMENT PROJECT - INDONESIA

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SEDERHANA (SIMPLE) IRRIGATION AND
LAND DEVELOPMENT PROJECT - INDONESIA

I. SUMMARY AND RECOMMENDATIONS

A. Borrower and Executing Agency.

The borrower is the Government of Indonesia (GOI). The executing agencies in the Ministry of Public Works and Electric Power are the Directorate General Water Resource Development (DGWRD) and 23 Provincial Public Works offices. The executing agencies in the Department (Ministry) of Agriculture are the Agency for Agriculture Education, Training and Extension (AAETE), the Rural Irrigation Service (RIS) and 23 Provincial Agriculture Services.

B. Loan.

The proposed loan amount is not to exceed TWENTY-THREE MILLION SEVEN HUNDRED THOUSAND DOLLARS (\$23,700,000).

1. Total Project cost.

The estimated cost of the AID Sederhana (Simple) Irrigation and Land Development Project is \$59.2 million. Of this amount \$4.7 million (8.0%) is foreign exchange and \$54.5 million (92.0%) is local currency. The DGWRD will implement \$41.1 million (69.3%), the Department of Agriculture will implement \$9.8 million (16.5%), the Ministry of the Interior will implement \$1.2 million (2.1%), the Bank Rakyat Indonesia (BRI) will provide \$3.3 million (5.6%) in medium-term credit to farmers and individual farmers will contribute \$3.9 million (6.5%). A detailed summary of the cost estimate by input type and implementing agency is contained in Table 3, page 19. See Annex B.2.Tables 21 and 22 for a detailed breakdown of the cost estimate by input and implementing agency.

2. AID assistance.

It is proposed that AID finance \$23.6 million or 39.9% of total Project cost. Costs are divided into four AID financing categories in the cost estimate. These categories are: (1) traditional direct procurement, (2) Fixed Amount Reimbursement (FAR), (3) GOI contribution and (4) farmer contribution. Sources of financing include the AID loan, the GOI and farmers. A summary of the cost estimate by source of financing is contained in

Table 3, page 19. See Annex B.2. Table 21 for a detailed breakdown of the cost estimate by AID financing category and Table 24 for a detailed breakdown by source of financing.

a. Foreign Exchange.

Traditional direct procurement items account for \$5.7 million or 9.6% of Project costs. Of this amount \$4.7 million is foreign exchange and \$1.0 million is local currency support. It is proposed that AID finance all foreign exchange costs of traditional direct procurement. No other foreign exchange items are included in Project costs.

b. Local Currency.

Cost items included in the FAR category total \$37.8 million or 63.9% of Project costs. It is proposed that AID finance 50% of the predetermined cost of these items or \$18.9 million.

c. Disbursement Schedule.

Disbursements from the AID loan are estimated at \$0.6 million (2.6%) in Indonesian fiscal year 1975-76 (IFY - 1 April to 31 March), \$9.4 million (39.9%) in IFY 1976-77 and \$13.6 million (57.5%) in IFY 1977-78. A detailed AID loan disbursement schedule by input and implementing agency is contained in Annex B.2. Table 25.

d. Proposed Terms.

- 1). Maturity: Forty years including a ten-year grace period.
- 2). Interest: Two percent per annum during the grace period and three percent per annum thereafter.
- 3). Currency: Interest and principal repayable in U. S. dollars.

e. Grant Assistance.

The first twelve months of services of the team leader of the consultant team has already been grant financed. This grant assistance amounts to \$50,000.

3. Borrower contribution.

The total GOI contribution is \$31.7 million or 53.6% of total Project cost. The GOI contribution made without AID assistance amounts to \$11.9 million or 20.0% of Project costs. Local currency support for traditional direct procurement items (\$1.0 million) and the GOI share of the financing of FAR items (\$18.9 million) account for the remainder of the GOI's contribution.

4. Farmer contribution.

Individual farmers will contribute \$3.9 million in self-help labor services to the Project. This amounts to 6.5% of total Project cost.

C. Description and Justification of Project.

1. Description.

The purposes of the AID Sederhana Project lie in three interrelated areas: (1) institution building, (2) rice production and (3) well-being of the rural poor. The institution building objective is to increase the institutional capability of GOI implementing agencies; particularly (1) the DGWRD, (2) Provincial Public Works offices, (3) the AAETE, (4) the RIS and (5) the Provincial Agriculture Services; to implement primarily the GOI's Sederhana (Simple) Irrigation and Land Development Program. Institution building is proposed as the primary focus of the Project. It is anticipated that successful implementation of the Sederhana Program will lead directly to increased rice production in Sederhana sub-project areas. Secondary crop production may also be increased. Implementation of the Program and increased rice production are expected to increase the well-being of the target group, the rural poor, through increasing farmer incomes and employment opportunities in these areas.

Annex D Logical Framework Matrix contains the detailed quantification of end-of-project and ultimate targets for the three interrelated Project objectives. Two conditions, in addition to achievement of the end-of-project rice production target, indicating end-of-project status in rice production are: (1) all major works serving each subproject area are in place and operational and (2) 40% of the area of each subproject is dependably irrigated and capable of producing paddy rice.

One important assumption for achieving the end-of-project and ultimate institution building purposes of the Project is that an adequate number of technical personnel are available to implement

the Program at target levels. Maintenance of the momentum generated during the implementation of the AID Project in subsequent years is another principal assumption underlying the ultimate institution building Project objective.

Two key assumptions related to achieving both the end-of-project and ultimate rice production objectives are that rice and input prices are kept at a level adequate to maintain farmer incentives and that the BIMAS production input package is provided to farmers in Sederhana subproject areas on the schedule detailed in the Economic Justification section, page 22. Subsequent completion of tertiary canals and farm service ditches serving 50% of the area of each subproject which were not completed during the Project is also an assumption underlying the achievement of the Project's ultimate rice production purpose.

Achieving the well-being of the rural poor objectives of the Project depends on three basic assumptions. These assumptions are: (1) rice and input prices are maintained at a level adequate to generate target increases in farmer income, (2) the present average size of landholding in subproject areas of one hectare of paddy or less is maintained and (3) implementation of subprojects is carried out in a labor-intensive manner.

Project inputs supporting the institution-building purpose of the Project include consultants and training. Materials and equipment contribute to both the institution building and rice production objectives of the Project. Other rice production inputs include funds for (1) survey, design and construction of the major works (weir, primary and secondary canals, major structures, etc.) and tertiary canals of IFY 1975-76 and IFY 1976-77 subprojects and (2) farm level implementation activities in connection with these subprojects such as (a) formation of water user associations and extension, (b) construction of water user association offices, (c) issuance of land certificates, (d) land clearing, leveling and paddy forming, and (e) construction of farm service ditches. Plans for water management and operation and maintenance (O and M) of (a) major works and (b) tertiary canals and farm service ditches are also inputs contributing to the rice production purpose of the Project. A detailed summary of the cost estimate by input type and implementing agency is contained in Table 3, Page 19. See Annex B.2. Tables 21 and 22 for a detailed breakdown of the cost estimate by input and implementing agency.

The key assumption for providing institution-building inputs is that the COI makes budget provision for and provides its inputs on a timely basis. Important rice production objective input

assumptions include that the GOI makes budget provision for and provides its inputs on a timely basis and farmers provide their inputs on a timely basis.

Institution-building outputs of the Project include (1) GOI implementing agency counterpart personnel assisted and trained by the consultants, (2) establishment of internal training programs in GOI implementing agencies and (3) GOI implementing agency personnel completing outside training programs. Outputs related to the rice production objective of the project include the (1) major works, (2) water user associations, (3) extension activities, (4) water user association offices, (5) land certificates, (6) finished rice paddies ready for planting, (7) tertiary canals and farm service ditches serving 40% of the area of each subproject, (8) effective water management and (9) adequate O and M of (a) major works and (b) tertiary canals and farm service ditches for IFY 1975-76 subprojects covering about 50,000 hectares and IFY 1976-77 subprojects covering about 60,000 hectares located in 23 of Indonesia's 26 provinces and special areas. See Annex B.2 Table 1 for a breakdown of the Sederhana Program for these two years by province.

Among important assumptions for achieving outputs are that (1) the Ministry of the Interior is able to provide land certificates to farmers, (2) BRI is able to provide required medium-term credit for land clearing, leveling and paddy shaping to farmers and (3) the Ministry of Transmigration and Cooperatives is able to provide required new transmigrant farmers and construction workers in subproject areas without AID assistance. Another key output assumption is that adequate financing is provided for O and M activities.

The Project is technically and administratively sound. If Project inputs are provided on schedule, it is anticipated that Project outputs can be produced on schedule. Since the input schedule is reasonable, it is expected that the output schedule will be met.

The internal rate of return (IRR) of the Project is very high, about 46%. The Project's distributive and employment effects are expected to be strongly positive. In fact, one of the three inter-related Project objectives is the well-being of the rural poor. See the Socio-Economic Analysis section, page 21, for a description of the cost-benefit analysis and the income and employment effects of the Project. It is anticipated that achievement of Project outputs will result in attainment of the desired end-of-project status and, since the end-of-project conditions can be expected to represent fulfillment of the three interrelated Project purposes, it is expected that achievement of Project outputs will result in the meeting of these objectives.

The sector goal is to decrease Indonesia's dependence on food imports, particularly rice, needed to feed its growing population. Key assumptions for achieving this goal are that (1) present conditions of political stability continue to prevail, (2) the GOI's Family Planning Program meets its targets, (3) other GOI food production programs meet their targets and (4) the transportation and marketing system is capable of moving rice from producers in surplus areas to consumers in deficit areas both intra- and inter-island. It is anticipated that the achievement of the purposes of the Project will make a significant direct contribution to realizing the sector goal.

2. Justification.

Current U. S. assistance strategy in Indonesia is to support the economic development strategy of the GOI as set out primarily in the Repelitas (Five-Year Plans), particularly in the areas of (1) food and nutrition, (2) family planning and health and (3) education and manpower. AID is also particularly interested in rural development projects and projects that will improve the well-being of Indonesia's poor. The Project closely fits these elements of U. S. assistance strategy in Indonesia.

Agriculture was the top priority sector during the GOI's Repelita I (IFY 1970 to IFY 1974) and will remain in this position during Repelita II (IFY 1975 to IFY 1979). Among Repelita II agriculture sector objectives, rice self-sufficiency is assigned high priority. The GOI's overall objectives in the agriculture sector are: (1) income growth, (2) employment creation and (3) income redistribution.

Basic policies for water resource development during Repelita II include (1) continuation of rehabilitation and improvement of the existing irrigation network and (2) construction of new irrigation systems. Within the proposed new irrigation system construction program the Sederhana Irrigation Program will be given highest priority.

In addition to high Repelita II priority, the Sederhana Program enjoys the continuing interest and support of President Soeharto who initiated the development of the Program. This indicates strong GOI support for the Program.

The Program clearly falls within one of AID's areas of concentration. The objective of the Program is a rapid increase in rice production.

Sederhana subprojects have an important role to play in rural development in Indonesia, particularly on the outer islands. These subprojects are concentrated in some of Indonesia's least developed provinces such as Bengkulu, Jambi, South Sumatra and Southeast Sulawesi. The subprojects will be the catalyst for rural development in these provinces as well as many less-developed areas of the more developed provinces in the outer islands. Rural development on Java and in better developed areas of the outer islands will be enhanced. Not only will the AID Project support the provision of infrastructure in rural areas; it will also provide assistance in the development of water user associations, local institutions in which farmers participate in development.

The Program will improve the well-being of Indonesia's rural poor. One of the three interrelated purposes of the AID Project is to increase the well-being of the rural poor through increasing farmer incomes and employment opportunities in Sederhana subproject areas.

II. PROJECT PAPER.

A. Project Background.

1. GOI Sederhana (Simple) Irrigation and Land Development Program.

The Sederhana Irrigation Program was proposed by President Soeharto. He saw the objective of the Program as increasing food production through undertaking projects which could be simply and rapidly executed.

In response to the President's initiative, the Directorate General Water Resources Development (DGWRD) requested Provincial Public Works offices to submit a list of small and medium-scale irrigation and reclamation projects in their areas suitable for implementation during Repelita II. Information requested included (1) a short project description, (2) a sketch map of the area and (3) answers to a short questionnaire. This DGWRD first questionnaire is included as Annex B.1.b.

The projects submitted in response to the DGWRD request totalled about 1,000,000 hectares. These projects were originally screened down to about 683,000 hectares and then to 550,000 hectares for inclusion in Repelita II. Two sets of criteria were used in this screening; general criteria applicable to all irrigation projects to be implemented in Repelita II and special criteria applicable only to the Sederhana Program. General criteria included:

1. Suitable soil.
2. Suitable quality and quantity of water.
3. Adequate manpower (farmers and construction workers) available in area or will be provided through organized transmigration program.
4. Proximity to market.
5. Physical accessibility.
6. No land status problems.
7. Low flood risk.

The following items were included among the special criteria for the Sederhana Program:

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

An additional criterion, cost less than Rp. 100,000 (\$241) per hectare, was used to choose projects for implementation during the first two years of the Program.

The DGWRD sent appraisal teams to the provinces in December 1973 to fill out another questionnaire on projects which had been tentatively selected for inclusion in the Program for IFY 1974-75. This DGWRD second questionnaire contained detailed questions on the capability of Provincial Public Works offices and private contractors to execute various phases of the Program. Somewhat more detailed questions on (1) soils, (2) meteorology, (3) hydrology, (4) manpower, (5) land and sea communications links and (6) the state of project preparation were also included. The answers to this questionnaire were used to screen IFY 1975-76 projects for budgetary presentation. It is included as Annex B.1.c.

In July 1974 the DGWRD sent a long and detailed questionnaire to the Provincial Public Works offices to be filled out which contained 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, (9) project status, (10) construction requirements, (11) construction budget, and (12) implementation plan. Appraisal teams were sent to the field in September 1974 to assist in answering the questions and check the answers provided. The information from this DGWRD third questionnaire has not yet been compiled and analyzed. It will be used to make final selection of subprojects for implementation in IFY 1975-76. Some projects in the IFY 1976-77 program will also be identified as a result of this analysis. The DGWRD third questionnaire is included as Annex B.1.d. Annex B.1.e. is the DGWRD grading sheet for selection of subprojects.

Present GOI plans call for construction of Sederhana sub-projects with a total area of approximately 550,000 hectares during Repelita II. The breakdown of the total by year of completion is set out in Table 1 below:

TABLE 1

Sederhana Program -
GOI Targets for Repelita II

IFY	Area (Ha.)	Percent of Total	Cumulative Percent of Total
1974-75	41155	7.4%	7.4%
1975-76	65469	11.8%	19.1%
1976-77	100169	18.0%	37.1%
1977-78	150000	26.9%	64.1%
1978-79	200000	35.9%	100.0%
Total	556733	100.0%	

Note: See Annex B.2. Table 6 for complete presentation with notes.

On the basis of the best DGWRD cost estimates available for each of these years, the total construction cost of the Sederhana Program will exceed \$90.0 million during Repelita II.

The IFY 1974-75 Sederhana Program includes projects located in 17 provinces, the IFY 1975-76 proposed Program includes projects in 21 provinces, and it is planned to eventually include 23 of Indonesia's 26 provinces and special areas in the Program. However, over 85% of the area involved in the Repelita II Sederhana Program is located in just 9 provinces: South Sulawesi, North Sumatra, Jambi, South Sumatra, Bengkulu, West Sumatra, Lampung, Southeast Sulawesi and Aceh (see Annex B.2. Table 7 for a complete presentation).

2. AID Sederhana (Simple) Irrigation and Land Development Project.

AID interest in the GOI Sederhana Program dates from October 1973. J. G. Howe, SER/ENCR, AID/Washington, spent several weeks in Indonesia in January-February 1974 appraising project development possibilities. His report contains a thorough discussion of many of the AID Project's basic parameters.

The Intensive Review Request for the Project was submitted to AID/Washington in May 1974. AID/Washington approval and comments were received in June 1974 (See Annex C).

John F. Mangan of the Bureau of Reclamation (BUREC) served as an advisor to the DGWRD on the Sederhana Program between the beginning of October and the end of December 1974. AID financed his services on a grant basis. His insights into the Program and close relationship with his Indonesian counterparts proved invaluable in development of the AID Project.

The primary objective of the AID Project is to increase the GOI's ability to implement the Sederhana Program. GOI Program targets increase from about 40,000 hectares in IFY 1974-75 to 200,000 hectares in IFY 1978-79, a compound annual growth rate of almost 50 percent. Although Sederhana subprojects are conceptually simple when taken individually, the large number of subprojects, their scattered and isolated locations and the rapid rate of increase of the size of the Program will require a rapid expansion and upgrading of the capability of the Government agencies concerned, if the Program is to be successfully implemented.

The Project, to be of real assistance to the GOI, must take the basic focus of the Sederhana Program fully into account. The major characteristic which differentiates this Program from other irrigation programs in Indonesia is the simple nature of the projects to be undertaken. Sederhana subprojects are visualized as simple to design, simple to construct, capable of rapid execution and relatively inexpensive. They are expected to have a quick impact in terms of rice production.

Although AID reimbursement of certain predetermined local currency costs will not be tied to any specific list of projects, such reimbursement is planned to cover IFY 1975-76 and IFY 1976-77 Sederhana subprojects. GOI plans call for the completion of construction of the major works of 407 subprojects covering a total area of 165,638 hectares during this period. This total is broken down into 190 subprojects covering 65,469 hectares in IFY 1975-76 and 217 subprojects covering 100,169 hectares in IFY 1976-77. The preliminary DGWRD construction cost estimate for these subprojects is \$27.0 million. See Annex B.2. Table 1 for a breakdown of the Sederhana Program for these two years by province.

The distribution of the subprojects province in IFY's 1975-76 and 1976-77 is not very different from the distribution for the Repelita II Program as a whole. Although these subprojects are likely to be located in 23 of Indonesia's 26 provinces and special areas, about 85% of them are located in South Sulawesi, Bengkulu, Lampung, Jambi, North Sumatra, West Sumatra, Aceh, South Sumatra, Southeast Sulawesi and South Kalimantan. The top nine provinces in the Repelita II Program are the same as the top 10 provinces in the Program for IFY's 1975-76 and 1976-77, with the exception that South Kalimantan is included in the latter group.

A detailed breakdown of subproject area by province is contained in Annex B.2, Table 7 and this information is summarized on a map of Indonesia in Annex B.4.d.

Based on an analysis of implementation capability where the binding constraint was assumed to be the availability of trained technical personnel for the Provincial Public Works offices, USAID estimates that the GOI will only be able to complete construction of the major works for approximately 275 projects serving about 110,000 hectares during IFY's 1975-76 and 1976-77. The constrained target for IFY 1975-76 is about 145 subprojects totaling 50,000 hectares and for IFY 1976-77 about 130 subprojects totaling 60,000 hectares. A description of the procedure used to make these estimates is contained in the Implementation Capability section, page 39, and a summary of the analysis is contained in Annex B.2, Table 19.

The USAID estimate of the total cost of subprojects included within these constrained targets is \$59.2 million. The Cost Estimate section, page 19, contains a description and detailed summary of the cost estimate.

3. Other GOI irrigation programs.

The Government's Sedang-Kecil (medium- and small-scale) Irrigation Program completed rehabilitation and extension of existing and construction of new technical irrigation projects totaling 220,000 hectares in 19 provinces during Repelita I. This program includes subprojects up to 7000 hectares in size which are implemented primarily by the Provincial Public Works offices. The GOI will continue the Sedang-Kecil Program during Repelita II.

The GOI has also received considerable assistance from multi-lateral and bilateral donors, primarily in rehabilitation, but also including some new construction of technical irrigation systems. These projects have normally had special project status and, therefore, have been implemented by special organizations set up for the purpose rather than by the Provincial Public Works offices.

The DGWRD also has programs for the control and development of rivers and reclamation of tidal and swampy areas. These projects have normally been implemented by the Provincial Public Works offices in the past, although some of the larger river projects have been given special project status.

As shown in Table 2 below, DGWRD budget expenditures in support of these programs amounted to \$58.4 million in IFY 1973-74 and the area completed totaled 406,851 hectares:

TABLE 2

DGWRD Budget Expenditures and Area Completed by Budget Category and Implementing Agency

	<u>Provinces</u>	<u>Percent</u>	<u>Special Projects</u>	<u>Total</u>	<u>Percent</u>
a. Budget Expenditures (\$ Thousand)					
Irrigation Rehabilitation	6436.4	23%	21336.4	27772.8	48%
Irrigation Extension	3033.7	36%	5492.6	8526.3	15%
Rehabilitation and Development of Rivers	1944.6	74%	688.2	2632.8	4%
Other Irrigation	1334.5	7%	18118.7	19453.2	33%
Total	12749.2	22%	45635.9	58385.1	100%
b. Area Completed (Ha)					
Irrigation Rehabilitation	44651	15%	260867	305518	75%
Irrigation Extension	16040	51%	15440	31480	8%
Rehabilitation and Development of Rivers	40003	71%	16710	56713	14%
Other Irrigation	10032	76%	3108	13140	3%
Total	110726	27%	296125	406851	100%

Notes:

1. Sedang-Kecil (Medium- and Small-scale) Irrigation Program included in Irrigation Extension category.
2. Tidal and swamp reclamation included in Other Irrigation Category.

Irrigation Rehabilitation was the DGWRD's largest program in IFY 1973-74, accounting for 48% of budget expenditures and 75% of area completed. The Irrigation Extension budget category, which includes the Sedang-Kecil Program, absorbed 15% of budget expenditures and completed 8% of the total area.

4. Prior AID assistance in related areas.

The only previous assistance that AID has provided to the DGWRD has been financing of the master plan and feasibility studies for the Citanduy River Basin Development Project under Loan 497-H-027. This work is expected to be completed in January 1975. AID is currently interested in financing the design of the first priority feasibility study, the Lower Citanduy/Ciseel Flood Control, Irrigation and Drainage Project, and the additional studies for the second priority project, Reclamation of the Segara Anakan.

AID is currently funding three activities in the agricultural sector which support the Sederhana Program. Under the Agricultural Research Project, technical advisors, participant training and research equipment are being provided to the Central Research Institute for Agriculture, the country's food crop research agency. Adaptive research work is being conducted on Java, Sumatra, Sulawesi, and Kalimantan concentrating on rice variety improvement, rice production problems and crop systems. The technology being produced through research is being fed into the extension system, particularly through the BIMAS and INMAS programs and will be made available to the beneficiaries of the Sederhana subprojects.

Under the Assistance to Agriculture Project, training has been provided in fertilizer marketing to participants from both government and industry and a fertilizer management board with a technical committee has been formed. The objectives of these bodies are to review fertilizer policies and programs and to develop better coordination and improvements in the production, distribution and marketing system. The translation of these objectives into action programs offers the best prospects for achieving material improvement in the timely distribution of fertilizer to the farmer.

The Higher Agriculture Education Project is building Indonesian institutional capacity to train provincial agriculturists at the university degree level. These efforts will increase the availability of competent professionals and skilled managers required to initiate and implement agricultural development projects such as the Sederhana Program.

5. Other donor assistance.

The DGWRD has received extensive assistance from multi-lateral and bilateral donors. The World Bank has provided the GOI with a total of four International Development Association (IDA)

credits for irrigation projects. Current plans are to provide International Bank for Reconstruction and Development (IBRD) financing for a fifth irrigation project sometime in the spring of 1975. The Asian Development Bank (ADB), Japan, the Netherlands and the United Kingdom have also been active in providing the DGWRD with project aid in the irrigation area. Technical assistance has been provided by the United Nations Development Program (UNDP), West Germany, Australia and Canada, as well as the donors mentioned above. See Annex B.4.c. for a listing of donor-financed irrigation projects committed during Repelita I by year of commitment and amount.

Two of these projects are particularly noteworthy. The Tajum Irrigation Project financed by the ADB is developing an innovative approach to on-farm water management. A United Kingdom project is making technical assistance available to the Provincial Public Works office of East Java. The two consultants financed by this project are providing advice and assistance to Provincial Public Works in: (1) project identification, (2) survey, (3) investigations, (4) planning, (5) design, (6) O and M procedures and (7) O and M training.

6. Views on the Project.

An IBRD irrigation project appraisal team which visited Indonesia in the spring of 1974 indicated that Indonesia's water resource development priorities during Repelita II should be (1) finishing the rehabilitation of existing irrigation systems, (2) providing water storage for existing systems where economically feasible and (3) constructing new systems. This team felt that the Sederhana Program is a particularly attractive new irrigation construction program because of its widespread effects and use of mainly labor-intensive techniques. Both the ADB and the Dutch feel that the Sederhana Program is worthy of our support.

B. Project Analysis.

1. Technical analysis.

a. Technical Description.

The size of Sederhana subprojects can be best described as small- and medium-scale, with a large majority falling in the 100 to 2000 hectare range. However, some subprojects of less than 100 hectares and a few of 2500 hectares are included in the Program. Subprojects included in the GOI IFY 1975-76 and IFY 1976-77 Programs are generally small. Over half have an area of 299 hectares or less. Another 35% encompass an area from 300 to 699 hectares and the remaining 15% include an area of 600 hectares or more. A detailed breakdown of the size of Sederhana subprojects scheduled for these two years by province is contained in Annex B.2. Table 4.

For these two years, 95% of the proposed projects involve irrigation and 5% involve swamp reclamation. A provincial breakdown is included as Annex B.2. Table 2.

About half of the subproject area planned for construction in these years is currently used for wet rice production. Much of this area is covered by existing village irrigation systems. The other half of the subproject area consists of extension of existing wet rice areas and the bringing under cultivation of completely new areas. About 20% of this extension and new area requires clearing. A provincial breakdown of subproject area between existing wet rice area and extension/new area for IFY's 1974-75 and 1975-76 is contained in Annex B.2. Table 3.

The extreme simplicity of the physical layout and construction of existing village irrigation systems make them comparable to the unsophisticated irrigation systems built by individuals or small groups of American farmer-ranchers in the United States Rocky Mountain area some 30 to 60 years ago. The water supply for these small systems is provided by a rudimentary weir made from gabion (wire mesh) or split bamboo rock baskets or crude piles of logs or branches across streams which normally flow the year round. Such systems are gravity-fed without provision for water storage. Some of them use a stop log to control the amount of water entering the main canal. On rare occasions a steel screw-lift gate is used. Some systems have a rock, bamboo or log arrangement to limit the width of the canal entrance. Vertical confinement at the canal entrance is often effected by using rocks or logs also.

Canals are unlined earthen structures, almost entirely dug using hand tools. The few control structures (turnouts, division structures, checks and drops and very rarely sluice and wasteways) are mostly constructed of masonry, rock, logs, bamboo or combinations of these materials. Because these projects are small in size and often long and narrow in shape, the main canal is often small and delivers water directly to the terminal (tertiary) units. Most of the projects are located in foothill country where drainage problems are minimal because of favorable slope conditions.

Where village irrigation systems exist, plans call for rehabilitation, improvement and extension of existing structures and service areas. Structures will usually be improved in design and material and may be enlarged, relocated or replaced. Additional structures may be added and additional drainage provisions may be made. Although the resulting irrigation systems will still be very unsophisticated or simple in nature compared with modern technical projects, the improvements will represent a general upgrading of present water supply, control and disposal conditions.

In situations where the existing wet rice area consists of rainfed paddy, a simple system will be designed and constructed to provide a dependable water supply. The technical characteristics of these new systems will be similar to the existing village irrigation systems described above, including planned rehabilitation, upgrading and extension.

Another group of subprojects will involve developing a simple irrigation system for completely new areas, some of which are now covered with along along grass or forest. Most of these subprojects are located in undeveloped provinces such as Jambi, Bengkulu, South Sumatra, and Southeast Sulawesi. They are often quite large and require a greater degree of sophistication in planning, design and construction than the simpler subprojects described above.

b. Design Standards.

Design standards will be consistent with the simple nature of the Sederhana Program. A recent DGWRD instruction on selection criteria and design standards for the Sederhana Program is included as Annex B.1.

The DGWRD has a Design Standards Project at the Institute of Hydraulic Engineering in Bandung which has established standards drawings and specifications for several classes of works. An organization chart of the Institute is included as Annex B.3 Chart 4. Design manuals are distributed in the field for the use of field engineers. The simple designs in these manuals or modifications thereof made by the Design Standards Project will be used for the Sederhana systems.

c. Construction Technology.

Generally, construction of Sederhana subprojects will be very simple, using hand labor and only light equipment such as 3/4 ton pickup trucks, inspection jeeps, inspection motor bikes and 4-inch water pumps. Only a very basic knowledge of construction rules will be expected such as (1) general volumetric field mixes for concrete and mortar, (2) results using varied quality materials, and (3) application results of locally applied compaction techniques with soils of varying moisture content. Only basic knowledge and judgment respecting the physics of soil, stone, cement, water, wood and other construction materials used locally will be required. This unsophisticated level of technology may be summed up as a requirement for sub-professional level capability, usually acquired through supervisory experience together with a technical high school (STM) education.

About 10% of the subproject area planned for implementation in IFYs 1975-76 and 1976-77 requires greater sophistication. These subprojects generally involve new areas, are relatively large in size, and are located in relatively unpopulated areas. They will require closer checking by experienced field engineers and supervisors who are used to working with reasonably close tolerance requirements. Some heavy equipment such as motorized backhoes, dump trucks, concrete mixers and soil compactors will probably be required for such subprojects, although construction will still be relatively labor-intensive in nature.

d. Crop Production Technology

After land clearing, leveling and paddy forming have taken place, most farmers in the areas served by Sederhana subprojects will be using traditional varieties and traditional agricultural technology with some use of fertilizer and pesticides when they are available locally. As soon as the tertiary canals and farm service ditches covering a substantial portion of the area of each subproject have been completed, usually about one year after the completion of construction of the major works, the BIMAS production input package will begin to be made available to the farmers with dependably irrigated land. The BIMAS Rice Intensification Program provides improved seed, other modern inputs, credit and extension services to farmers involved in the program. Generally, about two-thirds of a BIMAS loan is provided as urea, triple superphosphate (TSP), insecticide and rodenticide in kind and one-third is provided for consumption purposes in cash. It is anticipated that BIMAS coverage of each subproject will increase each year as tertiary canals and farm service ditches are completed over more and more of the area of the subproject and that the package will be made available to most of the farmers in the subproject service area within five years after the completion of the major works.

2. Cost Estimate.

Table 3 below presents a detailed summary of the estimated \$59.2 million total cost of the AID Sederhana Project:

TABLE 3

a. Detailed Summary of Cost Estimate (\$ Thousand).

	Foreign <u>Exchange</u>	Local <u>Currency</u>	<u>Total</u>	<u>AID Financing</u>	
				<u>Category</u>	<u>Amount</u>
I. <u>DGWRD</u>					
A. Long-term Consultants	1019.9	340.0	1359.9	DIR	1019.9
B. Short-term Consultants	336.4	112.1	448.5	DIR	336.4
C. Training					
1. In Country	-	293.2	293.2	FAR	146.6
2. Overseas	51.8	-	51.8	DIR	51.8
D. Gabion Wire	-	631.1	631.1	FAR	315.6
E. Light Equipment					
1. FAR	-	697.2	697.2	FAR	348.5
2. Direct Procurement	775.0	88.8	863.8	DIR	775.0
3. GOI Contribution	-	465.5	465.5	GOI	-
F. Hydrology	103.5	11.5	115.0	DIR	103.5
G. Maintenance Support Light Equipment and Hand Tools	1035.0	115.0	1150.0	DIR	1035.0
H. Survey and Design	-	912.0	912.0	FAR	456.0
I. Construction	-	32172.5	32172.5	FAR	16086.3
J. Central Administration	-	1893.5	1893.5	GOI	-
<u>Total DGWRD</u>	<u>3321.6</u>	<u>37732.4</u>	<u>41054.0</u>		<u>20674.6</u>
II. <u>Dept. (Min.) of Agriculture</u>					
A. Long-term Consultants	569.3	189.8	759.1	DIR	569.3
B. Short-term Consultants	67.3	22.4	89.7	DIR	67.3
C. Training					
1. In Country	-	457.3	457.3	FAR	228.6
2. Overseas	51.8	-	51.8	DIR	51.8
D. Light Equipment					
1. FAR	-	304.3	304.3	FAR	152.2
2. Direct Procurement	772.3	81.3	803.6	DIR	722.3
3. GOI Contribution	-	305.9	305.9	GOI	-
E. Hand Tools	-	256.2	256.2	FAR	128.1
F. Formation of Water User Associations and Extension	-	416.6	416.6	FAR	208.3
G. Construction of Water User Association Offices	-	456.1	456.1	FAR	228.0
H. Construction of Farm Service Ditches					
1. FAR	-	1216.1	1216.1	FAR	608.1
2. GOI Contribution	-	1520.2	1520.2	GOI	-
I. Office Facilities	-	114.7	114.7	GOI	-
J. Administration (Exploitation and Control)	-	3035.0	3035.0	GOI	-
<u>Total Dept. Agriculture</u>	<u>1410.7</u>	<u>8375.9</u>	<u>9786.6</u>		<u>2964.0</u>

	Foreign Exchange	Local Currency	Total	AID Financing	
				Category	Amount
III. <u>Ministry of Interior</u>					
A. Land Certificates	-	1216.1	1216.1	GOI	-
IV. <u>Bank Rakyat Indonesia (BRI)</u>					
A. Credit for Land Clearing, Leveling and Paddy Shaping	-	3313.5	3313.5	GOI	-
V. <u>Farmers</u>					
A. Land Clearing, Leveling and Paddy Shaping	-	2208.4	2208.4	FRM	-
B. Labor for Construction of Tertiary Canals and Farm Service Ditches	-	1641.9	1641.9	FRM	-
<u>Total Farmers</u>	-	<u>3850.3</u>	<u>3850.3</u>		-
VI. <u>Grand Total</u>	<u>4732.3</u>	<u>54488.2</u>	<u>59220.5</u>		<u>23638.6</u>

b. Summary of Cost Estimate by Source of Financing
(\$ Thousand).

	<u>AID</u>	<u>GOI</u>	<u>Farmers</u>	<u>Total</u>
I. DGWRD	20674.6	20379.4	-	41054.0
II. Dept. (Min.) of Agriculture	2964.0	6822.6	-	9786.6
III. Ministry of Interior	-	1216.1	-	1216.1
IV. Bank Rakyat Indonesia (BRI)	-	3313.5	-	3313.5
V. Farmers	-	-	3850.3	3850.3
VI. <u>Grand Total</u>	<u>23638.6</u>	<u>31731.6</u>	<u>3850.3</u>	<u>59220.5</u>

Notes:

1. Estimates include provision for contingency (15%) and price escalation (20% per year) where appropriate.
2. AID financing category legend:
 - a. FAR - Fixed Amount Reimbursement.
 - b. DIR - Traditional Direct Procurement.
 - c. GOI - Government of Indonesia Contribution.
 - d. FRM - Farmer Contribution.
3. See Annex B.2. Tables 21 to 24 for detailed cost estimate and breakdowns.

The cost estimate is based on the Sederhana Program constrained target of 110,000 hectares for IFY's 1975-76. A description of the procedure used to estimate this constrained target is contained in the Implementation Capability section, page 39, and a summary of the analysis is contained in Annex B.2. Table 19.

The construction cost estimate is based on the most recent DGWRD estimates available. It includes the cost of complementary investments such as access roads needed to realize Project benefits.

3. Socio-economic analysis.

a. Economic Justification.

The cost in current prices of the AID Project covering the constrained Sederhana Program for IFY's 1975-76 and 1976-77 is \$49.2 million. See Annex B.2. Table 25 for a detailed breakdown of this cost estimate.

This investment is expected to result in increased production of milled rice amounting to about 101,000 metric tons in IFY 1978-79 and ultimately to about 211,000 metric tons in IFY 1984-85. The result of the base economic analysis of the AID Sederhana Project is an estimated IRR of 46%. This base analysis is summarized below and in Annex B.2. Table 26.

Table 4 below summarizes estimated land use in subproject areas before and after the AID Project:

TABLE 4

Estimated Land Use Before and After AID Sederhana Project by Season

	<u>Before</u>		<u>After</u>	
	Hectares	Percent	Hectares	Percent
<u>Wet Season</u>				
Rice	49,372	45	98,744	90
Upland Non-rice	16,457	15	0	0
Idle	5,486	5	10,971	10
Uncultivated	<u>38,400</u>	<u>35</u>	<u>0</u>	<u>0</u>
Total	109,715	100	109,715	100
<u>Dry Season</u>				
Rice	10,972	10	32,915	30
Upland Non-rice	10,972	10	27,428	25
Idle	49,371	45	49,372	45
Uncultivated	<u>38,400</u>	<u>35</u>	<u>0</u>	<u>0</u>
Total	109,715	100	109,715	100

For existing wet rice areas, it is expected that 40% of the area will be dependably irrigated during the wet season in the first year after completion of the major works, 70% in the second year and 90% in the third and following years. It is anticipated that the dependably irrigated portion of currently upland and uncultivated areas will not

reach 40% until the second year after completion of the major works. This figure is expected to increase to 70% in the third year and 90% in the fourth and following years. In the case of areas which are currently upland and uncultivated, meeting this schedule depends on BRI's ability to provide required medium-term credit for land clearing, leveling and paddy forming. Since Sederhana subprojects are based on run-of-the-river irrigation, dependable dry season irrigation will be limited to an average of 30% of subproject area. It was assumed that 90% of the dependably irrigated area in each season is harvested.

The base analysis assumes that the BIMAS production input package will be made available to farmers tilling an average of 0, 15, 35, 55 and 60 percent of subproject area in the first through fifth years after completion of the major works, respectively, and 60 percent thereafter. This assumption is based on World Bank experience with irrigation projects in Indonesia.

The yield figures shown in Table 5 below were used to estimate incremental production resulting from the project:

TABLE 5

Estimated Rice Yield by Input Combination

Input Combination	Yield (MT/ha./crop)
Rainfed	0.8
Dependable irrigation with traditional crop production technology	1.5
Dependable irrigation with BIMAS modern crop production technology	2.6

Note: Yields on milled rice basis.

These yields are on the low end of a range of estimates recently made by the World Bank and are consistent with other statistical sources.

The long-term price of imported milled rice used to value incremental rice production from the Sederhana Project is \$260/MT, CIF Indonesian port of entry. This price is within the range of current prices for medium quality rice in many Indonesian urban areas. The farm gate price used in the analysis is \$245/MT. This differs from the CIF Indonesian port of entry price by the average transportation cost of moving to urban consuming centers that portion of the incremental production which is not consumed locally.

The IRR analysis includes incremental production costs necessary to attain incremental benefits. The net value of production calculations reduces the gross value by the cost of inputs for each level of technology. Annex B.2. Table 27 illustrates the breakdown of production costs and benefits per hectare. Recurrent costs for O and M, etc., were calculated separately.

b. Sensitivity Analysis.

In the judgment of USAID the base analysis described above uses the best estimates of technical and economic relationships available. Comparisons were made to the base analysis in order to test the sensitivity of the economic feasibility of the proposed Project to different sets of assumptions concerning the magnitude of benefits, construction costs, length of implementation period and treatment of on-farm labor.

1). Rice price.

In Indonesia the price of rice is highly correlated with the cost of labor, which is the major cost component in Sederhana subprojects. From the standpoint of historical domestic labor and rice price relationships as well as of import substitution, it is believed that \$260/MT, CIF Indonesian port of entry, is a realistic price on which to base IRR calculations. However, due to recent erratic world commodity prices, the IRR was tested for its sensitivity to changes in the price of rice. A price reduction of about 25% to \$200/MT lowers the IRR to 36%. A 15% increase to \$300/MT raises the IRR to 53%. It is to be noted that the world market price of rice has been above \$300/MT for nearly two years.

2). Crop production technology.

The IRR for two alternative levels of crop production technology were analyzed. As described above, additional investments in crop production technology in the form of the BIMAS production

input package were assumed in the base analysis. The second alternative assumes traditional varieties, cropping practices, production costs and yields. No investment other than that directly associated with construction and O and M is assumed. The resulting IRR for the Sederhana Project is 37%.

The difference in the two IRR's indicates the economic feasibility of including additional investment in a more advanced level of technology in the Sederhana Program. However, the Sederhana investment itself, exclusive of additional investment in a more advanced level of technology, yields a rate of return that is in excess of the opportunity cost of capital in Indonesia and indicates that the proposed package of subprojects is fully justified economically.

3). Reduction of rice yields.

Statistics from various sources produce a range of yields for each level of production technology. The base analysis assumes yields at the lower end of the range. It is possible that yields might be lower over the life of the Project due to such factors as prolonged adverse weather conditions, new or unusual plant disease or insect pests, or minor deleterious soil or water quality conditions that were not discovered during the subproject selection process. A 10% reduction in the assumed rice yields causes the IRR to drop to 40%.

It is also possible that yields might increase. Statistics show that yields higher than those used in the base analysis are already being obtained in some Indonesian locations. Furthermore, the base analysis assumes no increase in yields arising from newly developed technology packages during the next 15 years. A 10% increase in yields raises the IRR to 53%.

4). Higher construction costs.

A 20% increase in construction costs lowers the IRR to 31%. Again it should be noted that there is a close relationship between the price of rice and the cost of labor. It seems unlikely that this historical relationship can vary by any significant amount for more than a short period of time.

5). Longer construction and land development periods.

If the length of time for survey, design and construction of major works for the average Sederhana subproject is doubled the IRR drops to 37%. If the survey, design and construction of major works is implemented according to schedule but the period for completion of land clearing, leveling and paddy forming and construction of tertiary canals and farm service ditches is doubled the IRR drops to 36%.

6). Treatment of agricultural production labor.

The improved economic well-being of the rural poor is one of the three interrelated purposes of the AID Project. Therefore, the net increase in the return to labor (the value of the labor component of generated incremental agricultural production) is treated as a benefit of the project. If agricultural production labor is treated as a cost of the project, i.e., a production cost to the economy which is subtracted from benefits, the IRR is 31%.

A summary of the results of the sensitivity analysis is contained in Table 6 below:

TABLE 6

Summary of AID Sederhana Project
Sensitivity Analysis

Alternative	IRR
Base analysis	46%
Lower rice price (\$200/MT)	36%
Higher rice price (\$300/MT)	53%
No utilization of modern crop production technology (without BIMAS production input package)	37%
10% decrease in rice yields for given crop production technology.	40%
10% increase in rice yields for given crop production technology.	53%
20% increase in construction costs.	31%
Longer construction period for major works.	37%
Longer period for completion of land clearing, leveling and paddy forming and construction of tertiary canals and farm service ditches.	36%
Agricultural production labor as cost	31%

c. Evaluation of Sample Subprojects.

A detailed evaluation was undertaken of a geographic and size stratified random sample of subprojects. Subprojects ranging from less than 100 to 2,000 hectares and having current land uses including well irrigated rice, partially irrigated rice, rainfed rice, dryland non-rice cultivation, and grassland were visited. Aspects of engineering and agronomic technical considerations, construction costs, production costs and yields under various crop production technologies were studied in detail. The results of this analysis are presented in Annex B.2. Table 28.

On the average, the results of the analysis of the sample sub-projects were similar to the results of the overall analysis of the Sederhana Project described above. However, there is a wide range in the economic viability of individual sample subprojects. The IRRs ranged from 15 to 58% with the median being 41%.

d. Income and Employment Effects.

One of the three interrelated purposes of the AID Sederhana Project is improvement of the well-being of the rural poor. This objective will be achieved primarily by increasing farmer incomes and employment opportunities in subproject areas.

It is anticipated that the net value of production resulting from the AID Sederhana Project will amount to \$23.1 million in IFY 1978-79 and ultimately to \$43.4 million in IFY 1984-85. Subtracting the value of agricultural labor services and taxes, incremental farmer net income is expected to reach \$14.9 million in IFY 1978-79 and ultimately \$29.5 million in IFY 1984-85. Estimating an average farm size of one hectare, the Project will increase the net income of approximately 72,000 farmers by an average of about \$210 per year in IFY 1978-79. This implies a per capita income increase of \$42 per year affecting about 360,000 people, based on an estimated average family size of 5. Ultimately in IFY 1984-85, the income of approximately 110,000 farmers is expected to increase by an average of about \$270 per year, implying an increase in per capita income of \$54 per year for about 550,000 people.

A substantial percentage of this increase in income will accrue to Indonesia's rural poor. Sederhana subprojects will be concentrated in (1) areas close to consumption centers, (2) existing transmigration areas and (3) densely populated areas. This situation together with the small size and wide dispersion of the subprojects indicates that the need to market incremental production will not act as a deterrent to bringing land newly irrigated as a result of the Project rapidly into production.

Transmigration programs have been settling people in the outer islands since the Dutch period. Almost all transmigrants have come from Java and Bali. Most of them have been either landless laborers, urban poor or retired enlisted members of Indonesia's armed forces. Very few transmigrant settlements have been provided with irrigation and other rural infrastructure, so most transmigrant farmers have slipped back to subsistence agriculture after the first couple of years. The Repelita II Sederhana Program will give a high priority to providing dependable irrigation to these existing transmigrant areas.

Densely populated areas growing rainfed rice are among the poorest in Indonesia. The Java portion of the Sederhana Program seeks to provide dependable irrigation to many areas in this category.

Most beneficiaries of the Project will be small farmers whether they are natives of the subproject areas, existing transmigrants or new transmigrants. Currently transmigrants are being allocated one hectare of land with paddy potential and one hectare of upland and home yard. The average farm size in areas with established populations and agricultural production is approximately one hectare. A landholding of this size is typical of Project beneficiaries. Farms encompassing more than two hectares of paddy are rare. The limitation of paddy holdings to five hectares by law and the difficulties involved in alienating agricultural land in Indonesia make substantial increases in the average size of paddy holdings in subproject areas unlikely. USAID will be requested to devise prior to loan agreement signature a method to ascertain the land ownership patterns in the subproject areas toward eliminating from AID reimbursement assistance any that show significant concentration of large holdings.

The Sederhana Program has a large employment generation potential. Construction will be labor-intensive since the works involved are not well adapted to the use of heavy equipment. It is estimated that the construction of individual subprojects will require about 84,000 man-years of direct labor during the first year of the Project. This will increase to 108,000 man-years in the second year.

The Project will also create a large number of employment opportunities in working newly irrigated land. In IFY 1978-79 the Project is expected to result in about 97,000 new wet season agricultural employment opportunities and about 29,000 new dry season employment opportunities. Ultimately, in IFY 1984-85, the number of new wet and dry season jobs generated will reach about 179,000 and 59,000, respectively. Table 7 below summarizes the calculation of new agricultural jobs generated in IFY 1984-85:

TABLE 7

Estimated Additional Employment Opportunities in Working
Newly Irrigated Land Generated by AID Sederhana Project
in IFY 1984-85

	<u>Wet Season</u> <u>Irrigation</u>		<u>Dry Season</u> <u>Irrigation</u>	
	Now Rainfed Rice	Now Upland/ Uncult.	Now Rainfed Rice	Now Upland/ Uncult.
<u>BIMAS</u>				
Additional work days per ha.	180	380	180	380
Area cropped (thou. ha.)	26.7	32.7	5.9	11.9
Additional work days required (mil.)	4.8	12.4	1.1	4.5
<u>Traditional (Non-BIMAS)</u>				
Additional work days per ha.	90	290	90	290
Area cropped (thou. ha.)	17.8	21.8	3.9	8.0
Additional work days required (mil.)	1.6	6.3	0.3	2.3
<u>Total</u>				
Area cropped (thou. ha.)	44.5	54.5	9.8	19.9
Additional work days required (mil.)	6.4	18.7	1.4	6.8
Work days per season per worker	140	140	140	140
Additional employment opportunities generated (thou.)	45.7	133.6	10.0	48.6

Note: Same assumptions as base IRR analysis.

In addition about one worker for each 25 hectares will be required to carry out the operation and maintenance of Sederhana subprojects. For the total Project area of 110,000 hectares, this amounts to the generation of about 4,400 additional jobs.

e. Social Impact.

Many Sederhana subprojects are located in areas where the local economy is characterized by self-sufficiency at bare subsistence levels. Although these areas are past the stage of a barter market system, most family incomes are realized in terms of income in kind, i.e., self-produced food. There is little pecuniary income with which to improve family living standards. The marketable surpluses generated in these areas by a Sederhana subproject will generate money income without reducing income in kind. The result will be an advance in the areas's market economy in both agricultural and non-agricultural sectors.

Another impact in the subproject areas will be an improvement in diet. In many of the areas a large proportion of the income in kind, (i.e., food), is cassava. The Project will increase the production of other food crops, particularly rice, which have better nutritive characteristics. Although some of the increased production will be sold as marketable surpluses, some will be retained for family consumption as a substitute for cassava. Thus the subproject areas will enjoy the benefits associated with improved diet.

Another series of impacts will be associated with cropping patterns and crop production technology. Some of the subprojects are in areas where shifting cultivation is still common. The existence of irrigation will require more sedentary agricultural practices. Similarly, irrigated rice production will require higher levels of crop production technology than what is being practiced in some areas.

Associated with changes in the level of crop production technology are changes in the seasonality of agricultural production labor requirements. Irrigated rice production will even out the seasonal distribution of labor requirements.

Similarly, seasonal fluctuations in pecuniary income flows will also be reduced. The current practice in many areas is to produce food crops during the rainy season which are used for family consumption. During this period family pecuniary income is low. During the dry season farmers try to earn pecuniary income from off-farm activities. The Project will provide the basis for producing marketable surpluses of food crops, particularly rice, which generate pecuniary income on a year around basis.

The Project will have a favorable impact on women. Women are included in both the technical and administrative staffs of the GOI implementing agencies. The skills of the women directly involved in the implementation of the Sederhana Program will be upgraded as a result of the Project.

The availability of water user association offices is likely to result in the formation of women's groups by providing a convenient meeting place in subproject areas. Such groups would increase the participation of women in the affairs of their villages.

As an important part of farm families, women will share in the increased farm income resulting from the Project. Furthermore, the number of agricultural employment opportunities available.

to women will increase more than proportionately, as crop production shifts from rainfed rice production where women traditionally do 35% of the work to dependably irrigated rice production where women typically do nearly 60% of the total work. Also, women will share in the improved diet and reduction in seasonal fluctuations in agricultural labor requirements and farm pecuniary income stemming from the Project.

f. Balance of Payments Effect.

Indonesia is now and has been for many years a net importer of rice. During the current Indonesian fiscal year, rice imports are projected at 1.5 million MT -- over twenty percent of the total amount of rice entering world trade. During each of the two preceding Indonesian fiscal years, Indonesia imported 1.2 million MT. These levels of imports are slightly less than 10% of Indonesia's rice consumption. During the earlier period of 1968-1972, imports averaged slightly more than 5% of domestic rice consumption. One of the goals of the agriculture sector is to decrease Indonesia's dependence on food imports, particularly rice, needed to feed its growing population.

As stated earlier, it is anticipated that the Project will make a significant direct contribution toward realizing this sector goal. This is the obvious impact of the Project on Indonesia's balance of payments. Although the CIF price of imported rice has exceeded \$400/MT for over a year, this project has been evaluated at a more conservative medium-term estimate of \$260/MT for imported rice. At this price the foreign exchange savings from the reduced quantity of imports made possible by this Project will be \$21 million in IFY 1978-79 and ultimately \$47 million in IFY 1984-85.

Although Indonesia is currently benefiting from a large balance of payments surplus, this is considered to be a relatively short-term situation. As Indonesian development activities accelerate, it is expected that imports will grow more rapidly than export earnings. This makes it particularly desirable to minimize the need to expand foreign exchange on such imports as rice -- the production of which can be economically increased.

4. Policy analysis.

a. Rice Price Policy.

The stated GOI rice price policy is to (1) assure that producers receive a price that will encourage production while (2) consumers are protected against undesirably high prices. The GOI has sought to implement this policy through governmental domestic

rice purchases in defense of a stated producer floor price and the sale, at subsidized prices, of imported rice in sufficient quantities to defend the consumer ceiling price. In actual practice over the past several years rice pricing policy has tended to have a pro-consumer bias. In attempting to compensate for this, the GOI has supported the provision of fertilizer and credit at subsidized prices to rice farmers.

Between 1969 and the latter part of 1972, the GOI held the floor and ceiling support prices constant. During this period non-food prices and the prices of other food commodities increased appreciably, thereby resulting in a worsening of the terms of trade confronting the rice producer. Due to a poor crop and insufficient rice imports, the price of rice rose rapidly in late 1972 and early 1973. The floor and ceiling support prices were also raised during this period. At the present time the previous deterioration in the Indonesian price of rice relative to other domestic commodities has been reversed.

The Indonesian price of rice is significantly below the international price of rice. Currently, the Indonesian retail rice price is between \$210 and \$320 per metric ton (depending on geographic area). The producer floor support price is \$164/MT (but scheduled to be raised to about \$225/MT in February 1975) and the off-Java ceiling price is somewhat less than \$300/MT. The CIF cost of imported rice has been above \$400/MT for over a year. It is unclear what a reasonable medium-term price expectation is for internationally traded rice. The best judgment of USAID at the present time is that no less than \$260/MT is reasonable as a medium-term estimate for the CIF cost of imported rice in Indonesia. This figure is consistent with the current Indonesian floor price.

b. Impediments to Penetration of New Markets.

At the present time the GOI requires that all inter-island movement of rice be regulated and controlled by the Government. This is designed to prevent the smuggling of rice abroad, but it also serves to erect barriers to the movement of rice within the country and hampers the ability of producers to sell in the most profitable domestic markets. There are no restrictions on the intra-island movement of rice.

If the international price of rice declines to the level of the Indonesian price and/or the Indonesian price is increased to the international level, official restrictions on inter-island rice trade will hopefully be relaxed -- thereby eliminating this problem. As indicated above, USAID's best current judgment is that the international

and Indonesian prices will indeed move together. However, in the event that barriers to trade remain and these result in producers receiving inadequate prices, the benefits of the Sederhana Program could be reduced. The sensitivity of project justification to rice price reductions was discussed above.

c. Income and Employment Policy.

Employment generation and income growth and redistribution are important areas of policy emphasis in the GOI's Repelita II. As indicated previously, the GOI's three overall objectives in the agriculture and irrigation sector are (1) income growth, (2) employment creation and (3) income distribution.

Elimination of actual and disguised unemployment in the rural areas is one of the specific Repelita II objectives in the agriculture sector. Two objectives in the food sub-sector are to expand employment opportunities and to increase farmer income and decrease the seasonal nature of this income.

The GOI is looking to various programs to help meet Repelita II income and employment objectives. The broad geographic distribution, increased rice production, increased small farmer income and employment-generating effects of the Sederhana Program make it a particularly well-suited vehicle to carry out the GOI's income and employment policy.

d. Rural Development and Popular Participation.

As is well known, the Government of Indonesia's bureaucratic machinery extends all the way down to the village level through the Provincial, Kabupaten and Kecamatan levels. Each village has a village head (lurah) who is responsible ultimately to the Ministry of Interior through the Camat, Bupati and Provincial Governor. The military represented by the Army and the Police also have representatives at the village level. The only operational ministry that has representatives at the village level is the Department (Ministry) of Agriculture which has numerous extension field workers headquartered at the Kecamatan level (Kecamatan Agriculture Service).

However, in the past, this bureaucracy has acted mainly as a conduit for central development programs at the village level and has developed little popular participation in the development process. Even feedback from the local level through government apparatus to the Central Government has been attenuated.

Farm level implementation including (1) organization of water user associations and extension, (2) land clearing, leveling, and paddy forming, (3) construction of farm service ditches, (4) on-farm water management and (5) operation and maintenance of tertiary canals and farm service ditches is the single most important factor affecting the success of the Sederhana Program in meeting its objectives. The key to farm level implementation is the organization and development of water user associations which are composed of farmers and involve them in the many activities involved in providing them with dependable irrigation. Water user associations, called dharma tirta, have achieved a considerable degree of popular participation in the development process in Central Java in pilot programs. The Sederhana Project will provide assistance in the carrying out of farm level implementation activities in an effort to both increase the economic returns from the Project and popular participation of individual farmers in the development process.

5. Financial analysis.

a. Availability of Financing from other Donors.

This project is part of the U. S. Government contribution to IGGI non-food assistance for Indonesia during IFY 1974-75. The GOI has specifically requested AID assistance for this project. No other donor has expressed any interest in financing the Sederhana Program.

b. Indonesia's Debt Servicing Capacity

Indonesia's debt service payments (principal plus interest) on the \$6.9 billion of outstanding public sector debt are estimated at 4.7% of gross export earnings during IFY 1974-75. This decrease from a level of 8% of export earnings in 1972 reflects the recent large increase in Indonesian earnings from raw material exports. In comparison, debt service payments for all developing countries as a percentage of export earnings averaged 10.7% in 1973.

The known public debt includes \$5.5 billion of Central Government debt and \$1.4 billion of public enterprise debt. Approximately two-thirds of the projected service payments during 1974-75 are due to public enterprise debt -- reflecting the appreciable harder terms of such borrowings. Projected 1974-75 debt payments equal about 5% of outstanding public debt -- versus average debt payments of 15.3% of outstanding principal for all developing countries in 1973. Indonesia's debt servicing capacity is excellent at the present time.

c. Proposed Source of Procurement.

As indicated earlier, the costs of the project can be divided into four AID financing categories: (1) traditional direct procurement; (2) Fixed Amount Reimbursement (FAR); (3) GOI contribution and (4) farmer contribution. It is proposed that traditional direct procurement be limited to AID Geographic Code 941 countries plus Indonesia. FAR items would be procured for local currency in Indonesia.

Selection of the AID financing category for material and equipment items generally has been based on (1) a preference for direct procurement wherever this would not adversely affect Project implementation and (2) where the item is manufactured. Since the U.S. produces three-quarter ton pickup trucks and jeeps, they are included in the traditional direct procurement category. This is required by Section 636 (I) of the Foreign Assistance Act (FAA). Since Code 941 countries produce small cement mixers, hydrology equipment and maintenance light equipment and hand tools and delays in procurement of these items are not critical to Project implementation, these items are also designated for direct procurement.

FAR items include gabion wire, hand tools needed for construction of farm service ditches, small water pumps and motor bikes, all of which are produced in Indonesia. Since surveying equipment, drawing equipment and planimeters are not manufactured in Indonesia, they have been placed in the GOI contribution category. Direct procurement of these FAR and GOI contribution items is likely to result in substantial delays in Project implementation.

d. Impact on U. S. Economy.

Since traditional direct procurement financed by the Loan will be limited to Code 941 countries plus Indonesia and reimbursement to the GOI and FAR items will be made available via Special Letter of Credit (SLC) tied to imports from the U.S., there will be no adverse impact on the U.S. balance of payments.

e. GOI Contribution

GOI budget procedures applicable to the Project require that subproject selection be complete and the proposed budget for the following Indonesian fiscal year be compiled by September of the preceding year. Final approval and establishment of the budget normally takes place in January following review by Central Government ministries involved in Project implementation, the National Development Planning Agency (BAPPENAS) which is responsible for the development budget, and the Ministry of Finance. The budget will provide disbursements by quarter in advance according to the expected implementation schedule set forth in the budget documentation submitted for the subprojects.

The DGWRD approved budget for the Sederhana Program for IFY 1974-75 totals \$8.1 million and the proposed budget total for IFY 1975-76 is \$13.5 million. These budgets are set out in detail in Tables 8 through 11 of Annex B.2.

The Rural Irrigation Service (RIS) has an approved IFY 1974-75 budget of \$0.2 million for village irrigation activities including those in support of the Sederhana Program. The RIS proposed budget for IFY 1975-76 totals \$2.5 million.

f. Operation and Maintenance Financing.

Water user charges are the best way to insure adequate financing of the operation and maintenance of irrigation systems. GOI policy is to eventually impose such charges on irrigation system beneficiaries.

However, the GOI is not likely to introduce a charge which would be collected and spent on irrigation O and M by government entities. Traditional resistance to such a levy is particularly strong in Java and significant in the outer islands.

The effectiveness of water user charges would be greatly enhanced if they were levied and disbursed by water user associations. Experiments in Central Java with water user associations (dharma tirta) have indicated that collection of water user charges and expenditure of these funds for (1) the salary of water distributors, (2) O and M of the tertiary canals and farm service ditches and (3) minor improvements to the terminal (tertiary) system can be quite successful. The key element is that the farmer contributes the funds to his own organization and has a share in decisions concerning their use. It is anticipated that AID's assistance will result in the formation of viable water user associations for Sederhana Projects which will be able to follow the lead of the Central Java dharma tirtas in levying water charges on their members. See page 47 for a further discussion of water user associations.

Once the farmers accept the idea of water user charges collected and disbursed through their water user associations, it may become possible to increase the charges to cover the O and M of the major works and hand over responsibility for these works to water user associations or groups of water user associations. Until that time, adequate funding for the O and M of the major works will depend on provincial government budget allocations as it does now.

The principal source of provincial government revenues is the IPEDA (regional development contribution), a type of land tax. The IPEDA is a flat rate per hectare which varies with the use of the land. In the past the IPEDA has been an unreliable source of funds

for the O and M of irrigation systems. Collection rates have been low and, without a special allocation of IPEDA revenues for irrigation O and M, this activity has had to compete with all other uses of funds at the provincial level with predictably uneven results.

The GOI recognizes this problem and is taking steps to remedy the situation. The Central Government made a contribution to provincial government budgets of \$3.86 per hectare specifically earmarked for irrigation O and M in IFY 1974-75. It is planned to maintain this contribution at the same level in IFY 1975-76. The provincial governments are expected to take over full responsibility for funding irrigation O and M by the end of Repelita II so that Central Government contributions will no longer be needed. In pursuit of this end, the GOI is currently considering a decree which would require the provincial governments to allocate 30, 35 and 40% of their IPEDA revenues to irrigation O and M in IFYs 1975-76 through 1977-78, respectively.

6. Implementation capability.

a. GOI Organization.

Four GOI Ministries are directly involved in the implementation of the Sederhana Program: (1) the Ministry of Public Works and Electric Power, (2) the Department (Ministry) of Agriculture, (3) the Ministry of the Interior and (4) the Ministry of Transmigration and Cooperatives. Bank Rakyat Indonesia (BRI) and the BIMAS Organization also play a role in implementing the Program. See Annex B.3. Chart 1 for a presentation of the organization and function of Central Government agencies involved in the Program.

The Ministry of Public Works is responsible for overall planning, organization, coordination and program progress control for the Sederhana Program. The organization chart for this Ministry is contained in Annex B.3. Chart 2.

Within the Ministry of Public Works, the Directorate General Water Resources Development (DGWRD) is responsible for the Sederhana Program. The DGWRD exercises budgetary control over the Public Works portion of the Program including the budgets of the Provincial Public Works offices. The DGWRD will develop (1) selection criteria, (2) subproject lists, (3) standards, (4) design criteria, (5) operation and maintenance procedures and (6) program progress control procedures. It will also provide (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. Chart 3 of Annex B.3. outlines the organization of the DGWRD.

A new Division within the Directorate of Irrigation has been set up to carry out this responsibility called Construction II. This Division was set up especially for the Sederhana Program but it also handles other small- and medium-scale irrigation programs. Organizationally the Division is broken into three geographic subsections; one each for western, central and eastern Indonesia.

The Directorate of Planning and Programming within the DGWRD will be devoting a considerable amount of time to the Sederhana Program. They will be involved in establishing selection criteria, selecting subprojects, economic analysis of subprojects and subproject program progress control.

Within the Ministry of Public Works the primary implementing agencies for Sederhana subprojects are the 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.) and the first 50 meters of tertiary canal downstream of tertiary outlet structures from the secondary canal. Survey, design, provision of materials and construction supervision for the remainder of the tertiary canals is also their responsibility. The Section Public Works offices and the Chief of the Water Resources Division of Provincial Public Works report to the Chief of Provincial Public Works and he, in turn, reports directly to both the Provincial Governor and the Central Minister of Public Works. A typical Provincial Public Works organization chart is included as Annex B.3. Chart 5.

The Department of Agriculture is responsible for overall planning, organization, coordination and program progress control for the farm level implementation of the Sederhana Program. See Annex B.3. Chart 6 for the organization chart of the Department.

Within the Department, the Agency for Agriculture Education, Training and Extension (AAETE) is responsible for extension aspects of farm level implementation and the Rural Irrigation Service (RIS) is responsible for technical aspects. These agencies exercise budgetary control over the Department of Agriculture portion of the Program including the budgets of the Provincial Agriculture Services. Functionally, the RIS will come under the guidance of the AAETE for the Sederhana Program. The organization chart for these two agencies is included in Annex B.3. as Chart 7.

The Provincial, Kabupaten and Kecamatan Agriculture Services operating through field extension workers headquartered at the kecamatan level are the primary implementing organizations for required assistance to the farmers in farm level implementation. Among farm level implementation activities, the provincial AAETE is responsible for (1) extension services and (2) assistance to farmers in (a) formation of water user associations, (b) on-farm water management and (c) O and M of tertiary canals and farm service ditches. The provincial RIS is responsible for assistance to the farmers in (1) land clearing, leveling and paddy forming and (2) construction of farm service ditches. Chart 8 of Annex B.3. is a typical organization chart for the Provincial Agriculture Service.

BRI is responsible for providing farmers with medium-term credit for land clearing, leveling and paddy shaping and short-term credit for production inputs. The BIMAS Organization actually provides required production inputs to farmers.

The Ministry of the Interior is responsible for several activities related to the Sederhana Program. The Directorate General Rural Land Affairs (Agraria) is responsible for cadastral survey and the issuance of land certificates. Village development efforts are the responsibility of the Directorate General Rural Community Development and local government organizations are the responsibility of the Directorate General General Government.

The Ministry of Transmigration and Cooperatives also plays a role in the implementation of the Sederhana Program. The Directorate General Transmigration is in charge of providing transmigrants and the Director General Cooperatives is in charge of farmer cooperative activities.

At the national level an interministerial committee for the Sederhana Program has been established to coordinate the activities of the various ministries involved in the Program. BAPPENAS performs an advisory role on this committee. Some Provinces have provincial irrigation committees which are chaired by the Governor and have as members the 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 levels concerned. The provincial Sederhana Program organization all the way down to the farmer, including these irrigation committees, is contained in Annex B.3. Chart 9.

b. GOI Institutional Capability to Implement Project.

1). Binding constraint on the size of the Sederhana Program.

It is clear that the binding constraint on the size of the Program in IFY's 1975-76 and 1976-77 is the technical staff of the Provincial Public Works offices. The increase in Program targets from about 40,000 hectares in IFY 1974-75 to about 100,000 hectares in IFY 1976-77 represents a compound annual growth rate of almost 60%. Targets for provinces in the outer islands increase from about 30,000 hectares to about 97,000 hectares during the same time period, a compound annual growth rate of more than 80%. Workload increases of this magnitude would require a very rapid increase in the number of Provincial Public Works office technical personnel.

There are two classes of professional engineering personnel in Indonesia: university graduate engineers (Ir.) and academy graduates with a bachelor of engineering (BE or BIE) degree. The backbone of the technical staff of Provincial Public Works offices is technical high school graduates (STM) who have received their training in construction.

The DGWRD and Provincial Public Works offices combined are normally able to recruit a maximum of 75 Ir./BE/BIE in a single year for all water resource development programs. In 1971 there were over 6,000 STM graduates in construction throughout Indonesia. See Annex B.2. Table 12 for a breakdown of these STM graduates by province. Because of competition from other Government activities and the private sector, only a portion of STM graduates are available for GOI water resource development activities. In both categories of technical personnel, most graduates are produced on Java and few in the outer islands. In 1971 74% of STM graduates in construction received their education on Java. Normally, technical personnel from Java show some reluctance to work in the outer islands unless jobs are scarce.

USAID undertook an analysis of GOI Sederhana Program implementation capability with the ability of the Provincial Public Works offices to hire new technical personnel as the binding constraint. Requirements for Ir./BE/BIE and STM used in the analysis are derived from data on existing personnel (Annex B.2. Table 12), area completed and budget expenditures for all water resource development programs in IFY 1973-74. The constraining assumptions used are that provinces outside Java in a single year are able to (1) hire a maximum of five Ir./BE/BIE for the Sederhana Program, (2) hire a maximum of one-third of STM graduates from within the province for the Sederhana Program, (3) hire a maximum of 20 STM graduates from outside the province for the Sederhana Program and (4) increase total STM employees by a maximum of 100%. The constrained Program for IFY 1975-76 resulting from the analysis amounts to slightly less than 50,000 hectares or 76% of the GOI target. The IFY 1976-77 constrained target totals slightly less than 60,000 hectares, 60% of the GOI target. A summary of the analysis is contained in Annex B.2. Tables 17 to 19.

The constrained targets are realistic given current technical personnel availabilities in Indonesia. Therefore, they indicate the appropriate size for the AID Sederhana Project.

2). Ministry of Public Works.

a). Survey, planning and design.

The GOI plans to contract for survey, planning and design of the major works for most Sederhana subprojects. As shown in Table 14 of Annex B.2., there are at least 37 survey and design contractors in Indonesia. Although they are concentrated on Java (70%), there are several with domiciles in the outer islands. In addition, the Survey and Design Division of the Directorate of Irrigation located in Bandung has designated certain contractors with domiciles on Java to do the required work for provinces in the outer islands. See Table 15 of Annex B.2.

Survey and design contractors are assigned prequalification classifications based on minimum personnel, equipment and experience requirements set up by the Survey and Design Division. These requirements are set out in Annex B.4.a. Only prequalified survey and design contractors will perform work for the Sederhana Program.

Provincial Public Works offices have survey teams and survey equipment available to do survey work as well as engineers and BE/BIE's who perform design work on irrigation projects. The DGWRD intends to upgrade their capabilities to carry out such work for Sederhana subprojects. Provincial Public Works (1) existing survey equipment, (2) IFY 1974-75 and 1975-76 budget allocations and (3) IFY 1976-77 needs to meet constrained targets are shown in Annex B.2. Tables 13, 11 and 20, respectively.

The Survey and Design Division has a special survey and design capability. This capability will be made available to Provincial Public Works offices for larger and more difficult Sederhana subprojects on request.

The DGWRD's approved budget for IFY 1974-75 provides survey and design funds for subprojects covering about 180,000 hectares, about 60,000 hectares scheduled for major works completion in each of IFY's 1974-75 through 1976-77. A breakdown of this budget allocation by province is set out in Annex B.2. Table 12. All but 5 of the 17 provinces which received part of this budget allocation completed survey and design of IFY 1974-75 subprojects during the second quarter of IFY 1974-75. The remaining 5 provinces expected to complete survey and design of these subprojects by November 1974. Most provinces expect to complete survey and design work for a large majority of IFY 1975-76 subprojects and make a start on this work for IFY 1976-77 subprojects by the end of IFY 1974-75.

b). Construction.

The GOI will contract for construction of Sederhana subproject major works wherever possible. Provincial Public Works staff will normally be limited to contracting and construction supervision. The GOI has followed this policy for some time resulting in the development of considerable construction contractor capability. Also, Provincial Public Works offices have become experienced in the utilization of contractors.

There are over 1000 construction contractors in Indonesia. See Table 14 of Annex B.2. for a breakdown of this figure by province. As in the case of survey, planning and design contractors, about 65% of these are domiciled on Java. However, every province included

in the Sederhana Program in IFY 1974-75 has at least a few construction contractors available and some of the larger Javanese firms have the capability and desire to perform work in the outer islands.

The capability of individual Indonesian construction contractors varies widely from large, well-staffed and well-equipped firms with wide experience to small labor contractors with little or no equipment. Many Sederhana subprojects will require only labor contractors who have an adequate number of foremen, but only minimal equipment. However, some subprojects will require better qualified construction contractors with greater equipment and financial capability.

Each Provincial Public Works office has set up its own minimum personnel, equipment, experience and financial requirements for placing construction contractors in one of several prequalification classifications. The requirements of South Sulawesi Province are included as Annex B.4.b. as an illustration. Each province maintains its own list of construction contractors by prequalification classification. The Chief of Provincial Public Works makes the final selection among prequalified construction contractors, normally basing his decision on the outcome of a tendering process.

Whenever possible, construction contractors will supply needed equipment. Where contractors do not have the required equipment to do the job, the Provincial Public Works Office concerned will provide this equipment and an equitable adjustment will be made in the contract price.

About 90% of Sederhana subprojects will require the use of only light equipment such as three-quarter ton pickup trucks, inspection jeeps, inspection motor bikes and four-inch water pumps. Tables 13, 11 and 20 of Annex B.2 set out Provincial Public Works (1) existing light equipment, (2) budget allocations for IFY's 1974-75 and 1975-76 and (3) IFY 1976-77 needs to meet constrained targets, respectively.

As mentioned earlier, only about 10% of Sederhana subprojects are expected to involve the use of any heavy equipment such as motorized backhoes, dump trucks, soil compactors and large concrete mixers. Heavy equipment availability is not expected to operate as a constraint on the implementation of such subprojects. It is anticipated that heavy equipment services will amount to only 10% of construction costs for these subprojects, or only about 1% of total construction costs. As shown in Table 13 of Annex B.2., Provincial Public Works offices already have a substantial quantity of heavy equipment in their equipment pools. The GOI is currently seeking financing of the supplier credit type for procurement of additional heavy equipment for these equipment pools. The Government has been negotiating for U. S. Export-Import Bank financing of these items.

The two most important construction materials needed for Sederhana subprojects, other than locally acquired rock for the weir and other major structures, are cement and gabion wire. On the average, cement accounts for 12 to 15% of the construction costs of these subprojects. Even though 60% of the cement used in Indonesia is imported, it is anticipated that Sederhana subprojects will use locally-manufactured cement almost exclusively. This results from the strong preference of the Indonesian cement market for locally-produced cement, particularly cement produced by P. T. Semen Gresik. Because distributors and dealers are assigned a fixed allocation from the production of local producers, they tend to prefer smaller customers with relatively constant needs over larger customers with variable demands. Imported cement is consumed primarily by large projects and projects near the port cities of Jakarta, Semarang, Surabaya, Medan and Ujung Pandang.

Gabion wire will be used extensively in Sederhana subproject weir construction. All gabion wire used in these subprojects will be manufactured locally. DGWRD budget allocations for gabion wire in IFY's 1974-75 and 1975-76 are presented in Annex B.2. Table 10.

Provincial Public Works offices reported the status of construction of IFY 1974-75 subprojects to the DGWRD in October 1974. The provinces reported that construction of almost all of these subprojects was scheduled for completion in February and March 1975. However, twelve provinces of the 17 included in the IFY 1974-75 Program indicated that some construction work could be extended beyond 31 March 1975. Four provinces mentioned construction work extending into May 1975, three mentioned June and five mentioned July.

The GOI Sederhana Program target for IFY 1974-75 is about 40,000 hectares. However, the USAID implementation capability analysis indicates a constrained Sederhana target of about 35,000 hectares. See Annex B.2. Table 19.

The principal reason for the delays that are apparently occurring in the construction of IFY 1974-75 subprojects is the scheduling of survey, design and construction of these subprojects for a single year. It is anticipated that this problem will be limited to the first year of the Program. As mentioned above, most provinces expect to complete survey and design of a large majority of IFY 1975-76 subprojects before the end of IFY 1974-75.

c). Operation and maintenance.

Most of the heavy maintenance work on the major works of Sederhana subprojects will be done on a contract basis. Provincial Public Works offices will carry out the lighter work in conjunction

with local authorities who will organize the farmers to provide the required labor. Each of these offices has technical personnel assigned to operation and maintenance. These staffs will need to be expanded. Proper O and M of the major works will also require light equipment and hand tools. The AID Project contains an allocation of \$1.0 million for traditional direct procurement of this equipment.

3). Department of Agriculture.

The Agency for Agriculture Education, Training and Extension (AAETE) has a total of 18,731 employees in the provinces of which 550 are university graduate technicians, 14,619 are non-university graduate technicians and 3,562 are administrative personnel. Out of a total of 282 Rural Irrigation Service (RIS) employees in the provinces, 20 are university graduate technicians, 220 are non-university graduate technicians and 42 are administrative personnel. See Annex B.2. Table 16 for a breakdown of RIS personnel by province. In other words, these two agencies have a combined total of 570 university graduate technicians and 14,839 non-university graduate technicians. These technicians are stationed primarily at the Kabupaten and Kecamatan levels. It is expected that this staffing level will prove adequate to meet the Department of Agriculture's responsibilities for farm level implementation activities connected with the AID Sederhana Project.

The RIS has almost no equipment. Although there are RIS units in all of the 23 provinces included in the Sederhana Program only 7 of these units have jeeps and 8 have motor bikes. A breakdown of existing RIS light equipment by province is contained in Annex B.2. Table 16. The technical staff of the RIS will need certain types of equipment to perform their farm level implementation functions for Sederhana subprojects. As part of the AID Sederhana Project the RIS units in each of the 23 provinces included in the Program will be provided with a basic light equipment set including surveying equipment, drawing equipment, a planimeter, three-quarter ton pickup trucks, inspection jeeps, inspection motor bikes, two-inch water pumps and one-bag cement mixers. Table 20 of Annex B.2. shows RIS light equipment requirements to meet the constrained Sederhana targets for IFY's 1975-76 and 1976-77. RIS units will also receive a quantity of hand tools to use in implementing the Project.

4). Bank Rakyat Indonesia (BRI).

Farmers will require about \$3.3 million in medium-term credit to finance land clearing, leveling and paddy shaping in the service areas of subprojects included in the constrained Sederhana Program for IFY's 1975-76 and 1976-77. This estimate of medium-term

credit requirements is based on the following assumptions: (1) 10% of subproject service areas require land clearing and 50% require land leveling and paddy forming; (2) the Government will finance land clearing, leveling and paddy forming covering 60% of subproject service areas that require it and farmers will privately finance the remaining 40% and (3) 90% of subproject service areas will eventually be dependably irrigated as a result of the project.

The GOI is currently in the process of developing a program to provide medium-term credit to individual farmers for land clearing, leveling and paddy forming. BRI is administering this program. Because the program is relatively new, an adjustment period when credit requirements are quantified, medium-term credit availabilities increased and collateral procedures simplified will be required.

A pilot project has been implemented in the service area of the Way Seputih Irrigation Project in Lampung Province. During the period from November 1973 to March 1974, BRI extended about \$200,000 in medium-term credit for land clearing, leveling and paddy forming to 1397 farmers owning 1600 hectares in the project area. Farmers prepared an additional 1100 hectares for wet rice cultivation using private financing.

Bank Rakyat Indonesia is the major rural financial institution of the GOI and has a network of operations throughout the country that extends down to the village level. BRI operates 13 regional offices, 220 branch offices, 2,121 village units and 501 mobile units. In addition, it supervises 4,774 village banks and 3,125 paddy banks. These facilities provide good coverage of the provinces involved in the Sederhana Program.

BRI loan disbursements increased almost 200% between 1971 and 1973 as shown in Table 8 below:

TABLE 8

Bank Rakyat Indonesia (BRI) Loan Disbursements
1971 to 1973 (\$ million)

	1971	1972	1973
Short-term	302.9	371.6	920.0
Medium-term	13.0	6.2	10.4
<u>Total</u>	<u>315.9</u>	<u>377.8</u>	<u>930.4</u>

Note: Table from ADB, Appraisal of East Java Agriculture Credit Project in Indonesia, October 1974.

Almost 99% of BRI's loan disbursements in 1973 were short-term, mostly BIMAS, credits. The GOI plans to shift BRI's leading operations towards concentration on small investment credits and permanent working capital financing for the agricultural and rural sectors in the future.

BRI is capable of administering the medium-term credit required to support the constrained Sederhana Program for IFY's 1975-76 and 1976-77. It is anticipated that the GOI will make adequate capital available to the BRI to finance these medium-term credits.

5). BIMAS.

The GOI plans to rapidly expand the BIMAS Rice Intensification Program. Plans call for an increase in the area covered by the BIMAS and INMAS rice intensification programs from 4.3 million hectares in 1974 to 6.1 million in 1978, a compound annual growth rate of almost 9%. Under these circumstances, the availability of the BIMAS production input package in the service areas of completed Sederhana subprojects at the levels assumed in the base economic analysis is unlikely to become an implementation problem.

6). Ministry of the Interior.

Land normally serves as collateral for BRI loans to individual farmers. In order for a farmer to use his land as collateral, he must have title to the land as evidenced by a land certificate.

The status of land titles has been a problem for some irrigation projects located on the outer islands. Claims of mineral and forest concessionaires as well as the traditional claims of local slash and burn cultivators have sometimes conflicted with the claims of transmigrant cultivators. The GOI is currently developing a regulation concerning the status of transmigrants on land which would give them clear title to the land they cultivate in most cases.

Land certificates should not present a problem in implementation of the Sederhana Program. One of the criteria used in selecting subprojects for the Program was no land status problems. It is anticipated that the Directorate General Rural Land Affairs (Agraria) will issue required land certificates covering Sederhana subproject service areas in a timely manner.

7). Ministry of Transmigration and Cooperatives.

Labor availability should not be a problem for most Sederhana subprojects. The DGWRD has not been able to implement irrigation schemes in existing transmigration areas fast enough to

keep up with the demand. The Sederhana Program will concentrate on these areas first. Even with the Rapid expansion of the Program planned for Repelita II, the DGWRD will not be able to meet the irrigation needs of new transmigration areas for some time.

Existing labor may not be adequate to implement Sederhana projects in sparsely settled provinces such as Jambi, Bengkulu, South Sumatra and Southeast Sulawesi. In these areas it is anticipated that the Directorate General Transmigration will provide the required settlers under its organized transmigration program.

8). Water user associations.

The most important element in successful farm level implementation of the Sederhana Program is the development of viable water user associations. Pilot programs for the development of water user associations (dharma tirta) in Central Java have resulted in dramatic increases in rice yields.

These dharma tirtas normally include all farmers tilling land in a single terminal (tertiary) system. A terminal system normally covers between 150 and 400 hectares.

Full meetings of the membership are normally held at least twice a year and sometimes more often. Members have the right to: (1) select officers, (2) hold office, (3) make proposals, (4) determine rules, (5) determine water user charges and fines, (6) allocate funds collected and (7) protest unfair treatment in the division of water. Corresponding obligations of members include: (1) obeying rules, (2) paying water user charges and fines and (3) contributing labor to group works such as (a) O and M of the tertiary canals and farm service ditches and (b) minor improvement of the terminal system. Members are generally required to contribute labor to group works at least once a month and sometimes more often.

Water user associations will be formed as part of the Program in Sederhana subproject service areas. Considering the success of the dharma tirtas in Central Java, these associations have an excellent chance of becoming well-developed, self-sustaining and socially and economically viable organizations.

7. Proposed assistance to improve GOI institutional capability to implement Project.

a. Advisory Team.

1). Number, discipline and location.

Even though individual subprojects included in the Sederhana Program may be technically quite simple, the number of projects, their wide geographic dispersion and the wide diversity of their nature present a critical need for experienced guidance and assistance. Such assistance will be required if the GOI is to meet the constrained targets for the Program within the planned implementation schedule.

Present plans call for a Central Advisory Team in Jakarta and three Regional Advisory Teams located in Ujung Pandang, Medan and Palembang. There would be a total of 12 advisors provided. The Central Advisory Team would consist of a team leader/design engineer and an irrigation/construction engineer. Each of the three Regional Teams would include a leader/design engineer and an irrigation/drainage/construction engineer. One of these two engineers would be qualified in operation and maintenance. The third member of each Regional Team would be a farm irrigation specialist. A farm irrigation specialist would also be located in Jakarta or Bandung to serve Java, Kalimantan and the eastern islands.

It is anticipated that the consultants would be provided through a contract with the Bureau of Reclamation (BUREC). The farm irrigation specialists would probably come from the Soil Conservation Service (SCS). The final number and composition of the Advisory Team would be determined during contract negotiations with BUREC.

2). Scope of services.

The primary function of the Advisory Team would be to assist the GOI in building up its institutional capability to implement primarily the Sederhana Program. It would also assist the Government in the implementation of the IFY 1975-76 and IFY 1976-77 Sederhana Programs in a timely, efficient and effective manner.

The Central Advisory Team would advise and assist the DGWRD in (1) overall organization and planning, (2) coordination with other GOI implementing agencies, particularly the Department of Agriculture, (3) identification and selection of subprojects, (4) economic analysis of subprojects, (5) standards, (6) design criteria, (7) design problems, (8) O and M procedures, (9) staff training and (10) program progress control procedures. The Central Team would also advise and assist the AAETE and the RIS in ⁽¹⁾carrying out their farm level implementation responsibilities for the Sederhana Program and (2) program progress control procedures.

The engineers on the Regional Advisory Teams would advise and assist Provincial Public Works offices in their regions in (1) survey and hydrology problems, (2) planning and layout of irrigation and drainage systems, (3) design, (4) survey, planning and design contracting, (5) review of consultant firm designs, (6) administration of construction tenders and contracts, (7) construction supervision including procedures and controls, (8) effective manpower utilization, (9) O and M of major works, (10) coordination with other GOI implementing agencies at the province level and (11) staff training. The regional farm irrigation specialists would advise and assist Provincial Agriculture Services in their regions in (1) all aspects of farm level implementation, (2) coordination with other GOI implementing agencies at the province, kabupaten, kecamatan and village levels and (3) staff and farmer training.

3). Organizational relationships.

The team leader would directly advise the Director of Irrigation and the Chief of the Construction II Division. See Annex B.3. Chart 3. He would also be responsible for the overall coordination and supervision of the activities of the Central and Regional Advisory Teams. The other member of the Central Team would be assigned an Irrigation Division counterpart. A direct-hire USAID irrigation advisor would act as liaison between this Team, the AAETE, the RIS and the regional farm irrigation advisors. This organizational relationship is presented in Annex B.3. Chart 7.

Each regional team leader would directly advise the Chief of Public Works and the Chief of the Water Resources Development Division of Public Works of each province in his region. Chart 5 of Annex B.3. illustrates these relationships. He would also coordinate and supervise the activities of his Regional Team. The other engineer on each Regional Team would have a counterpart in the Public Works office in each province in the region. Similarly, a counterpart for each regional farm irrigation specialist would be located in each Provincial Agriculture Service in the region. See Chart 8 of Annex B.3.

The Regional Advisory Team located in Ujung Pandang would cover the provinces of South, Southeast, North and Central Sulawesi. Aceh, North Sumatra, West Sumatra and Riau would be covered by the Medan Regional Team. The Palembang-based Team would cover South Sumatra, Jambi, Bengkulu, and Lampung Provinces. The remaining provinces included in the Sederhana Program located on Java, Kalimantan and the eastern islands would be served from Jakarta.

4). Short-term consultants.

The BUREC contract would provide for 72 man-months of short-term consultant services. These consultants would provide services in such disciplines as (1) survey and mapping, (2) hydrology, (3) geology, (4) agronomy, (5) agricultural economics, (6) O and M and (7) irrigation training. Also, if it were determined at some later date that additional long-term consultant services were required to implement the Sederhana Project, some of the funds allocated to short-term consultants would be moved to the long-term consultant category.

b. Training.

Training is a key factor in achieving the Sederhana Project objective of increasing the institutional capability of GOI implementing agencies. The skills of existing and new GOI staff will require considerable upgrading. Farmer training is also important to the success of the Project.

As mentioned previously, the Advisory Team would advise and assist the DGWRD and Provincial Public Works offices in staff training. Training would be provided in such areas as: (1) survey, (2) planning, (3) design, (4) construction including contracting and supervision, (5) evaluation and (6) O and M. On-the-job, in country and overseas training would all be utilized.

The regional farm irrigation specialists would advise and assist Provincial Agriculture Services in their regions in staff and farmer training. Staff training would be provided in such areas as: (1) wet ricefield planning, (2) survey, design and construction of farm service ditches, (3) on-farm water management and (4) O and M of tertiary canals and farm service ditches. Farmer training would include such subjects as: (1) wet ricefield planning, (2) on-farm water management, (3) rice production technology, (4) marketing and (5) processing. Staff members would be trained on-the-job, in country and overseas. Farmers would be trained through their water user associations.

C. Project Implementation.

1. Implementing plan.

a. Implementation Plan.

1).	Loan authorized (AID/W).	Feb. 25, 1975
2).	BUREC consulting services contract negotiated (GOI/BUREC).	Mar. 25, 1975
3).	Advisory Team begins to arrive in Indonesia (BUREC).	Apr. 1, 1975
4).	Loan agreement negotiated and signed (GOI/AID).	Apr. 30, 1975
5).	Conditions precedent to opening letters of commitment met (GOI/AID).	May 31, 1975
6).	BUREC consulting services contract signed (GOI/BUREC)	May 31, 1975
7).	Letter of commitment opened (GOI/AID).	June 30, 1975
8).	Advisory Team in place in Indonesia (BUREC)	July 1, 1975
9).	Major works construction complete for all subprojects (GOI).	Mar. 31, 1977
10).	40% of tertiary canals and farm service ditches complete for all subprojects (GOI).	Mar. 31, 1978
11).	Consulting services completed (BUREC).	Mar. 31, 1978
12).	Final disbursement (GOI/AID).	Oct. 31, 1978

An implementation schedule for Project inputs is included as Annex B.4.e.

b. Project Monitoring.

1). GOI monitoring.

The GOI implementing agencies will carry out primary monitoring of the AID Sederhana Project. The Construction II Division of the Directorate of Irrigation will monitor the execution of DGWRD and Provincial Public Works office responsibilities for subproject implementation. Chart 10 of Annex B.3. is a monitoring flow chart for the Sederhana Project. The purposes of DGWRD monitoring are: (1) planning budget allocation, (2) detecting problems and providing needed assistance, (3) assuring that selection criteria are met, (4) approving plans and specifications, (5) approving construction cost estimates, (6) assuring that construction is complete and (7) preparing and certifying requests for AID reimbursement. The DGWRD plans to use computer data processing as an integral part of its program progress control system. As mentioned earlier, the Central Advisory Team would advise and assist the DGWRD in program progress control procedures.

The staff of the Construction II Division consists of the Chief and 12 professional engineering personnel, mostly BIE's. The staff of the Division will be increased as necessary to handle the additional work created by Sederhana Project monitoring activities.

The AAETE and the RIS will monitor the execution of their and Provincial Agriculture Service subproject farm level implementation responsibilities. Among the objectives of Department of Agriculture monitoring activities are: (1) planning budget allocations, (2) detecting problems and providing needed assistance, (3) assuring that water user associations are formed, (4) assuring that water user association office construction is complete, (5) assuring that 40% of tertiary canal and farm service ditch construction is complete and (6) preparing and certifying requests for AID reimbursement. Advice and assistance on program progress control would be available from the Central Advisory Team.

2). Required AID documentation.

The DGWRD's required AID documentation for each subproject would include (1) a certification of technical soundness, including conformity to selection criteria, with the final plans and specifications attached, (2) a construction cost estimate based on the final plans and specifications, (3) a certification of completion of construction and (4) an O and M plan for the major works. The certification of technical soundness and construction cost estimate would have to be submitted to AID and verified before construction began to make an individual subproject eligible for AID reimbursement. All other required documentation would have to be submitted with a request for reimbursement of DGWRD Fixed Amount Reimbursement (FAR) items.

The Department of Agriculture would be required to submit the following documentation for each subproject: (1) a certification of completion of construction of 40% of the tertiary canals and farm service ditches, (2) a certification of completion of construction of water user association offices, (3) a water management plan and (4) an O and M plan for the tertiary canals and farm service ditches. This required AID documentation would have to be submitted with a request for reimbursement of Department of Agriculture FAR items.

3). AID documentation procedure.

The Public Works technician field/extension worker in charge of a subproject would prepare and sign required AID documentation. The Chief of Provincial Public Works/Provincial Agriculture

Inspector would approve all subproject documentation and submit it to the DGWRD/AAETE/RIS for final approval and preparation/certification of a request for AID verification of the technical soundness certification and construction cost estimate or request for AID reimbursement.

4). USAID monitoring.

The principal objective of AID monitoring would be to ensure that the GOI program progress control system for the Sederhana Project functions properly. AID monitoring would be aimed primarily at verifying required documentation, but would also include normal problem identification and progress monitoring. Verification would be required at three points in subproject implementation: (1) technical soundness certification and construction cost estimate before commencement of construction, (2) DGWRD documentation after completion of major works and (3) Department of Agriculture documentation after completion of tertiary canals and farm service ditches covering 40% of the subproject area. Sources of information for AID monitoring would include: (1) required AID documentation, (2) regular GOI and Advisory Team reports, (3) site inspections and (4) close working relationships with the DGWRD, AAETE and RIS, but also Provincial Public Works offices and Provincial Agriculture Services.

USAID's monitoring staff would be small, consisting of a direct-hire irrigation engineer and a direct-hire irrigation advisor assisted by several Indonesian personnel. This small staff would verify required AID documentation through field checking for enough subprojects to satisfy themselves that the GOI program progress control system was working properly. This might require site inspections of all of the first few subprojects submitted for verification of the technical soundness certification and construction cost estimate or AID reimbursement of DGWRD or Department of Agriculture FAR items and spot checking thereafter. Where a subproject was not field checked, verification of required AID documentation would be based on previously agreed parameters such as anticipated production rates, cost ranges, etc. It would not be feasible to conduct site inspections of all of the approximately 275 subprojects included in the Sederhana Project at three points in implementation. Therefore, verification of documentation will suffice.

5). Applicability of Various AID Implementation Rules.

Section 105 of the Foreign Assistance Appropriation Act requires AID approval of contractors and contracts for capital projects. These are defined, for purposes of this section, as discrete, self-contained projects where AID's contribution exceeds \$100,000. For individual sub-projects here, this figure is based on the cost of the major works, exclusive of certain items handled on a central or provincial basis, such as extension services, consultant services, and light equipment. About 43 (or 17%) of Sederhana subprojects will exceed \$100,000 in AID input. With respect to these, AID will approve contractors and contracts.

The requirement for approval of contractors will be met by (1) reviewing and approving GOI prequalification standards (2) requiring the GOI to certify that all contractors on the lists of prequalified firms meet the applicable prequalification standards, (3) reviewing and approving lists of prequalified firms and (4) ensuring that each firm awarded a contract appears on the applicable list of prequalified firms.

With respect to contracts on these subprojects, the requirement will be met by (1) reviewing and approving the applicable GOI standard contract forms, (2) requiring the GOI to certify that the applicable approved form has been used and (3) reviewing and approving any modifications of the applicable approved form for individual contracts. If these procedures prove administratively burdensome because of the large number of contracts involved for each subproject, these requirements would be assessed and some adjustment in their application would be sought.

These same procedures for approving contractor firms will be in effect for smaller subprojects, also -- those projects with less than \$100,000 AID input. For contracts GOI standard contract forms will be reviewed and approved, but monitoring of their use will not be as close.

Section 11F4 of AID Handbook 15 requires source certification from suppliers in local source procurement. Each Sederhana subproject may involve up to 100 separate, small procurements. Since about 275 subprojects will be included under the loan, as many as 27,500 separate procurements may be involved. Requiring source certifications and monitoring compliance would represent a very large if not impossible administrative burden.

The loan will in part authorize local (Indonesian source and origin) financing. Since the facts of Indonesia's trade, manufacturing, and commodity availability, in the areas of these subprojects, indicate that the extent of items likely to be used in the FAR portion of the loan which may be of non-Indonesian origin will be very slight, it is proposed to seek a deviation or waiver from the origin and componentry tests and certification requirements, with respect to this portion of loan activities.

c. Fixed Amount Reimbursement (FAR).

1). Eligibility date.

In order for a Sederhana subproject to be eligible for AID reimbursement, construction would have to begin after both the AID loan authorization date and the date of verification of the technical soundness certification and construction cost estimate. FAR in-country training and procurement of FAR equipment would have to take place after the date of AID approval of the corresponding cost estimates to be eligible for inclusion in requests for AID reimbursement of individual subprojects.

2). Basis.

AID would reimburse a mutually agreed percentage of the approved construction cost estimate for each subproject. AID would also reimburse a mutually agreed percentage of the approved per trainee cost estimate for in-country training and approved per unit cost estimate for FAR equipment.

Since AID approval of cost estimates for (1) survey and design of major works and tertiary canals, (2) formation of water user associations and extension, (3) construction of water user association offices and (4) construction of farm service ditches for each subproject would be unworkable, these items would be reimbursed on the basis of a flat rate per hectare. GOI/AID agreement on the flat rate per hectare for these items would be a condition precedent to opening other commitment documents and the mutually agreed flat rate would be applicable for the life of the Project. AID would reimburse a mutually agreed percentage of the flat rate for these items.

3). Reimbursement percentage.

It is proposed that AID reimburse 50% of the approved cost estimate/mutually agreed flat rate for FAR items.

4). Procedure.

Upon completion of the major works for a subproject, the DGWRD would prepare and certify a request for AID reimbursement. The request would include (1) the verified construction cost estimate, (2) a pro rata share of the total of approved DGWRD cost estimates for in-country training and FAR equipment and (3) the mutually agreed flat rate per hectare for survey and design times the area of the subproject. AID would eventually reimburse the mutually agreed percentage of these items. However, 20% of the amount to be reimbursed would be retained. Table 9 below illustrates calculation of total AID reimbursement payable for major works construction for a hypothetical 500 hectare-subproject:

TABLE 9

Calculation of AID Reimbursement for Major Works Construction for
a Hypothetical 500-Hectare Project.

1. Verified construction cost estimate.
2. Total of approved DGWRD in-country training cost estimates X 500/110,000.
3. Total of approved DGWRD FAR equipment cost estimates X 500/110,000.
4. Area (ha.) X mutually agreed flat rate per hectare for survey and design.
5. Total eligible for AID reimbursement.
6. x 50% reimbursement.
7. Total AID reimbursement.
8. Less 20% retention.
9. Net AID reimbursement payable.

The Department of Agriculture would prepare and certify a request for AID reimbursement upon completion of tertiary canals and farm service ditches covering 40% of the area of a subproject. This request would treat the various FAR items in the same way as in the hypothetical DGWRD request illustrated above, except that no retention would be deducted and the DGWRD retention for the subproject major works would be added at the end to obtain the net AID reimbursement payable.

All requests for reimbursement would be submitted to AID through the Ministry of Finance with all required documentation attached. Requests for reimbursement would be submitted not more than four times per year nor for less than \$100,000 per request.

USAID Engineering would verify each request for AID reimbursement of completion of the major works of a subproject and USAID Agriculture would verify reimbursement requests for completion of tertiary canals and farm service ditches covering 40% of the area of a subproject. Verification would consist of a signed statement by a direct-hire American USAID employee that construction is complete and the required AID documents are in proper order.

After USAID verification of completion, AID would open an irrevocable Special Letter of Credit (SLC) for the net AID reimbursement payable in favor of the Borrower at a designated U.S. bank. The Borrower would draw down the SLC with imports from the U.S. as evidenced by bills of lading and supplier invoices. Other than source requirements, no other procurement regulations would apply to the SLC.

2. Evaluation plan.

a). Reports.

The GOI would submit a monthly report to AID which would list all Sederhana subprojects planned for eventual AID reimbursement with their status:

1. Survey in process/complete.
2. Planning in process/complete.
3. Design in process/complete.
4. Technical soundness certification prepared/submitted to AID/verified.
5. Construction cost estimate prepared/submitted to AID/verified.
6. Major works construction in process/complete.
7. Operation and maintenance plan for major works prepared.
8. Water user associations formed.
9. Extension in process.
10. Water user association office construction in process/complete.
11. Tertiary canal and farm service ditch construction in process/40% complete.
12. Water management plan prepared.
13. Operation and maintenance plan for tertiary canals and farm service ditches prepared.

This monthly report would also include the status of all requests for AID reimbursement (prepared/certified/transmitted to MOF/transmitted to AID/verified/dispensed).

The Advisory Team would submit monthly and other reports normally required of AID loan-financed engineering services contractors to the DGWRD, AAETE and RIS with copies to AID. The Team would also prepare an annual report for submission 6 weeks before each scheduled annual evaluation of the Project discussing progress and problems and recommending actions to improve implementation.

b). Annual evaluations.

Evaluations would be held once a year in Jakarta in December for the duration of the Project. Such evaluations would include representatives of the DGWRD, AAETE, RIS, the Advisory Team, BUREC and USAID. Key baseline data will be available from computer processing of the answers of the various DGWRD questionnaires. Translations of these questionnaires are included as Annexes B.1.b, B.1.c. and B.1.d. Most of the information required to evaluate the Project will be available through the GOI's computerized program progress control system. Special evaluation studies such as studies of farm level implementation activities and progress in institution building will be conducted as required to properly evaluate whether Project objectives are actually being met.

The data covered by these questionnaires will have to be expanded to include sufficient family income information so as to permit measurement of progress toward project purpose of improving the life of the rural poor.

D. Conditions and Covenants.

1. Conditions precedent to opening commitment documents for engineering services.

a. Opinion of the Indonesian Minister of Justice or other legal counsel satisfactory to AID that the loan agreement has been duly authorized or ratified by and executed on behalf of the Borrower and is a valid and legally binding obligation in accordance with its terms.

b. Names of the persons who will act as representatives of the Borrower together with evidence of their authority and specimen signature of each.

c. A draft contract acceptable to AID between GOI and BUREC or a consultant firm acceptable to AID. The selection of said consultant and terms of the contract shall be in accordance with AID Capital Projects Guidelines for engineering services.

d. Assurance of the establishment of (a) a budgetary allocation for the project for the first fiscal year in which loan funds will be required and (b) an approved payment authorization in the amount required for the first three months of project operations.

2. Conditions precedent to opening other commitment documents.

a. Detailed criteria for selection of subprojects including evaluation or indication of value to be accorded economic and other relevant factors.

b. A proposed flat rate per hectare applicable to the following Fixed Amount Reimbursement (FAR) cost items: (1) survey and design of major works and tertiary canals, (2) formation of water user associations and extension, (3) construction of water user association offices and (4) construction of farm service ditches.

c. A training plan for the Project including on-the-job, in-country and overseas training for (1) the Directorate General Water Resource Development, (2) the Agency for Agriculture Education, Training and Extension, (3) the Rural Irrigation Service, (4) Provincial Public Works offices, (5) Provincial Agriculture Services and (6) individual farmers covering the subjects mentioned on page 50.

3. Borrower covenants.

a. Make available to the executing agency on a timely basis any Indonesian currency necessary for implementation and completion of the project and any foreign exchange or Indonesian currency necessary to complete the project if the loan proceeds are not sufficient.

b. Cause the executing agency to carry out the project with due diligence and efficiency and in conformity with sound engineering, construction, financial, administrative and management practices, and any plans, specifications, schedules and other arrangements, together with all modifications therein.

c. Ensure that land certificates necessary to obtain financing required to implement individual subprojects are provided to farmers in a timely manner.

d. Ensure that the medium-term credit for land clearing, leveling and paddy forming required to implement individual sub-projects is provided to farmers in a timely manner.

e. Ensure that new transmigrant farmers and construction workers required to implement individual subprojects are provided in a timely manner.

f. Ensure that construction of tertiary canals and farm service ditches for individual subprojects not completed during Project implementation is carried out expeditiously.

g. Ensure that the BIMAS production input package is made available to farmers in individual subproject service areas beginning in the second Indonesian fiscal year following the completion of the major works.

h. Ensure that an effective program of operation, maintenance and repair, including necessary funding therefor, is provided for all completed subprojects.

E. Issues.

None.

LOAN AUTHORIZATION

A.I.D. Loan No.: _____

Provided under: Sec. 103: Food and Nutrition

For: Indonesia: Sederhana (Simple) Irrigation
and Land Development Project

Pursuant to the authority vested in the Administrator, Agency for International Development ("A.I.D."), by the Foreign Assistance Act of 1961, as amended, ("Act") and the delegations of authority issued thereunder, I hereby authorize the establishment of a Loan pursuant to Section 103 of said Act to the Government of the Republic of Indonesia ("Borrower") of not to exceed Twenty-three Million Seven Hundred Thousand United States dollars (\$23,700,000) to assist in financing the United States dollar and local currency costs of a small-and medium-scale irrigation project in Indonesia, the Loan to be subject to the following terms and conditions:

1. Terms of Repayment and Interest Rate

Borrower shall repay the Loan to A.I.D. in United States dollars within forty (40) years from the date of the first disbursement under the Loan, including a grace period of not to exceed ten (10) years. Borrower shall pay to A.I.D. in United States dollars interest at the rate of two percent (2%) per annum during the grace period and three percent (3%)

per annum thereafter on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

2. Other Terms and Conditions

a. Except as A.I.D. may otherwise agree in writing:

(1) Goods and services financed under the Loan shall have their source and origin in Indonesia and countries included in A.I.D. Geographic Code 941;

(2) The Borrower shall agree, by condition precedent, covenant, or both, to provide on a timely basis its portion of project financing at levels, under arrangements and on timing acceptable to A.I.D.

b. The Loan shall be subject to such other terms and conditions as A.I.D. may deem advisable.

Administrator

Date